



Clarus Regional Demonstrations

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Road Weather Stakeholder Meeting
Albuquerque, New Mexico
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Mixon Hill Team

- Subconsultants
 - National Center for Atmospheric Research (NCAR)
 - KMJ Consulting, Inc.
 - Avaya Government Solutions (formally Nortel)
 - Athey Creek Consultants
- Participating Agencies
 - **Iowa DOT**
 - **Illinois DOT**
 - **Indiana DOT**

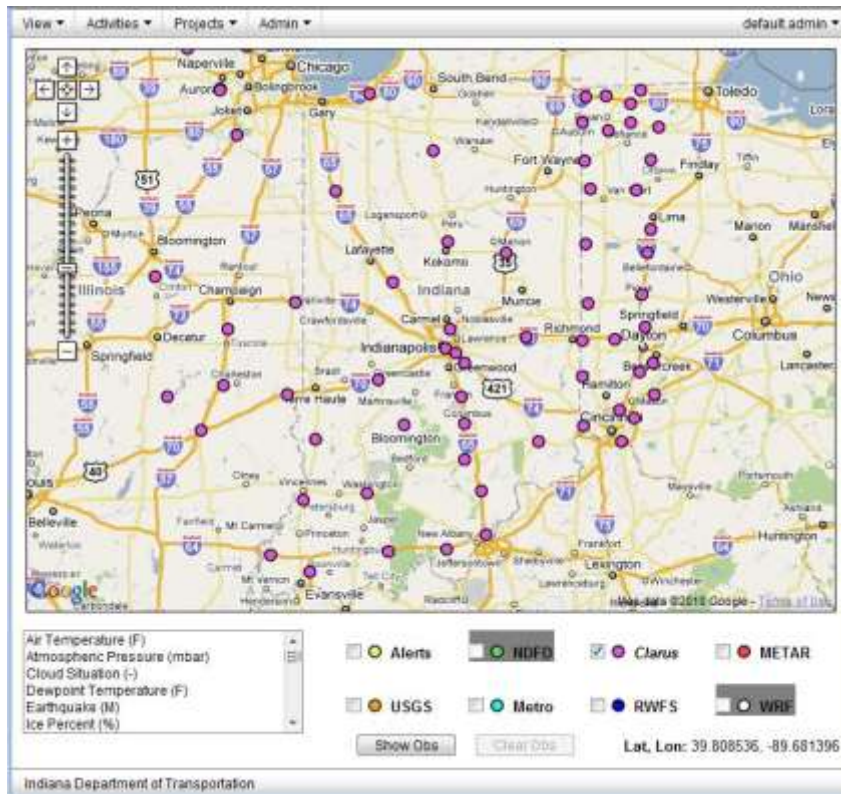


UC #3: Non-winter Maintenance & Operations
Decision Support Tool - Objectives

UC #4: Multi-state Control
Strategy Tool - Objectives

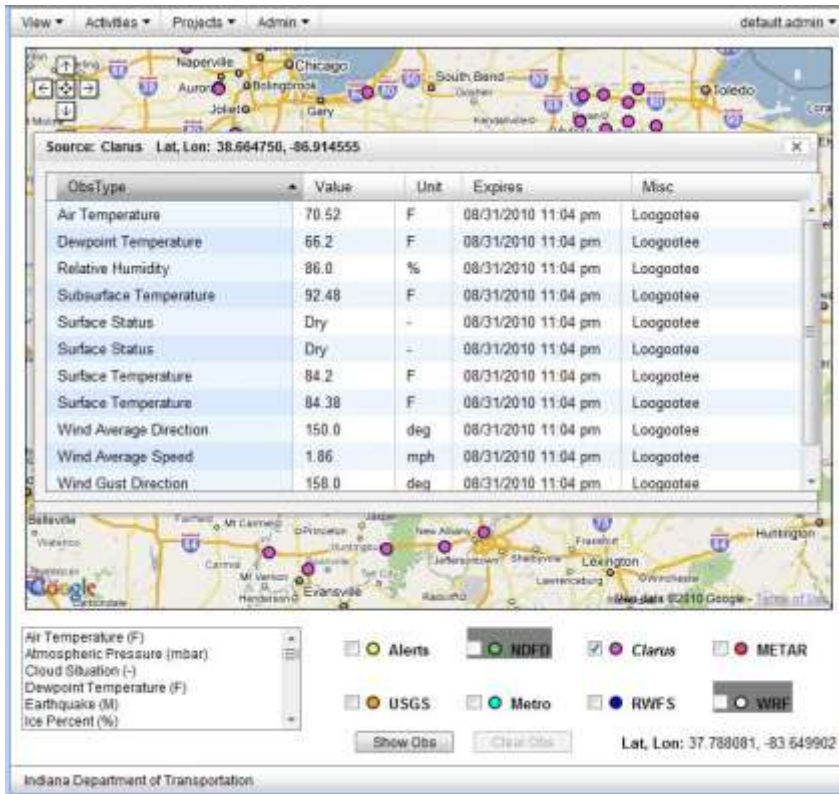
Common Elements

Observation Map



- Data Sources
 - Near Real-time Observations
 - Clarus
 - METAR - NWS
 - Earthquake - USGS
 - Alerts - NWS
 - Gridded Forecasts
 - WRF - NCAR
 - NDFD – NWS
 - Site Specific Forecasts
 - RWFS - NCAR
 - Metro - NCAR

