

Overview of TriLynx Systems

NovaStar Flood Warning System Software

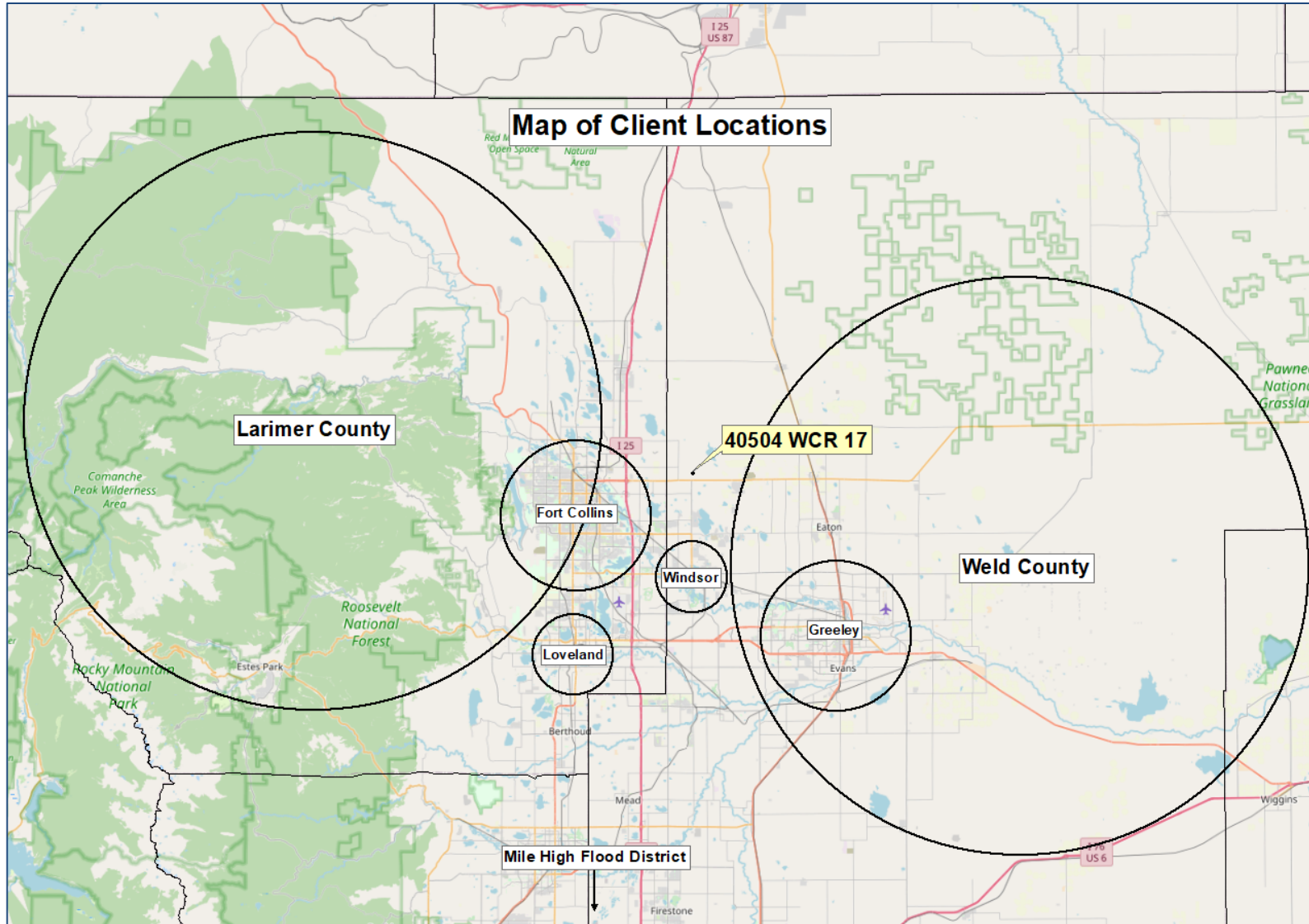
Trinity River COMMON VISION Flood Management Task Force Meeting



Alert for You
TriLynx

February 21, 2025
Steve Malers
TriLynx Systems

TriLynx Systems Office Location



- Severance, Colorado (near Fort Collins).
- Office can hear radio signals from several regional flood warning systems.

Co-located Companies



Alert for You
TriLynx

NovaStar Software, Bridge Monitor, and consulting.



