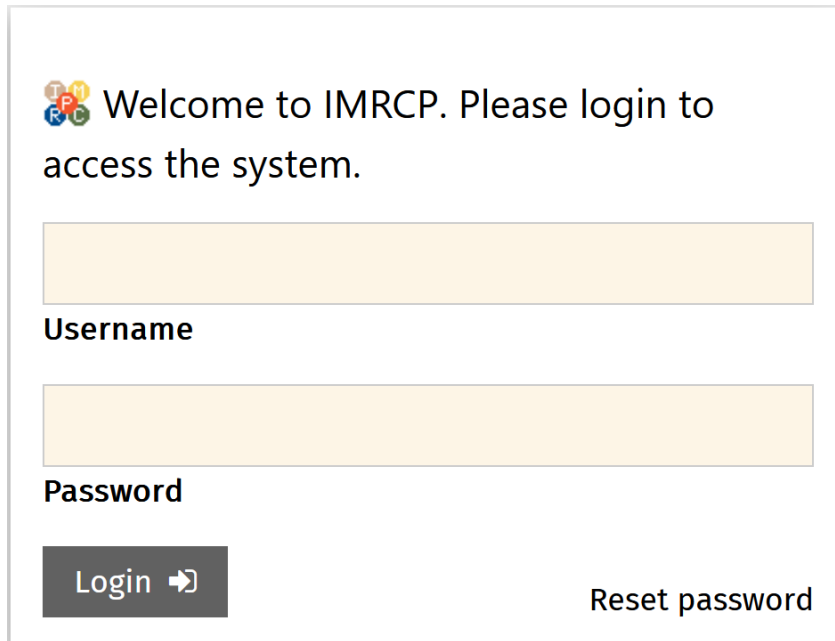


IMRCP USER HELP (VERSION 4)

LOGIN

The IMRCP user interface is accessed at <https://imrcp.data-env.com/>. User accounts are set up by the system administrators. A prospective user provides a contact email address to the administrators, who assign a password for the account. Administrators then send the account name and password back to the prospective user.

As shown in Figure 1, users input their username and password and click “Login” on the IMRCP landing page to access the IMRCP user interface. Users who have previously been provided with passwords but have lost their password can get a new password by clicking the “Reset password” link.

The image shows a login dialog box with a light gray border. At the top left is a logo consisting of four colored squares (blue, yellow, red, green) with letters 'I', 'P', 'F', 'C' inside them. To the right of the logo is the text "Welcome to IMRCP. Please login to access the system." Below this text are two input fields: the first is labeled "Username" and the second is labeled "Password". Both fields are empty and have a light yellow background. Below the "Username" field is a dark gray button with the text "Login" and a right-pointing arrow. To the right of the "Login" button is a link that says "Reset password".

Welcome to IMRCP. Please login to access the system.

Username

Password

Login ➔

Reset password

Figure 1. IMRCP login dialog.

A successful login presents the IMRCP map user interface.

MAP

The IMRCP map is the default view when logging into the system. It provides views of road conditions, weather conditions, and alerts in the immediate past, present, and near future.

The map view is available from the leftmost tab at the top of the IMRCP window. Map controls as shown in figure 2 are described in the following sections.

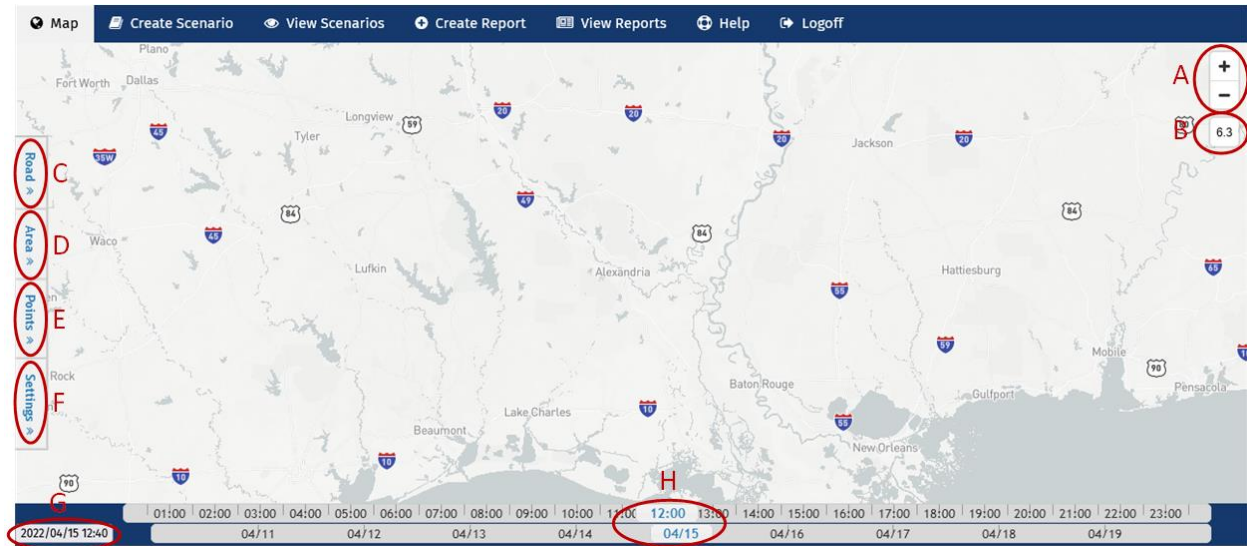





Figure 2. Map User Controls.

Using Map Tools

1. To zoom into and out of the map, use the zoom controls (A in figure 2) in the top right corner of the map or use the mouse's scroll wheel while the cursor is positioned over the map. Some map layers (for example, roads) may appear only when zoomed in to sufficient detail. The zoom level indicator (B) provides a reference.
2. To move the map, left-click on the map and drag the cursor.

Viewing Road Condition Data

3. As shown in figure 3, users select a road data layer from the "Road" tab and panel (C in figure 2) on the left side of the page. Left-click the tab to open the panel. Select the type of data to be displayed by left-clicking the checkbox to the left of the layer label. Users can select multiple layers to be displayed, with the last layer selected on top. Left-clicking the  icon to the right of a layer label opens the map legend for that layer. Left-click the  icon on the legend or the  icon to the right of the layer label to close the legend panel. Left-click the "Road" tab to close list of layers. The layer definitions can be found in appendix B.

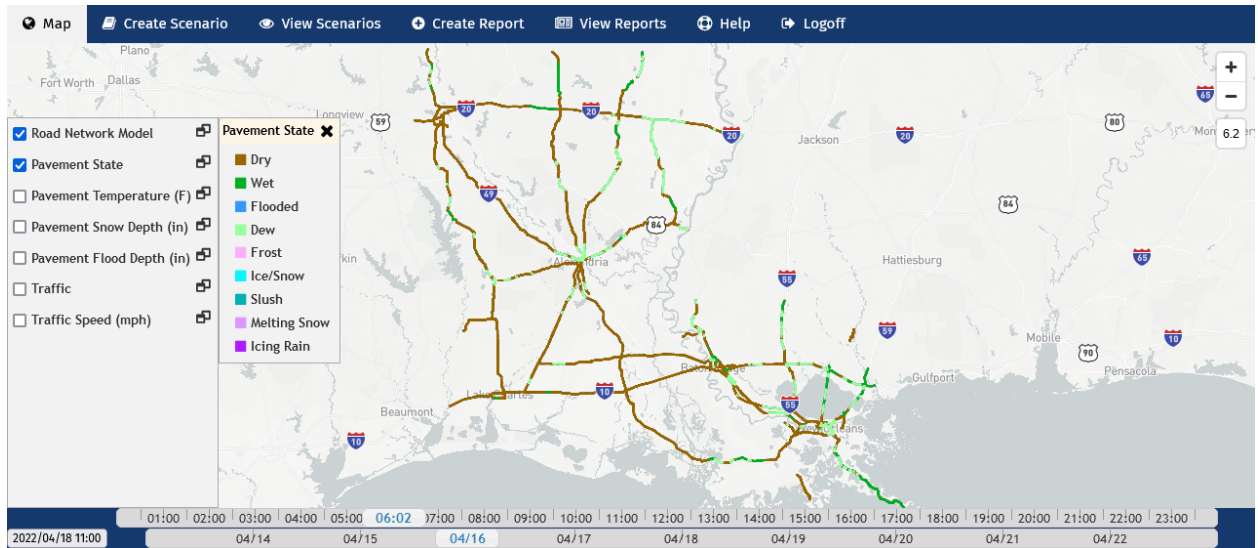



Figure 3. Viewing road condition data.

4. Left-click on a road segment on the map to view detailed data (figure 4) for that road segment at the date and time indicated on the time controls (H in Figure 2). Left-click the  icon to close the details dialog.