Observation Details



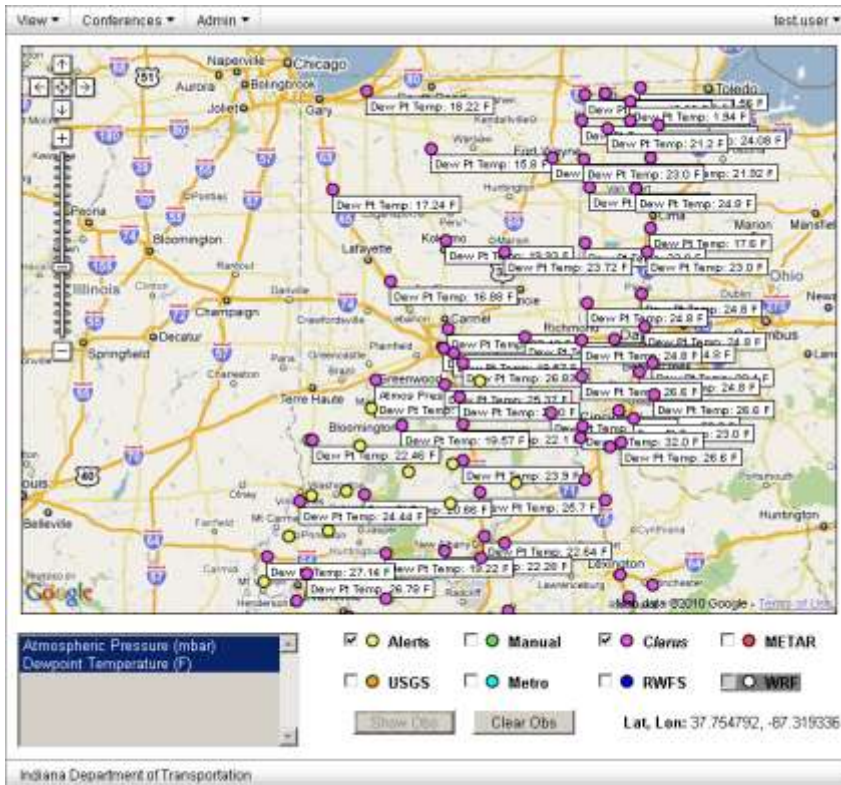
The screenshot shows a web interface with a map and a table of observation data. The table has the following columns: ObsType, Value, Unit, Expires, and Misc. The data rows are as follows:

ObsType	Value	Unit	Expires	Misc
Air Temperature	70.52	F	08/31/2010 11:04 pm	Loogootee
Dewpoint Temperature	66.0	F	08/31/2010 11:04 pm	Loogootee
Relative Humidity	86.0	%	08/31/2010 11:04 pm	Loogootee
Subsurface Temperature	92.48	F	08/31/2010 11:04 pm	Loogootee
Surface Status	Dry	-	08/31/2010 11:04 pm	Loogootee
Surface Status	Dry	-	08/31/2010 11:04 pm	Loogootee
Surface Temperature	84.2	F	08/31/2010 11:04 pm	Loogootee
Surface Temperature	84.38	F	08/31/2010 11:04 pm	Loogootee
Wind Average Direction	150.0	deg	08/31/2010 11:04 pm	Loogootee
Wind Average Speed	1.86	mph	08/31/2010 11:04 pm	Loogootee
Wind Gust Direction	158.0	deg	08/31/2010 11:04 pm	Loogootee

Below the table, there are several checkboxes for data sources: Alerts, NDFD, Clarus, METAR, USGS, Metro, RWFS, and WRF. The 'Clarus' checkbox is checked. At the bottom, there are buttons for 'Show Obs' and 'Clear Obs', and the coordinates 'Lat, Lon: 37.788081, -83.649902'.

- Click on a station or forecast point
 - Observation Type
 - Value
 - Unit
 - Expires
 - The time that the system will no longer use the observation during processing
 - Miscellaneous
 - The station description