WATER & EARTH
TECHNOLOGIES

Data collection network installation and maintenance.



Sensors for bridge and all-weather precipitation monitoring.



openwater
FOUNDATION

Open source software and open data solutions for water resources.

Typical Flood Warning Station



Flooded Roadway Warning Station



Blanco River



Post Road at Blanco River

5/25/20

Challenges



- Natural environment effects
- Seasons (snow, freezing)
- Wildfires
- Vandalism

NovaStar Administrator Software – For System Administrators

Small number of “power users”



NovaStar5 Administrator Interface (hostname: trilynx-aws-bullseye)

No Active Alarms

System up

Stations

Station List

Station Control

Station Poll

Station Type List

Station List

Clear

Displaying 305 items in Station List

Ant

+ Add

Numid ↑↓	Name ↑↓
2780	Antelope Creek
10041	Brantner Gulch near Syracuse Street
4100	Filter Plant
4570	St. Antons

View

Edit

Plots and Reports

Alert for You
TriLynx

NovaStar5 Administrator Interface (hostname: trilynx-aws-bullseye)

Last data update: 11:51:25 24-05-08

trilynx

No Active Alarms

System up

<

>

Stations

Points

Alarms

Data

Data Edit

View Maps

View Plots

View Reports

View Tables

Forecast

Product Definitions

System

Users

About NovaStar5

Contact TriLynx

View Plots

Select Plot Input

Plot: AAA-Annual Accumulation Plot

Point list

Clear

Displaying 5 items in Point list

Search keyword

Report_panel	Analysis	PointName	
	near/r3	Horseshoe Park Drop Precipitation-AR	↑↓
	near/r3	Fire Station #7 Precipitation-AR	↑↓
	near/r3	Confluence Pond Precipitation-AR	↑↓
	near/r3	Virginia Court Precipitation-AR	↑↓
	near/r3	Utah Park Precipitation-AR	↑↓

Select Display Time and

Starting time

Ending time

Display interval

Display Options

Display options

Options

Legend

Time interval

Plot Data Display

Storm Rainfall Accumulation

2023-09-21 18:05:37 - 2023-09-27 07:49:50

710 Horseshoe Park Drop Precipitation-AR

440 Fire Station #7 Precipitation-AR

720 Confluence Pond Precipitation-AR

510 Virginia Court Precipitation-AR

430 Utah Park Precipitation-AR

View

Edit

<

>

>|

Reset zoom (pan: shift+drag)

View Plots

Check Database Tool – Expanded for Stations

  No Active Alarms

 System up

- > Stations
- > Points
- > Alarms
- > Data
- > Forecast
- > Product Definitions
- ▼ System
 - Check Database
 - Configuration List
 - Data Export List
 - Data Flag List
 - Data Import List
 - Nova Score List
 - Scheduler List

Database Problems

- ☒ All stations
- ☐ Station A2 2 Way Test

Problem summary: 113 stations have problems.

> A2 2 Way Test - 360

▼ Antelope Creek - 291

#	Resource	Problem	Recommendation
1	Antelope Creek	Station "Antelope Creek" - 2 points have problems.	See the detailed messages for points.
2	Antelope Creek GPS Lock	Point "Antelope Creek GPS Lock" - Missing data units (check scaled value time series point type units).	Fix point data so that time series request is OK.
3		PointType "Latency" - Point type does not define SHEF parameter code.	Define the SHEF parameter code for the point type (see the 'dataTypes' web service).
4	Antelope Creek Latency	Point "Antelope Creek Latency" - SHEF parameter code is not set - unable to determine data type from SHEF physical element. SHEF parameter code is not set - unable to determine data interval from SHEF duration. SHEF parameter code is missing. Check point type SHEF parameter code.	Fix point data so that time series request is OK.

For more information, see </novastar/data/api/v1/checkDatabase?stationNumId=2780>

> Aurora Reservoir - 45

Help make sure that the database is properly configured.