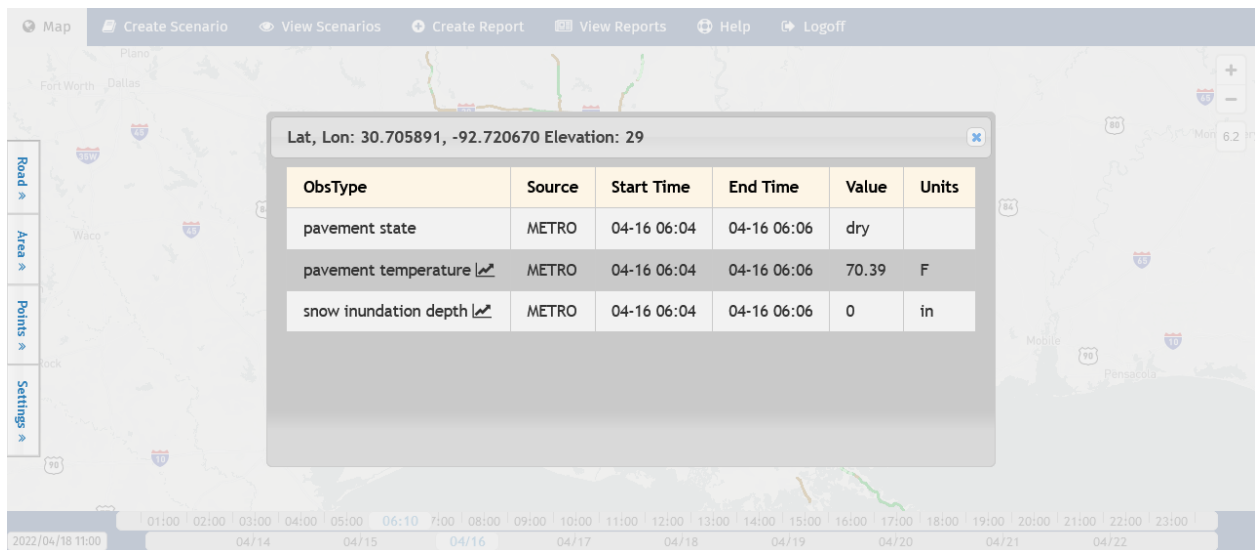





Figure 4. Viewing road condition data details.

Viewing Area and Weather Condition Data

5. Users select an area data layer from the “Area” tab and panel (D on figure 2) on the left side of the page. Left-click the tab to open the panel. Select the type of data to be displayed by left-clicking the checkbox to the left of the layer label (figure 5). Users can select multiple layers to be displayed, with the last layer selected on top. Left-clicking the  icon to the right of a layer label opens the map legend for that layer. Left-click the  icon on

the legend or the  icon to the right of the layer label to close the legend panel. Left-click the “Area” tab to close list of layers. The layer definitions can be found in appendix B.

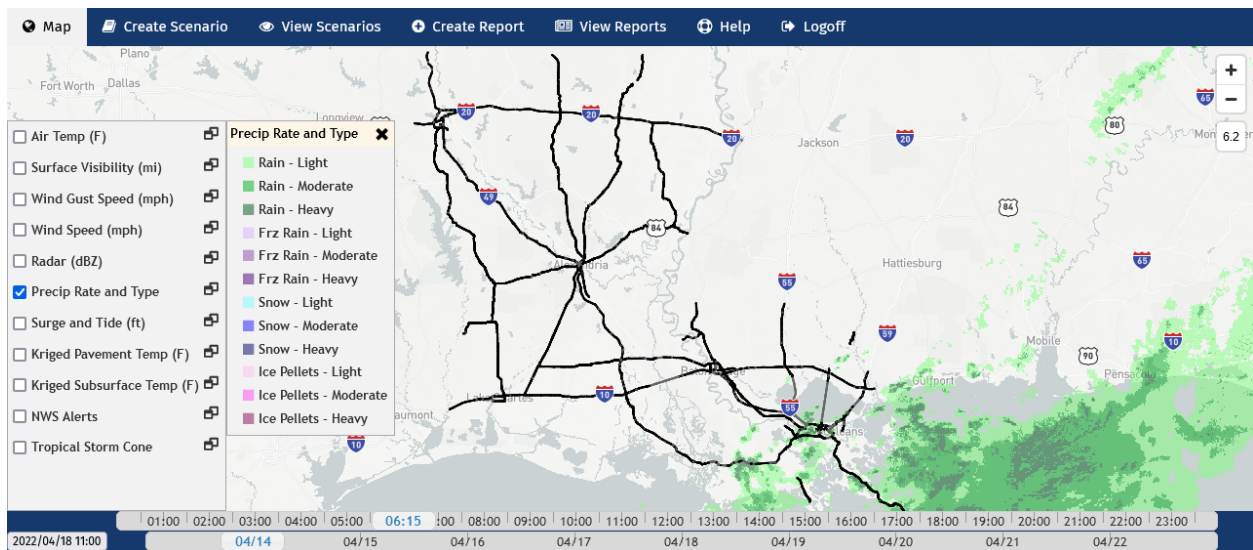






Figure 5. Viewing area and weather condition data.

- Left-click on a location with data for the selected layer on the map to view detailed data for that location at the date and time indicated on the time controls (H on figure 2). Left-click the  icon to close the details dialog.

Viewing Alerts and Field Sensor (Points) Data

- Users select a points data layer from the “Points” tab and panel (E on figure 2) on the left side of the page. Left-click the tab to open the panel. Select the type of data to be displayed by left-clicking the checkbox to the left of the layer label (figure 6). Users can select multiple layers to be displayed, with the last layer selected on top. Left-clicking the  icon to the right of a layer label opens the map legend for that layer. Left-click the  icon on the legend or the  icon to the right of the layer label to close the legend panel. Left-click the “Points” tab to close list of layers. The layer definitions can be found in appendix B.

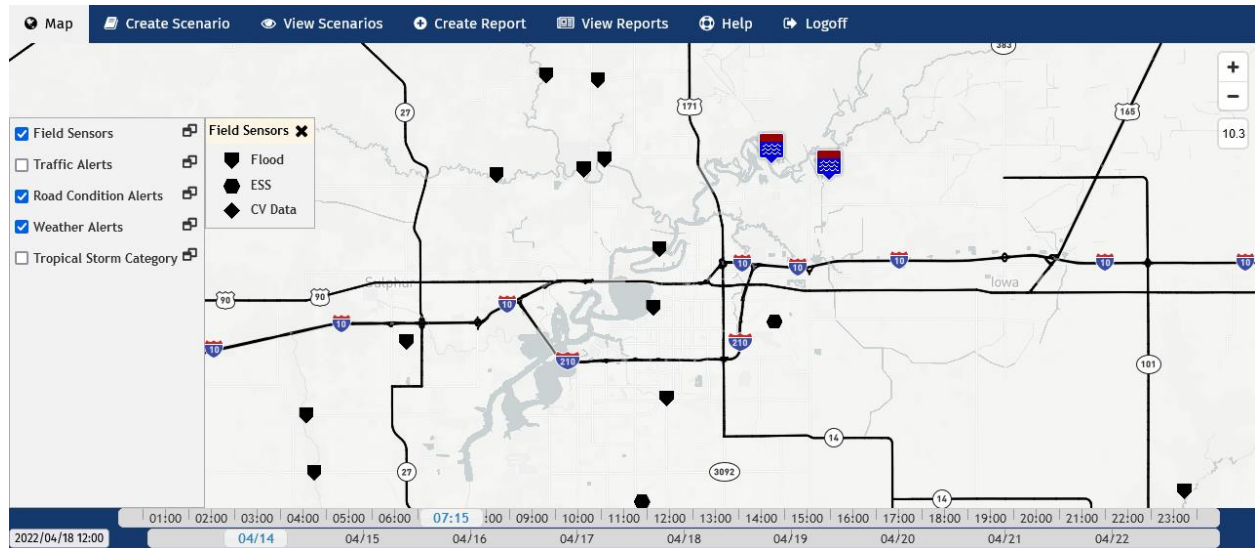



Figure 6. Viewing alerts and field sensor data.

2. Left-click on a point layer icon on the map to view detailed data for that location at the date and time indicated on the time controls (H on figure 2). Left-click the  icon to close the details dialog. Alert definitions can be found in appendix C.

Using the Time Selector

1. To view the map data layers for the immediate past, current, or future time frames, select a date and time on the time controls at the bottom of the map (H on figure 2).
2. The reference time frame can be set further into the past by left-clicking on the reference date-time display indicator (G in figure 2). A small calendar dialog will pop up over the map (figure 7). Select a date on the calendar using the year and month pulldown arrows or the left and right arrows at the top of the dialog to change the month and the calendar to select the day. Select the reference time on that day from the list on the right of the dialog. The dialog disappears when a time is selected. The date and time in the box and on the slider are changed to the new reference time for the view. Moving the time control sliders to the left will display data for that time. Moving the sliders to the right of the reference date and time will display forecasts as seen from that reference time.
3. To go back to the current time, click on the date display (G on figure 2) and then double-click on “NOW” in the pop-up dialog.