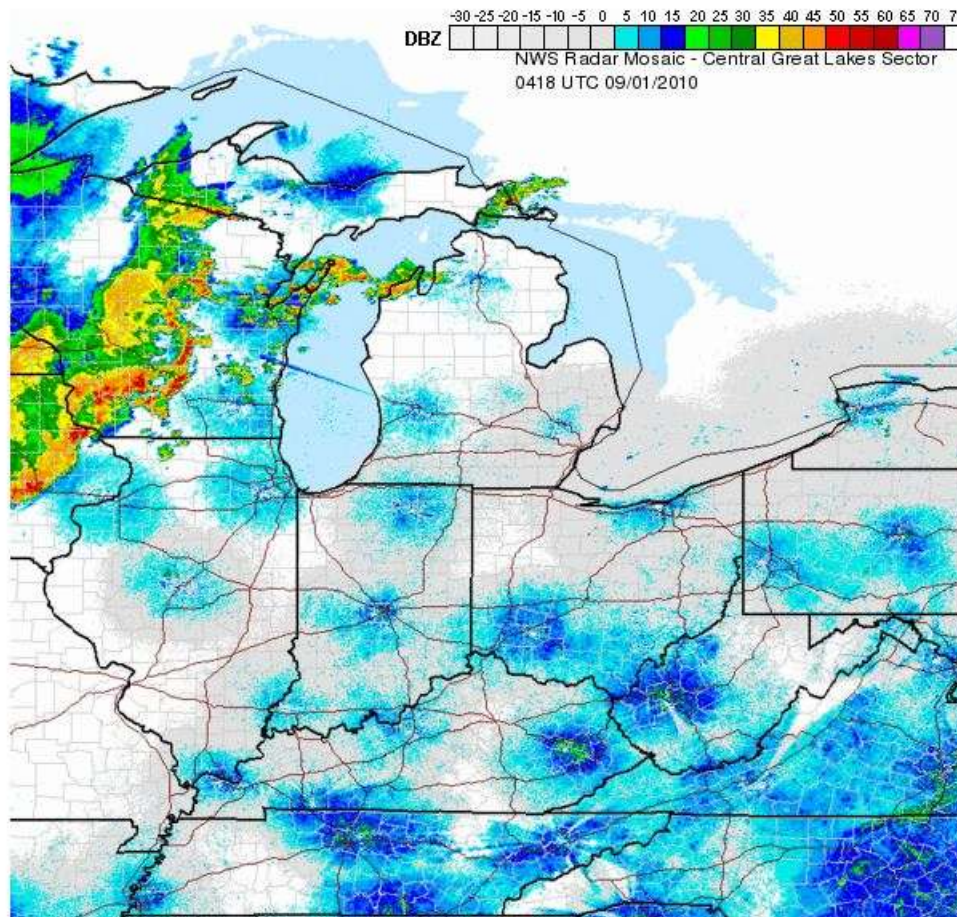
Show Observations



- Select one or more data sources
- Select one or more observation types
- Select Show Obs
- Current observations will appear next to the station, if available

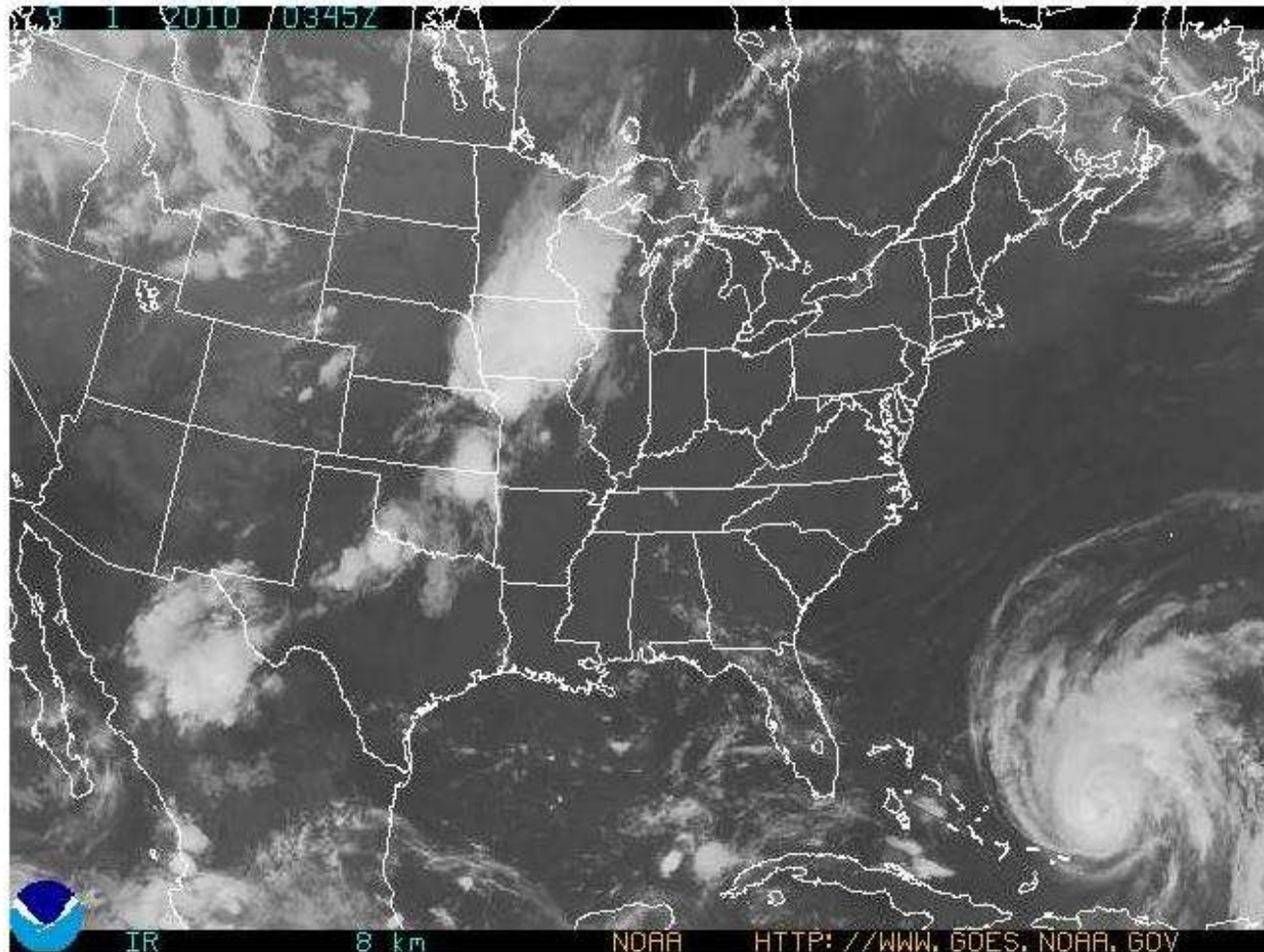


NWS Radar





NWS Satellite



NWS Alerts



The screenshot shows a web browser window displaying the National Weather Service (NWS) Alerts page for Indiana. The browser's address bar shows "default.admin" and the page title is "Watches, Warnings or Advisories for Indiana". The page features a blue header with the NOAA logo on the left and the NWS logo on the right. A navigation menu includes "Site Map", "News", "Organization", "Search", and "NW".