NovaStar Operator Software for Situational Awareness

Operator Interface

Station Dashboard

Station Summary

System Dashboard

My Dashboards

Map

Show legend

Quick zoom:

Data Display Layers

Q

Search

None

Precipitation

3-Hour Rainfall

12

1

104

0

1

1

0

Stage

7

1

53

0

0

0

0

Flow

6

0

31

0

0

0

0

Overlay Layers

Basins - HUC 8

Basins - HUC 12

Cameras

Fires (CO), Cur. Year

Fires, Historical

FEMA Floodplain

Rainviewer Radar (loop)

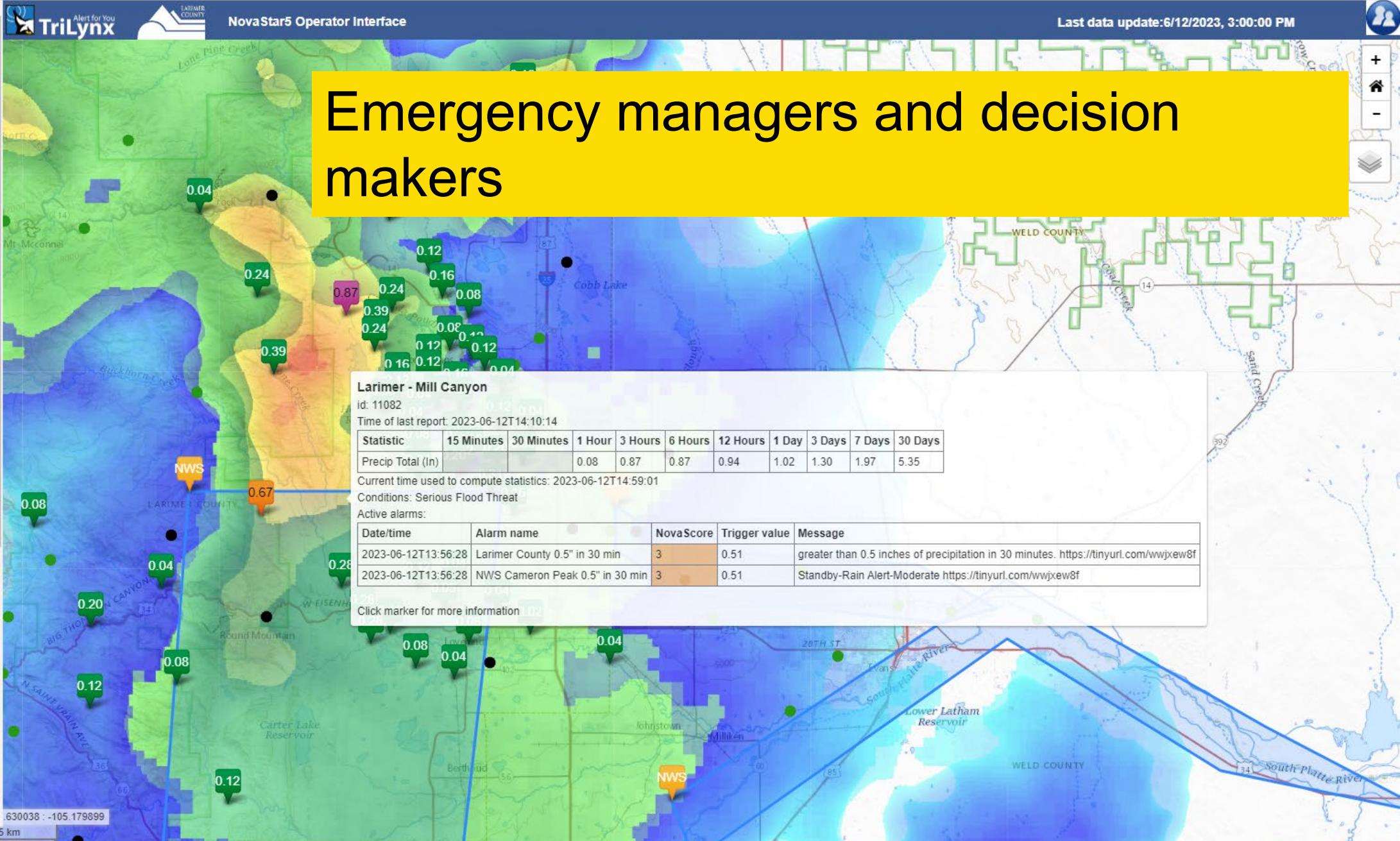
Drizzle (probably)