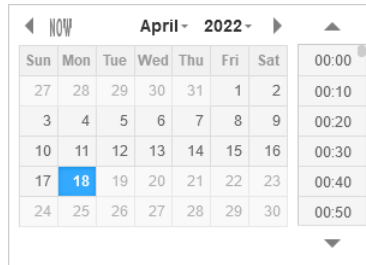


Figure 7. Reference time selection control.

Changing Settings for the Map View

Users can change and save map view settings as account defaults using the “Settings” tab and panel (F on figure 2) on the left side of the page.

1. Set the map zoom level, location, and time frame.
2. Click on the “Settings” tab. Map Behaviors can refresh the map view once a minute by checking “Auto refresh.”
3. The current settings can be saved as defaults and will become active when the “Settings” tab is clicked to close the panel.

CREATING A SCENARIO

Scenario modeling enables IMRCP users to postulate and evaluate the impact of operations and maintenance strategies on road conditions during challenging environmental and incident conditions. Users create models of operations and maintenance interactions with specific road segments that are saved for execution and evaluation under at particular times and varying conditions.

1. Select the “Create Scenario” tab at the top of the page. A map and dialogs for defining scenarios appears as shown in figure 8. The “Create and Edit Groups” dialog provides descriptions of the controls in the “Scenario Settings” dialog on the right.

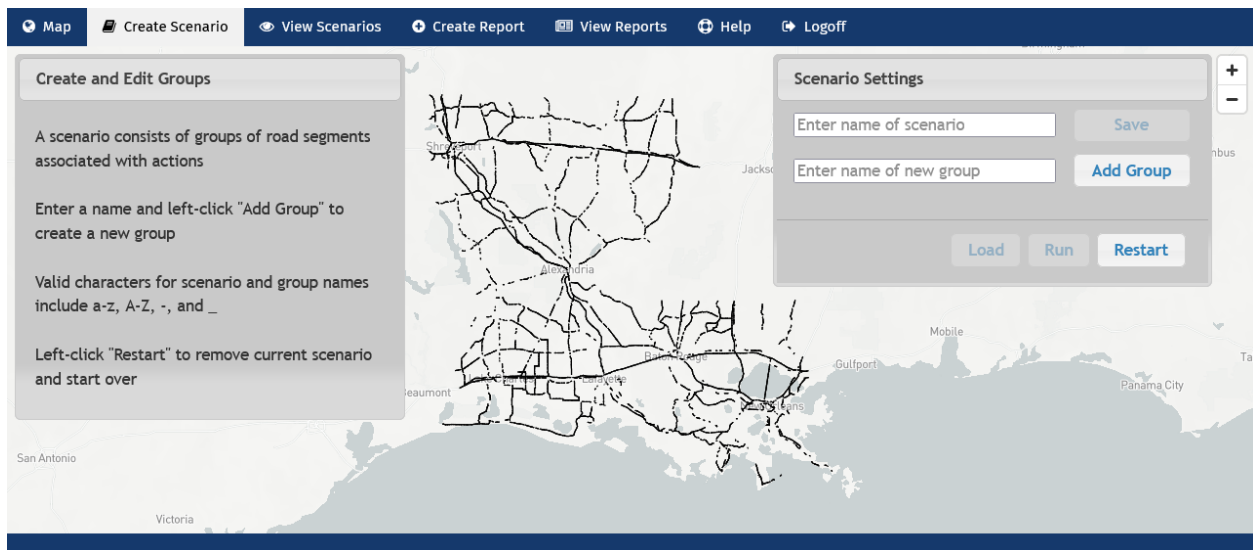



Figure 8. Dialogs for creating a scenario.

2. Enter a scenario name in the “Scenario Settings” dialog.
3. Enter a name for a new group of segments on which the scenario will take place and left-click "Add Group" to create a new group. The scenario and group names cannot contain spaces.
4. Use the map controls to zoom into an area for which the scenario is being created. Left-click the  icon to add segments to the group. The “Scenario Settings” dialog appears as shown in the figure 9 example. A group of segments will share the same set of actions in the scenario. Some segment groups may be selected for evaluation of conditions upstream or downstream of a set of actions, even though there are no actions applied to those segments.

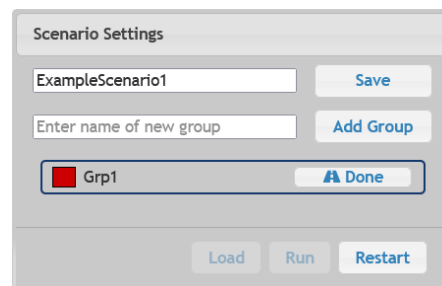



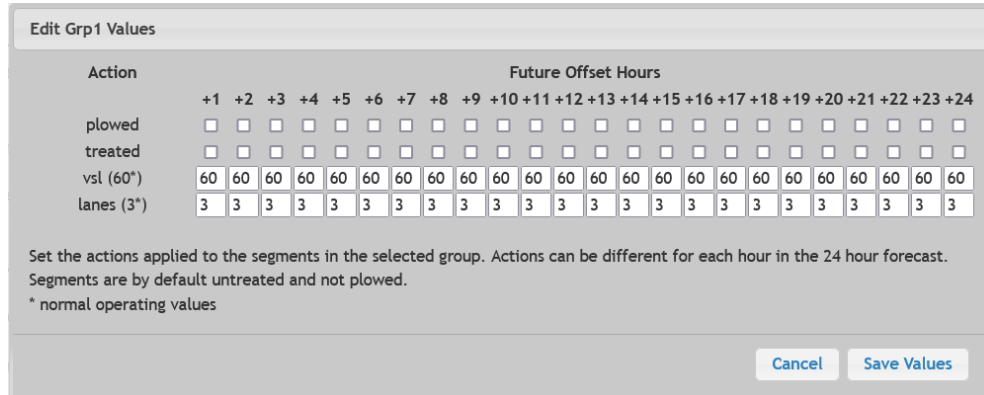


Figure 9. Scenario settings dialog.

5. Left-click to select the first segment for the first group. It may be necessary to zoom further in to distinguish segments that closely parallel each other on the map. The segment is highlighted as a thicker line than non-selected segments and in the group color. A green plus sign will be displayed when the mouse is hovered over a segment that can be selected. A red minus sign will be displayed when the mouse is hovered over a selected segment.
6. Left click to add/remove segments to/from the selection set. All segments in a group must share the same number of lanes and speed limit. The cursor will change to a “null” icon if a segment with different properties is attempted for inclusion in a group. There is no hard

limit on the number of segments that can be selected, but more segments will increase the time needed to process the report.

7. Left-click the  button to save the set of segments. The segments selected for the group will be highlighted in the color shown in the corresponding row in the Scenario Settings dialog. The count of segments selected will appear next to the  segment icon.
8. Left-click the  icon to associate actions with the group. A group of segments will share the same set of actions in the scenario. An “Edit [group name] Values” dialog pops up (figure 10).




Action	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10	+11	+12	+13	+14	+15	+16	+17	+18	+19	+20	+21	+22	+23	+24
plowed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
treated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
vsl (60")	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
lanes (3*)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

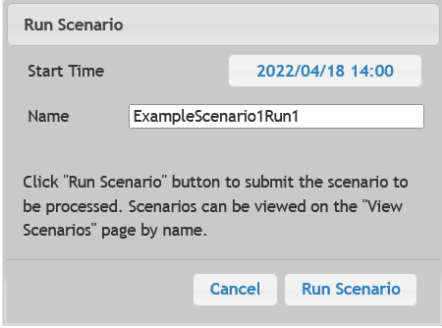
Set the actions applied to the segments in the selected group. Actions can be different for each hour in the 24 hour forecast.
 Segments are by default untreated and not plowed.
 * normal operating values

Cancel Save Values

Figure 10. Scenario actions dialog.

9. Set the actions applied to the segments in the selected group. Actions can be different for each hour in the 24-hour forecast. Segments are by default not plowed and not treated. Variable speed limits (“vsl”) model speed limit reductions that might be used to reduce the impacts of inclement weather or traffic congestion. Reducing the number of lanes can be used to simulate work zone or incident closure. Increasing the number of lanes models strategies like hard shoulder running or contraflow lanes. Normal operating values for are specific to the segments to which the actions are being applied. A value of “-1 for the vsl or lanes indicates that the normal operation value is unknown.
10. Left-click “Save Values” to save the action plan for the selected group. Left-clicking “Cancel” clears any changes. In either case, the dialog closes and the interface returns to the “Scenario Settings” dialog.
11. Add other groups as described in Steps 3 through 9 to complete the settings for the scenario. Left-click the “Save” button on the “Scenario Settings” dialog to save the segment groups and actions. A “Save Succeeded” dialog will appear. Left-click the  icon to close the dialog. The “Scenario Settings” dialog reappears with “Load” and “Run” buttons enabled for selection.
12. If additional changes need to be made to a saved scenario model, click “Load” to return to the “Scenario Settings” with the saved groups and actions.
13. Left-click “Run” to submit a scenario for analysis. A “Run Scenario” dialog will appear as shown in figure 11. Left-click in the “Start Time” box to select a date and time at which the scenario forecast should start. Left-click in the “Name” box to provide a label for the

scenario forecast results report. As instructed in the dialog, left-click the “Run Scenario” button to submit the scenario to be processed. Scenario results are listed and accessed on the “View Scenarios” tab at the top of the IMRCP page.