The main content area is titled "Watches, Warnings or Advisories for Indiana" and includes a breadcrumb trail: "Home > Alerts > Indiana". Below the title, a paragraph states: "This page shows alerts *currently* in effect for Indiana and is normally updated every two-three minutes. Please see here for other state and listing by county." The page was last updated on 08-31-2010 at 12:15 EDT.

A specific alert is displayed in a box:

Air Quality Alert	Urgency: Unknown
Issued: August 31 at 12:15PM EDT	Status: Actual
Expiring: September 01 at 8:00PM EDT	
Issued by: NWS Indianapolis	
Areas affected: Bartholomew; Brown; Jackson; Jennings; Lawrence; Monroe; Scott; Washington	

The footer of the page contains contact information for the US Dept of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, and the NWS Internet Services Team. It also includes links for Disclaimer, Information Quality, Credits, Glossary, Privacy Policy, Freedom of Information Act (FOIA), About Us, and Career Opportunities.

At the bottom of the browser window, the text "Indiana Department of Transportation" is visible.

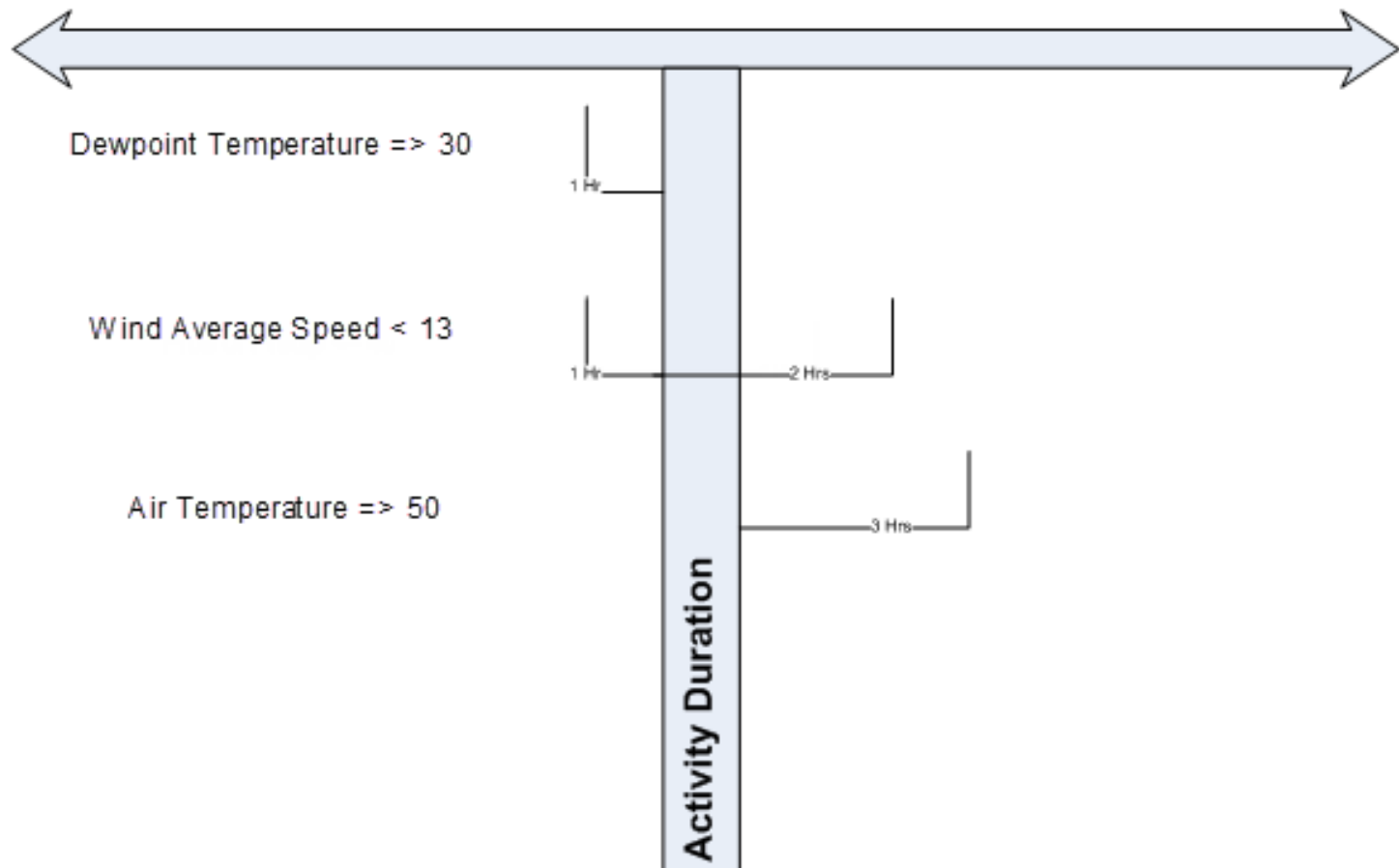


UC #3: Non-winter Maintenance & Operations Decision Support Tool - Objectives

- Expand decision support beyond snow and ice control
- Incorporate *Clarus* data to assist maintenance, operations, and construction-related scheduling decisions
- Provide the framework to bridge the current gap between the road weather information and the proactive decision-making process



Define Weather Related Practice





Define Weather Related Practice

Define Weather Related Practice

Activity Group
440s 440s

Activity
443C - Mowing with cab tractor 443C - Mowing with cab tractor

includes guardrail mower:

Conditions are not favorable for this activity. Check weather to determine to continue or reschedule activity.