Drizzle

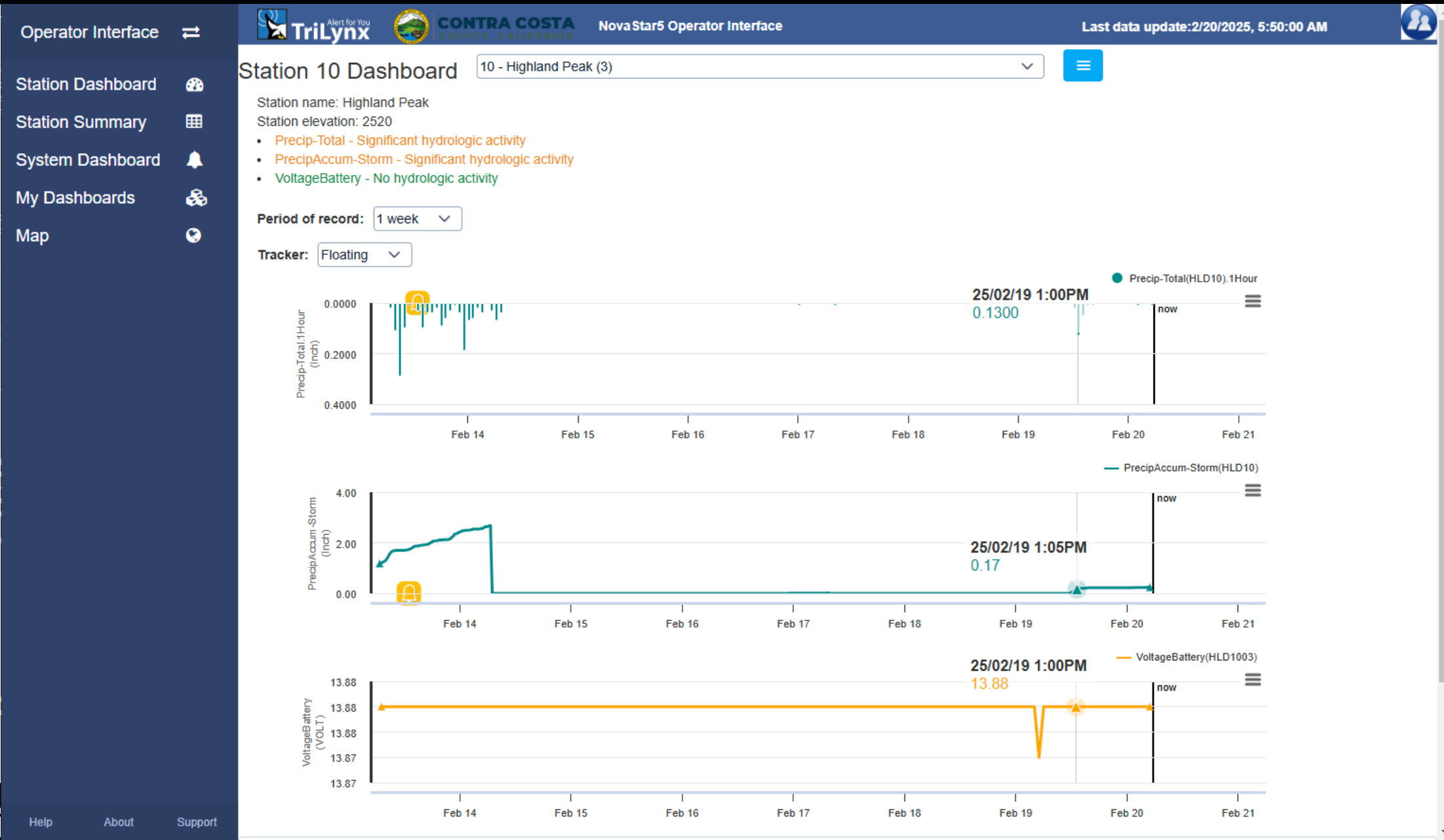
Light Rain

Light Rain

Rain



NovaStar Operator Station Dashboard



Help

About

Support

TriLynx System Dashboard

Contra Costa County (CA-County-ContraCosta)

AWS Database Backups



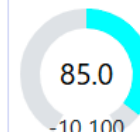
Ok

Stations with Missing Data (0D=2025-02-19)

0	0	0	0	0	0	0	0	HumidityRelative (0)
3	3	3	3	3	3	3	3	PrecipAccum (34)
0	0	0	0	0	0	0	0	TempAir (0)
0	0	0	0	0	0	0	0	UNKNOWN SHEFCODE-YIRRZZ (0)
4	4	4	4	4	4	4	4	VoltageBattery (48)
2	2	2	2	2	2	2	2	WaterLevelPool (7)
11	11	11	11	11	11	11	11	WaterLevelRiver (26)
0	0	0	0	0	0	0	0	WindDir (0)
0	0	0	0	0	0	0	0	WindGust (0)
3	3	3	3	3	3	3	3	WindSpeed (6)
-7D	-6D	-5D	-4D	-3D	-2D	-1D	0D	