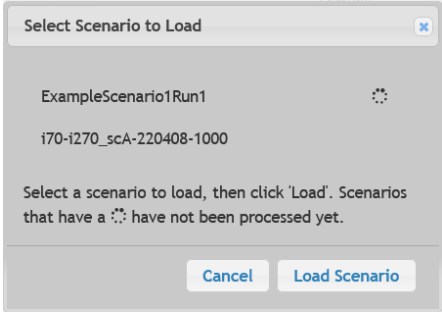
The "Run Scenario" dialog box has a title bar "Run Scenario". It contains a "Start Time" field with the value "2022/04/18 14:00" and a "Name" field with the value "ExampleScenario1Run1". Below these fields is a text instruction: "Click 'Run Scenario' button to submit the scenario to be processed. Scenarios can be viewed on the 'View Scenarios' page by name." At the bottom are two buttons: "Cancel" and "Run Scenario".

Figure 11. Run Scenario dialog.

VIEWING SCENARIO RESULTS

Scenario modeling enables IMRCP users to postulate and evaluate the impact of operations and maintenance strategies on road conditions during challenging environmental and incident conditions. Users create models of operations and maintenance interactions with specific road segments that are saved for execution and evaluation under at particular times and varying conditions. Those scenario models are run to create result that are then viewed in IMRCP.

1. Select the “View Scenario” tab at the top of the IMRCP page. A “Select Scenario to Load” dialog appears as shown in figure 12. All scenarios that have been queued to run or completed for the logged-in user will appear in the list.



The "Select Scenario to Load" dialog box has a title bar "Select Scenario to Load". It displays a list of scenarios. The first entry is "ExampleScenario1Run1" with a rotating gear icon to its right. Below it is the identifier "i70-i270_scA-220408-1000". A text instruction reads: "Select a scenario to load, then click 'Load'. Scenarios that have a [gear icon] have not been processed yet." At the bottom are two buttons: "Cancel" and "Load Scenario".

Figure 12. Scenario selection dialog.

2. Find the scenario run name in which you are interested. If the scenario was just recently submitted to run, it may still be in process as indicated by a rotating gear icon to the right of the scenario name. If so, come back to this page later. Scenarios that are complete and available for viewing have no gear icon to the right of the scenario name. When the run is complete, left click on the scenario run name to highlight that case. Left-click Load Scenario. The IMRCP window will show a map with the focus on the segment selections associated with the scenario that was run (figure 13). The specific time interval within the scenario time frame is selectable with the scale under the map.

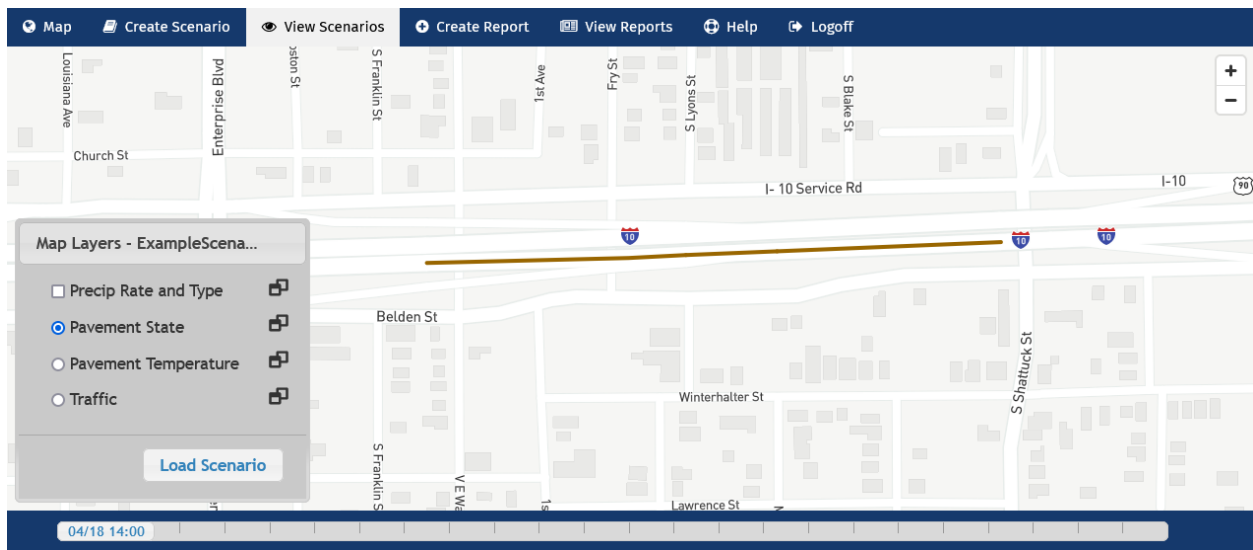
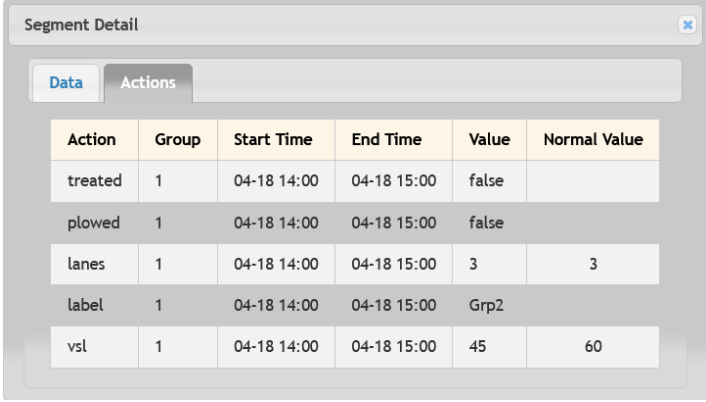


Figure 13. Scenario map view.

3. Users can select the layers available on the scenario results map in the dialog on the left. The precipitation rate and type can be displayed with any of the other roadway layers, only one of which can be displayed at a time.
4. Left-clicking on a segment brings up a dialog with the detailed results for that segment on a “Data” tab (figure 14). Left-clicking on the “Actions” tab displays the actions applied to the segment at the time being viewed on the scenario results map (figure 15). The rows in the table describe the actions for the selected segment at the time shown on the slide when the segment was selected for viewing.

Segment Detail				
<div> <div>Data</div> <div>Actions</div> </div>				
ObsType	Source	Start Time	End Time	Value
STPVT	METRO	04-18 14:00	04-18 15:00	Dry
TPVT	METRO	04-18 14:00	04-18 15:00	96.7
TRFLNK	MLP	04-18 14:00	04-18 15:00	-1.0

Figure 14. Data detail for segments in scenarios.



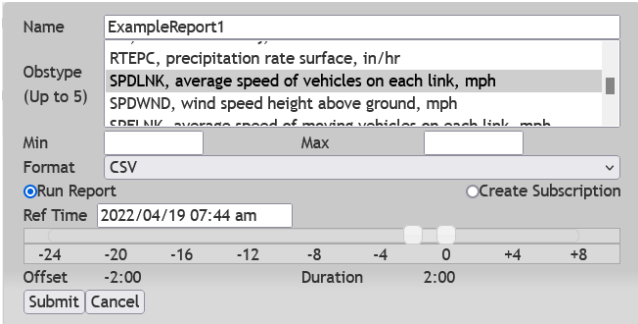
Action	Group	Start Time	End Time	Value	Normal Value
treated	1	04-18 14:00	04-18 15:00	false	
plowed	1	04-18 14:00	04-18 15:00	false	
lanes	1	04-18 14:00	04-18 15:00	3	3
label	1	04-18 14:00	04-18 15:00	Grp2	
vsl	1	04-18 14:00	04-18 15:00	45	60

Figure 15. Action detail for segments in scenarios.

CREATING A REPORT OR SUBSCRIPTION

Reports provide extracts of road and weather conditions collected or forecast by the IMRCP system at locations within the road network for specific time periods.

1. Select the “Create Report” at the top of the IMRCP interface. The system will display a map of the road network with an instruction dialog.
2. Use the map controls to locate a set of segments for which the report is to be run. It may be necessary to zoom further in to distinguish segments that closely parallel each other on the map. A green plus sign will be displayed when the mouse is hovered over a selectable segment. Left-click to select a segment for a report.
3. Left click to add/remove segments to/from the selection set. A red minus sign will be displayed when the mouse is hovered over a selected segment. Clicking on a selected segment removes it from the selection set. There is no hard limit on the number of segments that can be selected, but more segments will increase the time needed to process the report.
4. Press the enter key to finish the selection of segments for the report. A pop-up dialog for entering detailed report parameters will appear (figure 16).