Save Delete

Evaluation Parameters

Observation Type	Oper	Value	Start	Duration	Default	Edit
Precipitation 24 Hours(in)	<=	1	0d, 03h before	0d, 03h	true	yes
Precipitation Rate(in/hr)	<=	0.1	0d, 01h before	0d, 02h	true	yes

Observation Type	Oper	Value	Offset Start	Offset	Offset Duration	Default Result	Edit
Air Temperature (F)	<=	70	0 d 01 h	before	0 d 0 h	true	yes

Add Update Remove

Indiana Department of Transportation

- Define or select the activity group and activity
- Define the activity description and the default activity message
- Define the evaluation parameters

Plan an Activity

The screenshot shows a web application interface for planning an activity. At the top, there is a Google Map of Indiana with a green rectangular selection box over a rural area. Below the map, there is a form with the following fields and controls:

- Location Type:** A dropdown menu set to "Mowing Lanes".
- Location:** A list box showing "MMS 435" and "MMS 492".
- Lat1, Lat2, Lon1, Lon2:** Four empty input fields for coordinates.
- Activity Group:** A dropdown menu set to "440s".
- Activity Type:** A dropdown menu set to "443C - Mowing with cab tractor".
- Group:** A dropdown menu set to "admin".
- Username:** A text input field containing "Brends".
- Activity Duration:** A dropdown menu set to "0 d 05 h".
- Plan Description:** A text area containing "includes guardrail mower".
- View Times:** A button.
- Activity Date and Time:** A date field set to "Tu, 31 Aug 2010" and a time field set to "11:05 pm".
- Edit Emails:** A button.
- Modify WRP:** A button.
- Repeat:** A section with checkboxes for days of the week: Tu, We, Th, Fr, Sa, Su, Mo.
- Save Plan:** A button.
- Cancel:** A button.

At the bottom of the form, there is a footer that reads "Indiana Department of Transportation".

- Define location
- Define activity
- Define the activity duration
- Select “View Times”
- Select “Edit Emails”
- Select “Modify WRP”
- Repeat Activity

Schedule the Activity

View Times

Tu, 26 Oct 2010 04 : 35 pm

10/28	10/29	10/30	10/31	11/1	11/2										
<p>Dewpoint Temperature >= 33.0 F -- Offset: 0d, 1h before, Duration: 0d, 1h</p>															
<p>Wind Average Speed < 13.0 mph -- Offset: 0d, 1h before, Duration: 0d, 3h</p>															
<p>Air Temperature >= 50.0 F -- Offset: 0d after, Duration: 0d, 3h</p>															
12	18	0	6	12	18	0	6	12	18	0	6	12	18	0	6

52.06 F

Save Cancel



Temporarily Modify the WRP

Modify WRP
✕

Observation Type	Oper	Value	Start	Duration	Default
Dewpoint Temperature (F)	>=	33.0	0d, 01h before	0d, 01h	true
Wind Average Speed (mph)	<	13.0	0d, 01h before	0d, 03h	true
Air Temperature (F)	>=	50.0	0d, 00h after	0d, 03h	true

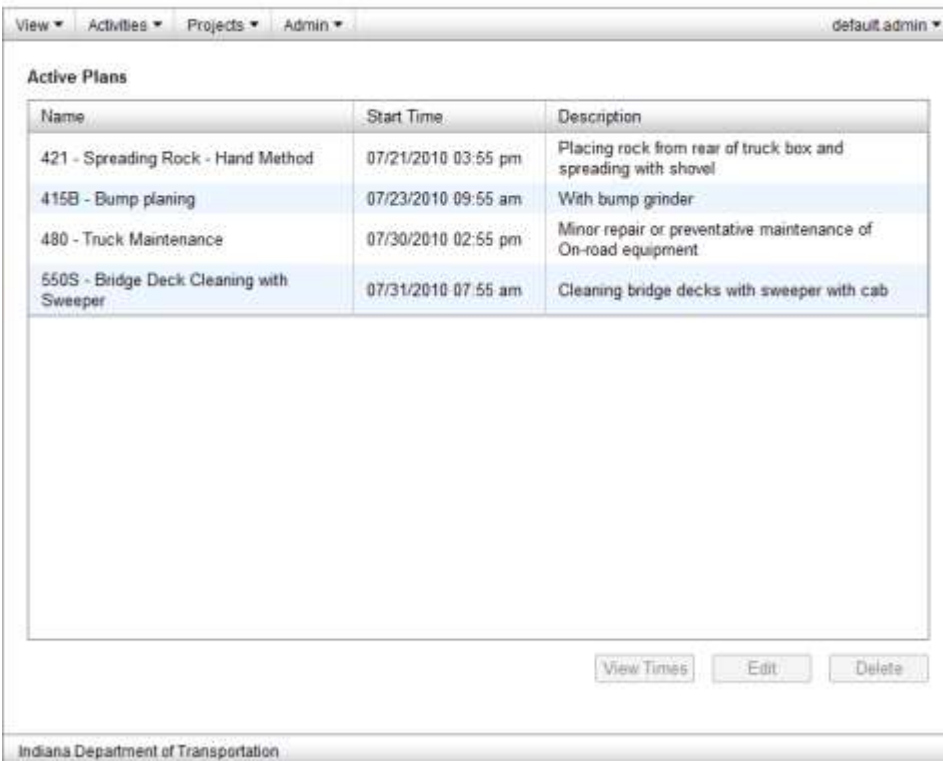
Observation Type	Oper	Value	Offset Start	Offset	Offset Duration	Default Result
Dewpoint Temperature (F) ▾	>= ▾	33.0	0 ▾ d 01 ▾ h	before ▾	0 ▾ d 01 ▾ h	true ▾