[?](#) [1](#)

Support Balance



[?](#) [1](#)

Operations

[System Performance](#)

[NovaStar Operator \(running on cloud server\)](#)

[NovaStar Data Web Services User Interface](#)

[Contra Costa Rain Map](#)

System Resources

[System Information](#)

[NovaStar Administrator \(primary - requires VPN\)](#)

[NovaStar Administrator \(cloud node\)](#)

[Zabbix - System Monitoring Dashboard](#)

[NovaStar Operating System Update Checklist](#)

Contacts

Mark Boucher (Contra Costa County)

TriLynx Support (TriLynx Systems)

Steve Malers (TriLynx Systems)

Billing & Contracts

[TriLynx Billing Details](#)

[NovaStar Service Level Agreement Contra Costa County Additions](#)

[TriLynx NovaStar General Service Level Agreement](#)

Other Resources

[Source Addresses Management System \(SAMS\)](#)

[Standard Hydrometeorological Exchange Format \(SHEF\) Code Manual](#)

Software Resources

[NovaStar Software License](#)

[TSTool \(Time Series Tool\)](#)

Backups

[NovaStar database backups](#)

[NovaStar file backups](#)

Example - Data Details

Check every
sensor
(NovaStar point)
time series for
missing data.

1) 100000000 - Larimer - Tunnel Creek at Hwy 14 Stage TEST
2) 10401 - Weld - Big T at WCR 13 Stage
3) 10402 - Weld - Big Thompson near La Salle BIGLASCO Stage
4) 10403 - Weld - Poudre at Fern Ave CLAGRECO Stage
5) 10404 - Weld - Poudre at WCR13 Stage
6) 10405 - Weld - South Platte near Kersey PLAKERCO Stage
7) 10406 - Weld - St Vrain at Platteville SVCPLACO Stage
8) 10408 - Greeley - Poudre River at 59th Avenue Stage
9) 11004 - Fort Collins - Rustic Stage
10) 11005 - Fort Collins - Lions Park Stage
11) 11009 - Fort Collins - Poudre at Whitewater Park Water Level PT
12) 11018 - Fort Collins - Tait Hill @ Spring Creek Stage
13) 11020 - Fort Collins - CR56 at Boxelder Creek Stage
14) 11021 - Poudre River at Mouth Stage
15) 11023 - Fort Collins - Timberline @ Spring Creek Stage
16) 11082 - Larimer - Mill Canyon Stage
17) 11083 - Larimer - Rist Canyon Stage
18) 11514 - Larimer - Poudre River at Crown Point Drive Stage
19) 11515 - Larimer - Poudre River at Kelly Flats Campground Stage
20) 11516 - Larimer - Poudre River at Narrows Stage
21) 11517 - Larimer - SF Poudre at Pingree Park Road Stage
22) 11518 - Larimer - Bennett Creek at Pingree Park Road Stage
23) 11519 - Larimer - Sevenmile Creek @ Mouth Stage
24) 11523 - Larimer - South Fork Poudre at CSU Campus Stage

**Need to clean up data
gaps:**

- retired stations?
- maintenance?
- winterization?
- new stations?
- something else?

**Annotations can help
explain the information.**

WaterLevelRiver 1Day Data Count

Updated: 2024-05-07 12:42:05 America/Denver

Legend Index



Regular Report Analytics

Battery reports are convenient for monitoring station performance.

Need to clean up data gaps:

- **bad station configuration?**
- **bad database configuration?**
- **TDMA issue?**
- **radio path issue?**
- **something else?**