Name: ExampleReport1

Obstype (Up to 5): RTEPC, precipitation rate surface, in/hr
SPDLNK, average speed of vehicles on each link, mph
SPDWND, wind speed height above ground, mph
CPDLNK, average speed of moving vehicles on each link, mph

Min: Max:

Format: CSV

☒ Run Report ☐ Create Subscription

Ref Time: 2022/04/19 07:44 am

Offset: -2:00 Duration: 2:00

Submit Cancel

Figure 16. Report settings dialog.

5. Type a name in the name field.

6. Select the observation types (obstype) to be listed in the report/subscription. Observation type definitions and units are found in appendix A. Hold down the control key to select multiple individual types, or use the shift key to select a range of types.
7. If only selecting one observation type, optionally type a minimum and/or maximum value for that observation type in the “Min” and “Max” fields. Values less than the minimum or greater than the maximum constraints will be filtered from the report.
8. Select the format for the report/subscription from the dropdown menu. Comma-separated value (CSV) is the only option currently supported in IMRCP.

To run a report:

9. Select the “Run Report” radio button on the Report/Subscription wizard.
10. Select a reference date and time by clicking on the “Ref Time” input box.
11. Set the time range for the report relative to the reference time using the left and right slide controls. Note that time to the left of the reference time will yield measured and estimated values at those times; time to the right of the reference will yield values as they were forecast at that time.
12. Select the “Submit” button.

To create a subscription, complete the top part of the dialog and then:

13. Select the “Create Subscription” radio button on the Report/Subscription wizard (figure 17).

The screenshot shows a 'Subscription Settings Dialog' window. At the top, the 'Name' field contains 'ExampleSubscription1'. Below it, the 'Obstype' list is expanded, showing four options: 'RH, relative humidity, %', 'RTEPC, precipitation rate surface, in/hr', 'SPDLNK, average speed of vehicles on each link, mph', and 'SPDWND, wind speed height above ground, mph'. The 'Format' dropdown is set to 'CSV'. There are two radio buttons: 'Run Report' (which is selected) and 'Create Subscription'. Below the radio buttons, the 'Interval' is set to '1 hour' (with '15 min' and '30 min' also visible). A horizontal slider is positioned at 0, with a scale from -4 to +8. At the bottom, the 'Offset' is '0:00' and the 'Duration' is '1:00'. 'Submit' and 'Cancel' buttons are located at the very bottom.

Figure 17. Subscription Settings Dialog.

14. Select an interval radio button.
15. Set the time range for the report relative to the reference time using the left and right slide controls. Note that time to the left of the reference time will yield measured and estimated values at those times; time to the right of the reference will yield values as they were forecast at that time.
16. Select the “Submit” button.

VIEW REPORTS

Reports and subscriptions created are accessed through the “View Reports” tab at the top of the IMRCP page.

1. Select the “View Reports” tab at the top of the IMRCP page. Reports submitted by the user are listed in the left panel and the subscriptions submitted by the user are listed in the center panel (figure18). The creation date and filter criteria for each report and subscription is listed below its name. Each report and subscription is retained for two weeks after it has been downloaded and will then be removed from the system.

The screenshot shows the 'View Reports' tab selected in the top navigation bar. The interface is divided into three main panels:

- Reports:** Contains text explaining that reports are listed with identifying attributes and are available upon completion. It also states that reports can be retrieved multiple times but will be removed after two weeks. Below this text is a report entry: I71NB_RidgeRd_forecast60m_5pm0116.csv, with a download status of 'Downloaded: Apr 19 07:53 UTC', created on 'Apr 12 21:23 UTC', and started on 'Jan 16 22:00 UTC'.
- Subscriptions:** Contains text explaining that subscriptions are listed with attributes and are retained for up to two weeks. It also states that each subscription is listed with its attributes and that when selected, the subscription files are listed in the right panel. Below this text is a subscription entry: I-10_over_Mississippi_R, with a creation date of 'Apr 19 15:48 UTC' and an interval of '60 minutes'.
- Subscription Files:** Contains text explaining that the selected subscription's files are listed below, with the most recent files at the top. Below this text is a file entry: obs_20220419_1600.csv.

Figure 18. Reports and Subscription Listings.

Viewing a Report

2. To view a report, click on the report name on the left panel of the page. The page may need to be refreshed if a report is pending fulfillment as reports may not be generated for several minutes after they have been requested.

Viewing a Subscription

3. To view a subscription, click on the subscription's name in the center panel of the page. The files generated for that subscription will appear in the right panel of the page.
4. Click on the subscription file you would like to open. The subscription files are named based on the time they are generated in a “YYYYMMDD_HHMM” format.

APPENDIX A. OBSERVATION TYPE DEFINITIONS

Table 1. Observation type descriptions.

Name	Description
COVCLD	total cloud cover
DIRWND	wind direction
DPHLIQ	liquid inundation depth
DPHLNK	link depth
DPHSN	snow inundation depth
EVT	event
GSTWND	wind speed gust
KRTPVT	kriged pavement temperature
KTSSRF	kriged subsurface temperature
MPLOW	MAC main plow
PCCAT	precipitation category
PRSUR	surface pressure
RH	relative humidity
RTEPC	precipitation rate
RTLIQM	liquid material rate
RTPREM	prewet material rate
RTSLDM	solid material rate
SPDLNK	average speed of vehicles on each link
SPDWND	wind speed
SSCST	extra tropical storm surge combined surge and tide
STG	flood stage
STPVT	pavement state
TAIR	air temperature
TDEW	dew point
TPLIQM	liquid material type
TPLOW	MAC tow plow
TPPREM	prewet material type
TPSLDM	solid material type
TPVT	pavement temperature
TRFLNK	traffic
TRSCAT	tropical storm category
TRSCNE	tropical storm cone
TRSTRK	tropical storm track
TSSRF	subsurface temperature
TYPPEC	precipitation type
VIS	surface visibility
WPLOW	MAC wing plow

Table 2. Observation types enumeration.

Name	Enumeration	Description
EVT	101	light-winter-precip
	102	moderate-winter-precip
	103	heavy-winter-precip
	104	light-precip
	105	moderate-precip
	106	heavy-precip
	107	low-visibility
	108	flood-stage-action
	109	flood-stage-flood
	201	dew-on-roadway
	202	frost-on-roadway
	203	blowing-snow
	204	icy-roadway
	301	incident
	302	workzone
	303	slow-traffic
	304	very-slow-traffic
	305	flooded-road
	306	lengthy-queue
	307	unusual-congestion
	399	test
	512	accident
	513	serious-accident
	514	injury-accident
	515	minor-accident
	516	multi-vehicle-accident
	517	numerous-accidents
	518	accident-involving-a-bicycle
	519	accident-involving-a-bus
	520	accident-involving-a-motorcycle
	521	accident-involving-a-pedestrian
	522	accident-involving-a-train
	523	accident-involving-a-truck
	524	accident-involving-a-semi-trailer
	525	accident-involving-a-hazardous-materials
	526	earlier-accident
	527	medical-emergency
	528	secondary-accident
	529	rescue-and-recovery-work-removed
	530	accident-investigation-work
	531	incident
	532	stalled-vehicle
	533	abandoned-vehicle
	534	disabled-vehicle

Name	Enumeration	Description
	535	disabled-truck
	536	disabled-semi-trailer
	537	disabled-bus
	538	disabled-train
	539	vehicle-spun-out
	540	vehicle-on-fire
	541	vehicle-in-water
	542	vehicles-slowing-to-look-at-accident
	543	jackknifed-semi-trailer
	544	jackknifed-trailer-home
	545	jackknifed-trailer
	546	spillage-occurring-from-moving-vehicle
	547	acid-spill
	548	chemical-spill
	549	fuel-spill
	550	hazardous-materials-spill
	551	oil-spill
	552	spilled-load
	553	toxic-spill
	554	overturned-vehicle
	555	overturned-truck
	556	overturned-semi-trailer
	557	overturned-bus
	558	derailed-train
	559	stuck-vehicle
	560	truck-stuck-under-bridge
	561	bus-stuck-under-bridge
	562	accident-cleared
	563	incident-cleared
	1000	Extreme Fire Danger
	1001	Fire Warning
	1002	Fire Weather Watch
	1003	Red Flag Warning
	1004	Heat Advisory
	1005	Excessive Heat Warning
	1006	Excessive Heat Watch
	1007	Severe Thunderstorm Warning
	1008	Severe Thunderstorm Watch
	1009	Storm Warning
	1010	Storm Watch
	1011	Tornado Warning
	1012	Tornado Watch
	1013	Severe Weather Statement
	1014	High Wind Warning
	1015	High Wind Watch