Add
Update
Remove



View Active Plans

- Screen shows all of the plans that are active
 - Name of Plan
 - Start time of the plan
 - Description of the plan
- Links
 - view additional times
 - Edit the plan
 - Delete the plan



Name	Start Time	Description
421 - Spreading Rock - Hand Method	07/21/2010 03:55 pm	Placing rock from rear of truck box and spreading with shovel
415B - Bump planing	07/23/2010 09:55 am	With bump grinder
480 - Truck Maintenance	07/30/2010 02:55 pm	Minor repair or preventative maintenance of On-road equipment
550S - Bridge Deck Cleaning with Sweeper	07/31/2010 07:55 am	Cleaning bridge decks with sweeper with cab

View Times Edit Delete

Indiana Department of Transportation

WRP Forecast

The screenshot shows a web application interface for WRP Forecast. At the top, there are navigation tabs: 'View', 'Activities', 'Projects', and 'Admin'. The main area features a map of Indiana and surrounding states, with a search bar and a list of activity types on the left. Below the map, there is a form with the following fields:

- Location Type:** (Select Location Type) dropdown menu.
- Location:** A large text input field.
- Lat1:** Text input field.
- Lat2:** Text input field.
- Lon1:** Text input field.
- Lon2:** Text input field.
- Activity Group:** (Select Group) dropdown menu.
- Activity Duration:** Text input field with a value of '0 d 00 h'.
- Submit:** A button to submit the form.

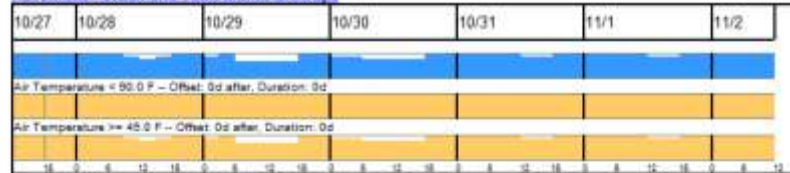
The footer of the page reads 'Indiana Department of Transportation'.

- View the schedules available for a number of activity types at a selected location
 - A specific activity group can be selected to limit the number of schedules displayed
 - All activity types in the system can be evaluated

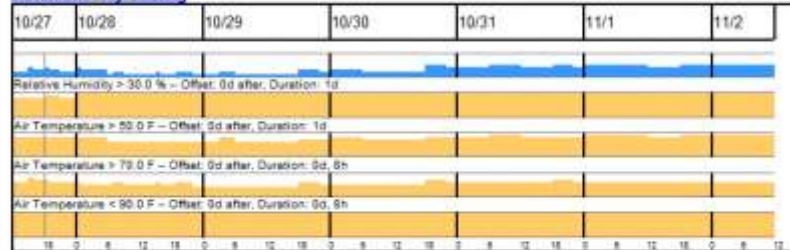


WRP Forecast Results

Pavement - Crack and Joint Maint: Blowups



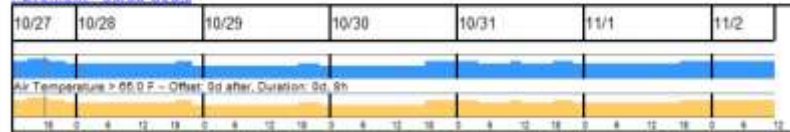
Pavement - Fly Coating



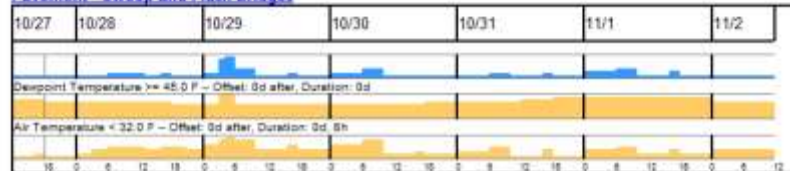
Pavement - Full Depth Concrete Replacement