Data Web Services User Interface



Time Series

GET	/api/v1/data	Get one or more NovaStar data records, which includes raw and scaled values. The results include arrays for data values, whereas the 'dataReports' service returns a flat representation. Must specify pointNumId, pointId, or locId and dataType to limit the query. See also the 'tscatalog' and 'ts' services, which return time series metadata and data. Some formats such as 'datadispatch' are specific formats that are provided for convenience and to duplicate old programs.	▼
GET	/api/v1/dataFlags	Get one or more NovaStar data flags, which are used to indicate data quality for data values.	▼
GET	/api/v1/dataReports	Get one or more NovaStar data reports, which are data records for sensor observations and other data measurements. The results are in a flat representation, whereas the 'data' service returns arrays of data values. Must specify pointNumId, pointId, or locId and dataType to limit the query. See also the 'tscatalog' and 'ts' services, which return time series metadata and data.	▼
GET	/api/v1/dataTypes	Get one or more NovaStar data types, which indicate what is measured at a point.	▼
GET	/api/v1/shefPhysicalElements	Get the NovaStar SHEF parameter code physical elements, which are data types used by the National Weather Service and other agencies.	▼
GET	/api/v1/stationStatistics	Get one or more NovaStar station statistics, which are single values calculated using time series values. Multiple data types, intervals, and statistics can be requested to compute multiple statistics. This service is useful for computing system-wide data statistics, for example to list in a table or show on a map.	▼
GET	/api/v1/stationSummaries	Get one or more NovaStar station summaries. This service is used by the Operator software to provide system-wide data summaries. It also returns lists of supporting and related data, to avoid many subsequent requests during interactive viewing.	▼
GET	/api/v1/statisticTypes	Get statistic types, useful to provide a list of choices in user interfaces.	▼
GET	/api/v1/ts	Get one NovaStar time series for a location, data type, and interval.	▼
GET	/api/v1/tscatalog	Get one or more NovaStar time series catalog, which provide metadata about time series. Each entry joins station, station type, point, point type, point class, data type and other data. Use the 'ts' service to query individual time series.	▼



TSTool NovaStar Web Service Example

1. Select a
NovaStar web
service
datastore and
other query
parameters

2. Get the list of time
series

3. Click to highlight and select 1+ time
series

4. Copy to commands

5. Run
commands

6. Right-click,
and select **Graph**
- **Line**

7. Graph is shown
Draw a box to zoom
Right click to edit graph properties

TSTool - no commands saved

File Edit View Commands Commands(Table) Commands(Plugin) Run Results Tools Help

Input/Query Options

Datstore: Input type

Datstore: nsdataaws-mhfd

Data type: *

Time step: *

Where: Matches

Where: Matches

Where: Matches

Where: Matches

Get Time Series List

Time Series List (14953 time series, 1 selected)

	Location ID	Station Identifier	Station Name	Data Type	Point Name	Interval
1	100	100	Carr Street	DischargeRiver	Carr Street Water Level PT	IrregSecond
2	100	100	Carr Street	DischargeRiver-Max	Carr Street Water Level PT	15Minute
3	100	100	Carr Street	DischargeRiver-Max	Carr Street Water Level PT	1Hour
4	100	100	Carr Street	DischargeRiver-Max	Carr Street Water Level PT	1Day
5	100	100	Carr Street	DischargeRiver-Max	Carr Street Water Level PT	1Year
6	100	100	Carr Street	DischargeRiver-Mean	Carr Street Water Level PT	15Minute
7	100	100	Carr Street	DischargeRiver-Mean	Carr Street Water Level PT	1Hour
8	100	100	Carr Street	DischargeRiver-Mean	Carr Street Water Level PT	1Day

Copy Selected to Commands

Copy All to Commands

Commands (1 commands, 0 selected, 0 with failures, 0 with warnings)

100.NovaStar5.DischargeRiver.IrregSecond-nsdataaws-mhfd

2

3

4

5

6

7

8

9

10

Run Selected Commands

Run All Commands

Results

Ensembles Networks Output Files Problems Properties Tables Time Series Views

1 time series, 1 selected

1) Carr Street Water Level PT - 100.NovaStar5.DischargeRiver.IrregSecond (2021-04-10 19:28:31 to 2022-04-10 18:00:00)

Completed running commands. Use Results and Tools menus.

TSTool - Time Series - Graph

600.00 cfs

500.00

400.00

300.00

200.00

100.00

0.00

21 28 5 12 19 26 2 9 16 23

2021-07 2021-08

— Carr Street Water Level PT, 100.NovaStar5.DischargeRiver.IrregSecond (2021-04-10 10:28:31 to 2022-04-10 09:19:03)

Visible Period (white):

|< << < > >> >|

Zoom Out Tracker: None

Summary Table Print Save Close

Zoom Mode X: 2021-07-31 07:13, Y: 565.71

100% 100% Ready

Thank You

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TriLynx