Name	Enumeration	Description
	1016	Wind Advisory
	1017	Extreme Wind Warning
	1018	Brisk Wind Advisory
	1019	Blowing Dust Advisory
	1020	Dust Storm Warning
	1021	Dense Fog Advisory
	1022	Dense Smoke Advisory
	1023	Air Quality Alert
	1024	Air Stagnation Advisory
	1025	Ashfall Advisory
	1026	Ashfall Warning
	1027	Earthquake Warning
	1028	Volcano Warning
	1029	Winter Storm Warning
	1030	Winter Storm Watch
	1031	Winter Weather Advisory
	1032	Ice Storm Warning
	1033	Blizzard Warning
	1034	Blizzard Watch
	1035	Avalanche Warning
	1036	Avalanche Watch
	1037	Blowing Snow Advisory
	1038	Snow and Blowing Snow Advisory
	1039	Heavy Snow Warning
	1040	Sleet Advisory
	1041	Sleet Warning
	1042	Snow Advisory
	1043	Freeze Warning
	1044	Freeze Watch
	1045	Freezing Drizzle Advisory
	1046	Freezing Fog Advisory
	1047	Freezing Rain Advisory
	1048	Freezing Spray Advisory
	1049	Frost Advisory
	1050	Hard Freeze Warning
	1051	Hard Freeze Watch
	1052	Wind Chill Advisory
	1053	Wind Chill Warning
	1054	Wind Chill Watch
	1055	Extreme Cold Warning
	1056	Extreme Cold Watch
	1057	Flash Flood Statement
	1058	Flash Flood Warning
	1059	Flash Flood Watch
	1060	Flood Advisory

Name	Enumeration	Description
	1061	Flood Statement
	1062	Flood Warning
	1063	Flood Watch
	1064	Hydrologic Advisory
	1065	Hydrologic Outlook
	1066	Beach Hazards Statement
	1067	Coastal Flood Advisory
	1068	Coastal Flood Statement
	1069	Coastal Flood Warning
	1070	Coastal Flood Watch
	1071	Gale Warning
	1072	Gale Watch
	1073	Hazardous Seas Warning
	1074	Hazardous Seas Watch
	1075	Heavy Freezing Spray Warning
	1076	Heavy Freezing Spray Watch
	1077	High Surf Advisory
	1078	High Surf Warning
	1079	Lake Effect Snow Advisory
	1080	Lake Effect Snow and Blowing Snow Advisory
	1081	Lake Effect Snow Warning
	1082	Lake Effect Snow Watch
	1083	Lakeshore Flood Advisory
	1084	Lakeshore Flood Statement
	1085	Lakeshore Flood Warning
	1086	Lakeshore Flood Watch
	1087	Lake Wind Advisory
	1088	Low Water Advisory
	1089	Marine Weather Statement
	1090	Rip Current Statement
	1091	Small Craft Advisory
	1092	Special Marine Warning
	1093	Tsunami Advisory
	1094	Tsunami Warning
	1095	Tsunami Watch
	1096	Hurricane Force Wind Warning
	1097	Hurricane Force Wind Watch
	1098	Hurricane Statement
	1099	Hurricane Warning
	1100	Hurricane Watch
	1101	Hurricane Wind Warning
	1102	Hurricane Wind Watch
	1103	Tropical Storm Warning
	1104	Tropical Storm Watch
	1105	Tropical Storm Wind Warning

Name	Enumeration	Description
	1106	Tropical Storm Wind Watch
	1107	Typhoon Statement
	1108	Typhoon Warning
	1109	Typhoon Watch
	1110	Hazardous Weather Outlook
	1111	Special Weather Statement
	1112	911 Telephone Outage
	1113	Administrative Message
	1114	Child Abduction Emergency
	1115	Civil Danger Warning
	1116	Civil Emergency Message
	1117	Evacuation Immediate
	1118	Hazardous Materials Warning
	1119	Law Enforcement Warning
	1120	Local Area Emergency
	1121	Nuclear Power Plant Warning
	1122	Radiological Hazard Warning
	1123	Shelter In Place Warning
	1124	Test
	5888	impassable
	5889	almost-impassable
	5890	passable-with-care
	5891	passable
	5892	surface-water-hazard
	5893	danger-of-hydroplaning
	5894	wet-pavement
	5895	treated-pavement
	5896	slippery
	5897	low-ground-clearance
	5898	at-grade-level-crossing
	5899	mud-on-roadway
	5900	leaves-on-roadway
	5901	loose-sand-on-roadway
	5902	loose-gravel
	5903	fuel-on-roadway
	5904	oil-on-roadway
	5905	road-surface-in-poor-condition
	5906	melting-tar
	5907	uneven-lanes
	5908	rough-road
	5909	rough-crossing
	5910	ice
	5911	icy-patches
	5912	black-ice
	5913	ice-pellets-on-roadway

Name	Enumeration	Description
	5914	ice-build-up
	5915	freezing-rain
	5916	wet-and-icy-roads
	5917	melting-snow
	5918	slush
	5919	frozen-slush
	5920	snow-on-roadway
	5921	packed-snow
	5922	packed-snow-patches
	5923	plowed-snow
	5924	wet-snow
	5925	fresh-snow
	5926	powder-snow
	5927	granular-snow
	5928	froazen-snow
	5929	crusted-snow
	5930	deep-snow
	5931	snow-drifts
	5932	drifting-snow
	5933	expected-snow-accumulation
	5934	current-snow-accumulation
	5935	sand
	5936	gravel
	5937	paved
	5938	dry-pavement
	5939	snow-cleared
	5940	pavement-conditions-improved
	5941	skid-hazard-reduced
	5942	pavement-conditions-cleared
MPLOW	0	Plow up
	1	Plow down

Name	Enumeration	Description
PCCAT	0	no-precipitation
	1	light-rain
	2	moderate-rain
	3	heavy-rain
	4	light-freezing-rain
	5	moderate-freezing-rain
	6	heavy-freezing-rain
	7	light-snow
	8	moderate-snow
	9	heavy-snow
	10	light-ice
	11	moderate-ice
	12	heavy-ice
	101	other
	102	unknown
	104	light-unidentified
	105	moderate-unidentified
	106	heavy-unidentified
STG	0	not-defined
	1	no-action
	2	action
	3	flood
	4	moderate
	5	major
STPVT	1	other
	2	error
	3	dry
	4	trace-moisture
	5	wet
	6	chemically-wet
	7	ice-warning
	8	ice-watch
	9	snow-warning
	10	snow-watch
	11	absorption
	12	dew
	13	frost
	14	absorption-at-dewpoint
	20	ice/snow
	21	slush
	22	melting-snow
	23	icing-rain
	30	flooded
TPLOW	0	Plow up
	1	Plow down

Name	Enumeration	Description
TRSCAT	479	Tropical Depression
	642	Hurricane
	809	Major Hurricane
	1057	Tropical Depression
	1072	Tropical Storm
	37345	Subtropical Depression
	37360	Subtropical Storm
TRSCNE	479	Tropical Depression
	642	Hurricane
	809	Major Hurricane
	1057	Tropical Depression
	1072	Tropical Storm
	37345	Subtropical Depression
	37360	Subtropical Storm
TRSTRK	479	Tropical Depression
	642	Hurricane
	809	Major Hurricane
	1057	Tropical Depression
	1072	Tropical Storm
	37345	Subtropical Depression
	37360	Subtropical Storm
TYPPC	0	none
	1	rain
	2	snow
	3	ice-pellets
	4	freezing-rain
	5	other
	6	unknown
WPLOW	0	Plow up
	1	Plow down

Table 3. Observation type source descriptions.

Source	Forecast/ Observation	Spatial Extent	Temporal Extent	Observation Types
ADCIRC	forecasts	2.5 km x 2.5 km grid for CONUS	1 hour forecasts for 120 hours starting 6 hours after collection	SSCST
AHPS	observations and forecasts	Individual stations	Most recent observed values and 24 hour forecast	EVT, STG, STPVT
CAP	observations and forecasts	County and custom polygons	Varies	EVT
Geotab	observations	Individual vehicles	Observations valid for 1 minute	MPLOW, RTLIQM, RTPREM, RTSLDM, SPDLNK, TPLIQM, TPLOW, TPPREM, TPSLDM, TPVT, WPLOW
GFS	forecasts	25 km x 25 km grid for entire world	3 hour forecasts for 168 hours starting 54 hours after collection	DPHSN, GSTWND, PCCAT, PRSUR, RH, RTEPC, SPDWND, TAIR, TDEW, TYPPC, VIS
IMRCP	observations	Area surrounding individual stations	Observations valid for 1 hour	KRTPVT, KTSSRF
IMRCP	forecasts	2.5 km x 2.5 km grid for CONUS	1 hour forecasts for 72 hours starting 1 hour after collection	PCCAT
IMRCP	observations	1 km x 1 km grid for CONUS	Observations valid for 4 minutes	PCCAT
Inrix	observations	Individual segments	Observations valid for 5 minutes	SPDLNK
Lac2c	observations	Individual geo coordinates	Observations valid for 1 minute	EVT, SPDLNK
Ladotd511	observations	Individual geo coordinate points and polylines	Varies	EVT
MEtro	forecasts	Individual segments	2 minute forecasts for 1 hour, then 20 minute forecasts for 11 hours	DPHLIQ, DPHSN, STPVT, TPVT, TSSRF
mlp	forecasts	Individual segments	15 minute forecasts for 2 hours, or 1	SPDLNK, TRFLNK