Pavement - Scrub Seals

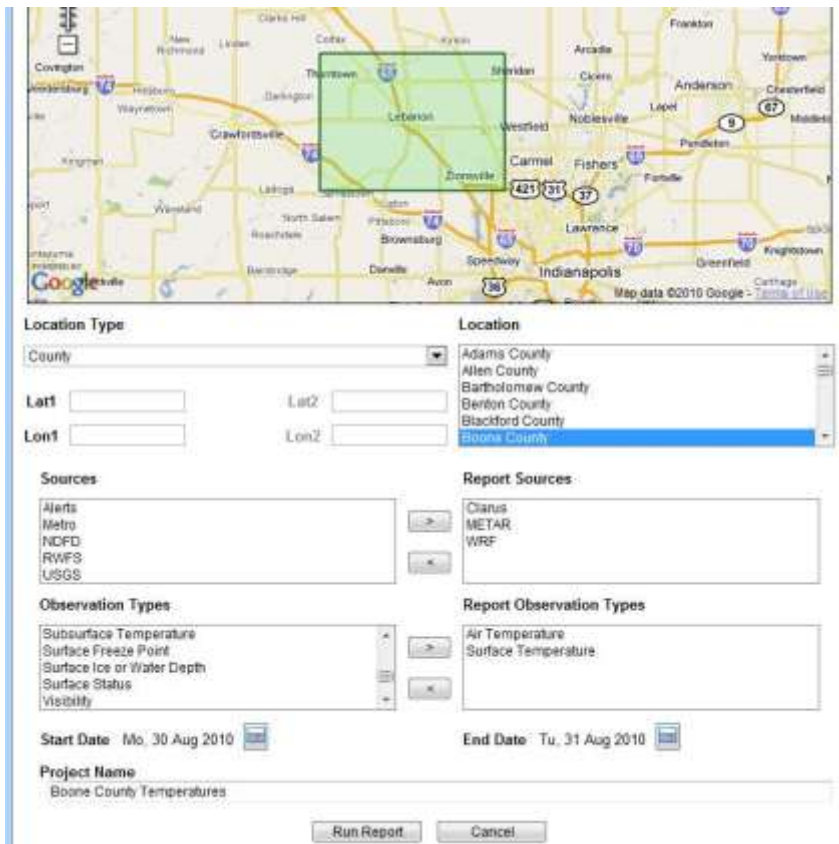


Pavement - Sweep and Flush Bridges





Run Report



Location Type

County: Location:

Lat1: Lat2: Location: Adams County, Allen County, Bartholomew County, Berrien County, Blackford County, Boone County

Lon1: Lon2: Location: Boone County

Sources

Alerts, Metro, NCFD, RWFS, USGS

Report Sources

Chorus, METAR, WRF

Observation Types

Subsurface Temperature, Surface Freeze Point, Surface Ice or Water Depth, Surface Status, Visibility

Report Observation Types

Air Temperature, Surface Temperature

Start Date: Mo, 30 Aug 2010 End Date: Tu, 31 Aug 2010

Project Name: Boone County Temperatures

Run Report Cancel

- Select a location
- Select the source(s)
- Select the observation type(s)
- Select the start and end date
- Create the project name for the report
- Run the report



Current Reports

View ▾ Activities ▾ Projects ▾ Admin ▾ default.admin ▾

Current Reports

Name	Start Date	End Date	Status	Size	Download	Delete
Boone County Temperatures	08/30/2010	08/31/2010	Completed	2 Mb	Download	<input type="button" value="Delete"/>

Report disk space allocated: 50 Gb, Report disk space used: 1.76 Mb

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What did the project team learn from their experience? What were the key findings?

- Selecting a method to establish weather-related practices was difficult
- Training would be crucial and would have to be included in the roll out.
- For inexperienced supervisors, this tool would be invaluable to them.
- It would be nice to have a better weather info/forecast interface.



UC #4: Multi-state Control Strategy Tool - Objectives

- Provide data and strategies which will improve the coordination between agencies with respect to the imposition of controls and dissemination of associated advisories
- This coordination will assist agencies in proactively responding to situations, allow for timely dissemination of safety-related information, and thus mitigate the impact to travelers

Set up a Conference

The screenshot shows a web form for creating a conference. At the top is a map of Indiana with a green box highlighting the Indianapolis area. Below the map are several form sections:

- Location Type:** A dropdown menu labeled 'County'.
- Location:** A list box showing counties: Madison County (highlighted), Marion County, Marshall County, Martin County, Miami County, and Monroe County.
- Coordinates:** Fields for Lat1, Lat2, Lon1, and Lon2.
- Conference Title:** A text field containing 'ClarusMDSS Stakeholder Meeting'.
- Author:** A text field containing 'Brenda'.
- Conference Description:** A text area containing 'Warn stakeholders of adverse weather'.
- Auto Approve:** Radio buttons for 'None', 'Read', and 'Read/Write'.
- Strategy Name:** A text field.
- Strategies:** A list box containing 'High Winds' and 'High Temperatures'.
- Available Users:** A list box containing 'Dennis Belter' and 'Bill Cornell'.
- Current Subscribers:** A list box containing 'Kirk Carpenter'.

At the bottom of the form are two buttons: 'Save Conference' and 'New Conference'.

Location

Title & Description

Subscribers

Strategy Names

Define Strategy

- Verify Location
- Set up evaluation parameters
- Set up Action
- Set as “Active”
- Set as “Continuous” or not

The screenshot shows a web application interface for defining a strategy monitor. At the top, there are navigation tabs for 'View', 'Conferences', and 'Admin', and a user name 'default.admin'. Below this, there are two dropdown menus: 'Conference' set to 'Clarus/MDSS Stakeholder Meeting' and 'Strategy' set to 'High Temperatures'. To the right of these dropdowns are buttons for 'Detail' and 'Description'. Below the dropdowns is a section titled 'Monitor Configuration' which contains a text input field for 'Monitor Name' with the value 'Temperatures over 85 F'. To the right of this field are 'Save' and 'Delete' buttons. Below the 'Monitor Name' field are four checkboxes: 'Location' (checked), 'Evaluation', 'Action', and 'Active'. To the right of these checkboxes is another checkbox for 'Continuous'.

View ▾ Conferences ▾ Admin ▾ default.admin ▾

Conference: Clarus/MDSS Stakeholder Meeting ▾ Detail

Strategy: High Temperatures ▾ Description

Monitor Configuration

Monitor Name: Temperatures over 85 F Save Delete

Location Evaluation Action Active Continuous



Set Up Evaluation Parameters

Monitor Evaluations

Observation Type	Oper	Value	Start	Duration	Default
Air Temperature (F)	>=	85	0d, 00h after	0d, 00h	true

Observation Type	Oper	Value	Offset Start	Offset	Offset Duration	Default Result
Air Temperature (F)	>=	85	0 d 00 h	after	0 d 00 h	true

Observation Types

- Prob of Precip 24-Hr (%)
- Prob of Precip 3-Hr (%)
- Prob of Precip 6-Hr (%)
- Sky Cover (%)
- Snow Amount (in)

Extra Observation Types

- Relative Humidity (%)

- Set up the observation evaluation up the same of use case #3
- Additional observations can be shown outside of the evaluation

Set up Actions

Monitor Actions

True Action

Create New Strategy and Append Message

Append Message to Current Strategy

Wear sunscreen and drink plenty of water

False Action

Create New Strategy and Append Message

Append Message to Current Strategy

Take Curt for a walk around downtown Indianapolis

Save Cancel

- Set up the messages that you want sent out when the parameters evaluate to true and to false

View ▾ Conferences ▾ Admin ▾ default.admin ▾

(IN) Spring Flooding
default.admin

Evacuate Post View

Sandbag Post View

Brenda 06/30/2010 16:13
River levels have been rising steadily. Prepare to start sandbagging if they get much higher.

(IL) Quad Cities
default.admin

Accidents View

default.admin 06/24/2010 11:52
Accident on I-80 West outside of Chicago. Post detour instructions to highway signs

High Winds View

default.admin 06/24/2010 11:17
High wind advisory has been issued. Notify truckers via HAR to use caution.

(IL) Weather Warnings
default.admin

Weather Warnings View

Warnings, Condition Monitor 05/13/2010 13:00
A Weather Warning has been issued from the NWS.

(IA) Creston to Boone
bonnie.castillo

weather changes View

Tina Greenfield 04/02/2010 11:27
Temperatures soared on Thursday well into the 80s and fell just a few degrees short of records for the date. On a statewide basis, yesterday was warmer than nearly every day during July of 2009! The featured analysis displays the number of days during 2009 that were warmer than 1 April 2010. It is amazing to consider that for some locations, there were only a handful of days during all of 2009 warmer than yesterday! A cold front will sweep the state clean of the really warm air today, but temperatures this weekend will be spring like in the 60s.

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Conference Overview

- Displays all active conferences
- Ability to view all messages
- Ability to post additional messages
- Ability to view observations associated with message, if applicable



Monitor Results

(IN) Clarus/MDSS Stakeholder Meeting
Brenda

Edit

Delete

High Temperatures

Post

View

Temperatures over 85 F, Condition Monitor

09/01/2010 00:10

Take Curt for a walk around downtown Indianapolis



Conference Details

View ▾ Conferences ▾ Admin ▾ default.admin ▾

Conference:

Strategy:

Monitor Configuration

Monitor Name:

Active
 Continuous

Message History Viewing Page 1 / 1

default.admin	09/01/2010 00:22
Reschedule the walk for Curt at another time - it is not safe to walk after midnight without additional protection.	
Temperatures over 85 F, Condition Monitor	<input type="button" value="View Obs"/> 09/01/2010 00:10
Take Curt for a walk around downtown Indianapolis	
default.admin	09/01/2010 00:07
High temperatures strategy was set up at midnight on 9/1/10	



Mobile Phone Application

default.admin	
Preferences	Logout
1/2	1 2
Quad Cities default.admin	
Accidents	
default.ad	2010-06-24 16:52
Accident on I-80 West outside of Chicago. Post detour instructions to highway signs	
High Winds	
default.ad	2010-06-24 16:17
High wind advisory has been issued. Notify truckers via HAR to use caution.	
Weather Warnings default.admin	
Weather Warnings	
Warnings	2010-05-13 18:00
Condition Monitor	
A Weather Warning has been issued from the NWS.	
Marion County Test default.admin	
Marion County - Test by Bre	
Brenda	2010-07-06 18:22
This is the fourth test	
1/2	1 2
Indiana Department of Transportation	

default.admin	
Overview	Logout
Set page width	
<input checked="" type="radio"/> Auto <input type="radio"/> 240 <input type="radio"/> 360 <input type="radio"/> 480	
Conference Overview	
4	Strategies Per Page
Show	
<input type="radio"/> Messages newer than	
0	minutes
<input checked="" type="radio"/> Most recent	
1	messages
Strategy View	
4	Messages per page
<input type="button" value="Save"/>	
Indiana Department of Transportation	



What did the project team learn from their experience? What were the key findings?

- Coordination between agencies outside the DOTs is very difficult
- New processes (especially a proof-of-concept) becomes somewhat lost during real-time incidents especially in the field
- The accuracy of the real-time warnings were excellent and timely

Contacts

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U.S. DOT

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 - FHWA, Road Weather Management Team
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 - Paul.Pisano@dot.gov