Source	Forecast/ Observation	Spatial Extent	Temporal Extent	Observation Types
			hour forecasts for 24 hours	
mrms	observations	1 km x 1 km grid for CONUS	Observations valid for 4 minutes	RDR0, RTEPC
ndfd	forecasts	2.5 km x 2.5 km grid for CONUS	1 to 3 hour forecasts for 72 hours starting 1 hour after collection	COVCLD, RTEPC, SPDWND, TAIR, TDEW
nhc	forecasts	Tropical storm cones of probability	6 hour forecasts for 120 hours	TRSCAT, TRSCNE, TRSTRK
ohgo	observations	Individual geo coordinates	Observations valid for 5 minutes	EVT
rap	forecasts	13 km x 13 km grid for CONUS	1 hour forecasts for 21 hours	PCCAT, PRSUR, RTEPC, SPDWND, TYYPC, VIS
rtma	forecasts	2.5 km x 2.5 km grid for CONUS	1 hour forecast	COVCLD, DIRWND, GSTWND, PRSUR, SPDWND, TAIR, TDEW, VIS
wxde	observations	Individual stations	Observations valid for 1 hour	DIRWND, DPHLNK, GSTWND, PCCAT, PRSUR, RH, RTEPC, SPDWND, STPVT, TAIR, TDEW, TPVT, TSSRF, TYPPC, VIS

Table 4. Observation type synthesis algorithms.

Name	Description	Source – Observations	Source – Predictions
dphliq	liquid inundation depth	Model of the Environment and Temperature of Roads (METRo) is run for each link in the road network model to determine liquid inundation depth estimations.	METRo is run for each link in the road network model to determine liquid inundation depth predictions.
dphlnk	link depth	AHPS stage observations at select locations in the road network model are collected when new values are available. These values are used to determine the flood depth on links based on inundation mapping provided by NOAA/NWS.	AHPS stage predictions at three locations in the road network model are collected when new values are available. These values are used to determine the flood depth on links based on inundation mapping provided by NOAA.
dphsn	snow inundation depth	METRo is run for each link in the road network model to determine pavement snow depth estimations. The snow inventory is tracked from previous runs.	METRo is run for each link in the road network model to determine pavement snow depth predictions. The snow inventory is tracked from each run to the next, accounting for new accumulation and melting.
evt	event	Workzone and Incident event details are collected from contributing transportation management centers. National Weather Service (NWS) Common Alerting Protocol (CAP) alert events are collected from NWS. CAP alerts affecting counties use previously stored county definitions to display on the map. CAP alerts affecting areas other than counties use the area definition provided in the CAP alert to display on the map.	Workzone and Incident event details are collected from contributing transportation management centers. NWS CAP alert events are collected from NWS. CAP alerts affecting counties use previously stored county definitions to display on the map. CAP alerts affecting areas other than counties use the area definition provided in the CAP alert to display on the map.

Name	Description	Source – Observations	Source – Predictions
pccat	precipitation category	<p>The precipitation category is determined based on observation TYPPC and RTEPC.</p> <ul style="list-style-type: none"> • Light Freezing Rain: RTEPC $\leq 7.056 \times 10^{-5}$ kg/m²-s and TYPPC = [freezing rain] • Medium Freezing Rain: $7.056 \times 10^{-5} < \text{RTEPC} \leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [freezing rain] • Heavy Freezing Rain: $7.056 \times 10^{-4} < \text{RTEPC}$ kg/m²-s and TYPPC = [freezing rain] • Light Snow: RTEPC $\leq 7.056 \times 10^{-5}$ kg/m²-s and TYPPC = [snow] • Medium Snow: $7.056 \times 10^{-5} < \text{RTEPC} \leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [snow] • Heavy Snow: $7.056 \times 10^{-4} < \text{RTEPC}$ kg/m²-s and TYPPC = [snow] • Light Ice Pellets: RTEPC $\leq 7.056 \times 10^{-5}$ kg/m²-s and TYPPC = [ice pellets,] • Medium Ice Pellets: $7.056 \times 10^{-5} < \text{RTEPC} \leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [ice pellets,] • Heavy Ice Pellets: $7.056 \times 10^{-4} < \text{RTEPC}$ kg/m²-s and TYPPC = [ice pellets] • Light Rain: RTEPC $\leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [rain] 	<p>The precipitation category is determined based on predicted TYPPC and RTEPC.</p> <ul style="list-style-type: none"> • Light Freezing Rain: RTEPC $\leq 7.056 \times 10^{-5}$ kg/m²-s and TYPPC = [freezing rain] • Medium Freezing Rain: $7.056 \times 10^{-5} < \text{RTEPC} \leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [freezing rain] • Heavy Freezing Rain: $7.056 \times 10^{-4} < \text{RTEPC}$ kg/m²-s and TYPPC = [freezing rain] • Light Snow: RTEPC $\leq 7.056 \times 10^{-5}$ kg/m²-s and TYPPC = [snow] • Medium Snow: $7.056 \times 10^{-5} < \text{RTEPC} \leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [snow] • Heavy Snow: $7.056 \times 10^{-4} < \text{RTEPC}$ kg/m²-s and TYPPC = [snow] • Light Ice Pellets: RTEPC $\leq 7.056 \times 10^{-5}$ kg/m²-s and TYPPC = [ice pellets,] • Medium Ice Pellets: $7.056 \times 10^{-5} < \text{RTEPC} \leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [ice pellets,] • Heavy Ice Pellets: $7.056 \times 10^{-4} < \text{RTEPC}$ kg/m²-s and TYPPC = [ice pellets] • Light Rain: RTEPC $\leq 7.056 \times 10^{-4}$ kg/m²-s and TYPPC = [rain]

Name	Description	Source – Observations	Source – Predictions
		<ul style="list-style-type: none"> • Medium Rain: $7.056 \times 10^{-4} < \text{RTEPC} \leq 2.117 \times 10^{-3} \text{ kg/m}^2\text{-s}$ and $\text{TYPPC} = [\text{rain}]$ • Heavy Rain: $2.117 \times 10^{-3} < \text{RTEPC} \text{ kg/m}^2$ and $\text{TYPPC} = [\text{rain}]$ 	<ul style="list-style-type: none"> • Medium Rain: $7.056 \times 10^{-4} < \text{RTEPC} \leq 2.117 \times 10^{-3} \text{ kg/m}^2\text{-s}$ and $\text{TYPPC} = [\text{rain}]$ • Heavy Rain: $2.117 \times 10^{-3} < \text{RTEPC} \text{ kg/m}^2$ and $\text{TYPPC} = [\text{rain}]$
STpvt	pavement state	<p>METRo is run for each link in the road network model to determine pavement state estimations.</p> <ul style="list-style-type: none"> • Dry Road: The water reservoir contains less than 0.01 mm and the ice/snow reservoir contains less than .2 mm of water equivalent. • Wet road: The water reservoir contains more than 0.01 mm of water. • Ice/Snow: The ice/snow reservoir contains more than 0.2 mm of water equivalent. • Water/Snow: Both of the reservoirs (water and ice/snow) contain more than 0.2 mm of water equivalent. • Dew: Condensation on the road when the temperature of the surface of the road is above the freezing point. • Frost: Condensation on the road when the temperature of the surface of the road is below the freezing point or water already present on the road is turning into ice. 	<p>METRo is run for each link in the road network model to determine pavement state predictions.</p> <ul style="list-style-type: none"> • Dry Road: Each reservoir (water and ice/snow) contains less than 0.01 mm of liquid water equivalent. • Wet road: The water reservoir contains more than 0.01 mm of water. • Ice/Snow: The ice/snow reservoir contains more than 0.2 mm of water equivalent. • Water/Snow: Both of the reservoirs (water and ice/snow) contain more than 0.2 mm of water equivalent. • Dew: Condensation on the road when the temperature of the surface of the road is above the freezing point. • Frost: Condensation on the road when the temperature of the surface of the road is below the freezing point or water already present on the road is turning into ice.
trflnk	traffic	The estimated speed value for each link is divided by the speed limit for that link.	The predicted speed value for each link is divided by the speed limit for that link.

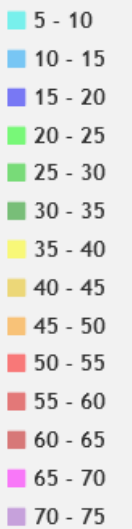

APPENDIX B. MAP LAYER LEGENDS

Table 5. Layer Definitions.

Layer	Observation Type	Legend
Pavement State	STPVT	<div> <div> Pavement State ✕ <ul style="list-style-type: none"> Dry Wet Flooded Dew Frost Ice/Snow Slush Melting Snow Icing Rain </div> <div> <p>The Pavement State layer categories are consistent with the METRo model pavement state categories. A flooded state is projected from local inundation calculations, where available.</p> </div> </div>
Pavement Temperature	TPVT	<div> <div> Pavement Temperature (F) ✕ <ul style="list-style-type: none"> Below 0 0 - 20 20 - 30 30 - 34 34 - 45 45 - 56 56 - 68 68 - 86 86 - 104 Above 104 </div> <div> <p>The Pavement Temperature map layer is divided into levels based on pavement behaviors at temperature intervals. Pavement temperatures between 30°F and 34°F indicate a transition to freezing conditions. Salt treatment may be effective on pavement at temperatures between 20°F and 29°F. Salt loses its effectiveness as an anti-icing agent below 20°F.</p> </div> </div>
Pavement Snow Depth	DPHSN	<div> <div> Pavement Snow Depth (in) ✕ <ul style="list-style-type: none"> 0.01 - 1 1 - 3 Above 3 </div> <div> <p>The Pavement Snow Depth layer is represented in bands for noticeable, actionable, and significant impacts on travel conditions.</p> </div> </div>
Pavement Flood Depth	DPHLNK	<div> <div> Pavement Flood Depth (in) ✕ <ul style="list-style-type: none"> 0 - 12 Above 12 </div> <div> <p>The flood depth calculation is available only at specific locations, and an absence of a flood depth indication is not necessarily evidence of an absence of flooding.</p> </div> </div>

Layer	Observation Type	Legend	
Traffic	TRFLNK	<p>Traffic ✕</p> <ul style="list-style-type: none"> Slow Fast 	The Traffic layer is divided into five categories ranging from standstill traffic to traffic moving at or near the local speed limit.
Traffic Speed	SPDLNK	<p>Traffic Speed (mph) ✕</p> <ul style="list-style-type: none"> 0 - 15 15 - 30 30 - 45 45 - 60 Above 60 	The Traffic Speed layer is divided into five equal bands ranging from 0 to 75 mph.
Air Temperature	TAIR	<p>Air Temp (F) ✕</p> <ul style="list-style-type: none"> Below 0 0 - 20 20 - 30 30 - 34 34 - 45 45 - 56 56 - 68 68 - 86 86 - 104 Above 104 	The Air Temperature layer is divided into layers based on typical temperature behaviors. The narrow band at 32 F highlights the precipitation freezing point.
Surface Visibility	VIS	<p>Surface Visibility (mi) ✕</p> <ul style="list-style-type: none"> Below 0.2 0.2 - 0.6 Above 0.6 	The Surface Visibility layer remains white until the visibility is below 0.6 mi (1 km). Travelers can be significantly affected by visibility below this point.

Layer	Observation Type	Legend	
Wind Speed	SPDWND	<p>Wind Speed (mph) ✖</p> <ul style="list-style-type: none"> Below 5 5 - 15 15 - 25 25 - 39 39 - 57 57 - 74 74 - 85 85 - 96 96 - 111 111 - 130 130 - 144 144 - 157 Above 157 	<p>The Wind Speed bands mark increasing intensity up to and through the tropical storm and hurricane levels.</p>
Wind Gust Speed	GSTWND	<p>Wind Gust Speed (mph) ✖</p> <ul style="list-style-type: none"> Below 5 5 - 15 15 - 25 25 - 39 39 - 57 57 - 74 74 - 85 85 - 96 96 - 111 111 - 130 130 - 144 144 - 157 Above 157 	<p>The Wind Gust Speed bands use the same levels as Wind Speed.</p>

Layer	Observation Type	Legend	
Radar	RDR0	Radar (dBZ) ✕ 	The Radar layer is divided into levels based on those used by the NWS.
Precipitation Rate & Type	PCCAT	Precip Rate and Type ✕ 	The Precipitation Rate & Type layer is divided into categories based on the observation returned by PCCAT. PCCAT categories are described in 0.

Layer	Observation Type	Legend	
Surge and Tide	DPHLIQ	<p>Surge and Tide (ft) ✕</p> <ul style="list-style-type: none"> Below 0.3 0.3 - 0.6 0.6 - 0.9 0.9 - 1.2 1.2 - 1.5 1.5 - 1.8 1.8 - 2.1 2.1 - 2.4 2.4 - 2.7 2.7 - 3.0 3.0 - 3.3 3.3 - 3.6 3.6 - 3.9 Above 3.9 	<p>The surge and tide layer presents the depth of water from storm surge and tide over the coastal landform, provided by the NWS from its SLOSH/ADCIRC model.</p>
Kriged Pavement Temp	KRTPVT	<p>Kriged Pavement Temp (F) ✕</p> <ul style="list-style-type: none"> Below -14.0 14.0 - 15.8 15.8 - 17.6 17.6 - 19.4 19.4 - 21.2 21.2 - 23.0 23.0 - 24.8 24.8 - 26.6 26.6 - 28.4 28.4 - 30.2 30.2 - 32.0 32.0 - 35.6 35.6 - 39.2 39.2 - 42.8 42.8 - 46.4 46.4 - 50.0 50.0 - 53.6 53.6 - 57.2 57.2 - 60.8 60.8 - 64.4 64.4 - 68.0 Above 68.0 	<p>Spatial estimates of pavement temperature are computed by IMRCP from measurements at environmental sensor stations (ESS) using Kriging statistical methods.</p>



Layer	Observation Type	Legend	
Kriged Subsurface Temp	KTSSRF	Kriged Subsurface Temp (F) ✕ <ul style="list-style-type: none"> Below -14.0 14.0 - 15.8 15.8 - 17.6 17.6 - 19.4 19.4 - 21.2 21.2 - 23.0 23.0 - 24.8 24.8 - 26.6 26.6 - 28.4 28.4 - 30.2 30.2 - 32.0 32.0 - 35.6 35.6 - 39.2 39.2 - 42.8 42.8 - 46.4 46.4 - 50.0 50.0 - 53.6 53.6 - 57.2 57.2 - 60.8 60.8 - 64.4 64.4 - 68.0 Above 68.0 	<p>Spatial estimates of subsurface temperature are computed by IMRCP from measurements at environmental sensor stations (ESS) using Kriging statistical methods.</p>
NWS Alerts	EVT	NWS Alerts ✕ <ul style="list-style-type: none"> Fire Heat Storm/Tornado Wind/Fog/Smoke Air Quality Earthquake/Volcano Winter Storm Freeze Cold Flood Lake/Marine/Coastal Tropical Storm Special Weather Other Other 	<p>The NWS Alerts Layer is categorized based on the type of alert issued by the NWS.</p>

Layer	Observation Type	Legend	
Tropical Storm Cone	n/a	<div> <div>Tropical Storm Cone</div> <div> <div>Subtropical Depression</div> <div>Subtropical Storm</div> <div>Tropical Depression</div> <div>Tropical Storm</div> <div>Hurricane</div> <div>Major Hurricane</div> </div> </div>	<div>✕</div> <p>Tropical storm cones are represented from National Hurricane Center (NHC) data to show the potential path and current category of tropical storms.</p>

Source: FHWA, 2019







APPENDIX C. ALERT DEFINITIONS

Table 6. Traffic Alert Definitions

Type	Algorithm	Extent	Reference	Notify	Icon
Incident	EVT=Incident	point	TMC	n/a	
Work Zone	EVT=Workzone	link	TMC	n/a	




Source: FHWA, 2019

Table 7. Weather Alert Definitions.

Type	Algorithm	Extent	Reference	Notify	Icon
Medium Winter Precip	PCCAT= [Medium Freezing Rain, Medium Snow, Medium Ice Pellets]	area	METRo	n/a	
Heavy Winter Precip	PCCAT= [Heavy Freezing Rain, Heavy Snow, Heavy Ice Pellets]	area	METRo	n/a	
Medium Precip	PCCAT= [Medium Rain]	area	METRo	n/a	
Heavy Precip	PCCAT= [Heavy Rain]	area	METRo	n/a	
Flood Stage Action	n/a	point	AHPS	n/a	
Flood Stage Flood	n/a	point	AHPS	n/a	






Source: FHWA, 2019

Table 8. Road Condition Alert Definitions.

Type	Algorithm	Extent	Reference	Notify	Icon
Low Visibility	VIS < 0.2 mi	area	RAP	n/a	
Ice on Bridge	STPVT= [ice]	segment	METRo	n/a	
Flooded Road	DPHLNK > 0 in.	segment	AHPS	n/a	

Source: FHWA, 2019

Table 9. Tropical Storm Categories.

Type	Algorithm	Extent	Reference	Notify	Icon
Subtropical Depression	From NHC	point	NHC	n/a	
Subtropical Storm	From NHC	point	NHC	n/a	
Tropical Depression	From NHC	point	NHC	n/a	
Tropical Storm	From NHC	point	NHC	n/a	
Hurricane	From NHC	point	NHC	n/a	
Major Hurricane	From NHC	point	NHC	n/a	