Western States Rural Transportation Consortium Meeting

June 14, 2011

Overview/Agenda

- Welcome / Introductions / Recent ITS Activities
- General Status of the WSRTC
- Clarus One Stop Shop Update
- Year 1 Incubator Project Update/Overview
- COATS Phase 4 Project Follow-up
- Other discussions (as needed)

Roundtable of Recent ITS Activities

General Status of the Western States Rural Transportation Consortium

Clarus One Stop Shop

Broad Agency Announcement No. DTFH61-10-R-00015

- Posted by FHWA on March 15, 2010
- Proposals Due April 14, 2010

- *The goal of this Broad Agency Announcement (BAA) is to support research and scientific study on the use of Clarus System data to improve surface transportation weather management/operations, create innovative interfaces, and/or develop new applications including weather-responsive traffic management tools. The FHWA anticipates making up to seven (7) awards, but reserves the right to make more or fewer than seven (7) awards.*

WTI Proposal

- Proposal Submitted on Time
- Included signed letters of support from WSRTC member states: California, Oregon, Washington and Nevada

- GOAL: Expand the One-Stop-Shop Prototype to Cover all of California, Oregon, Washington and Nevada

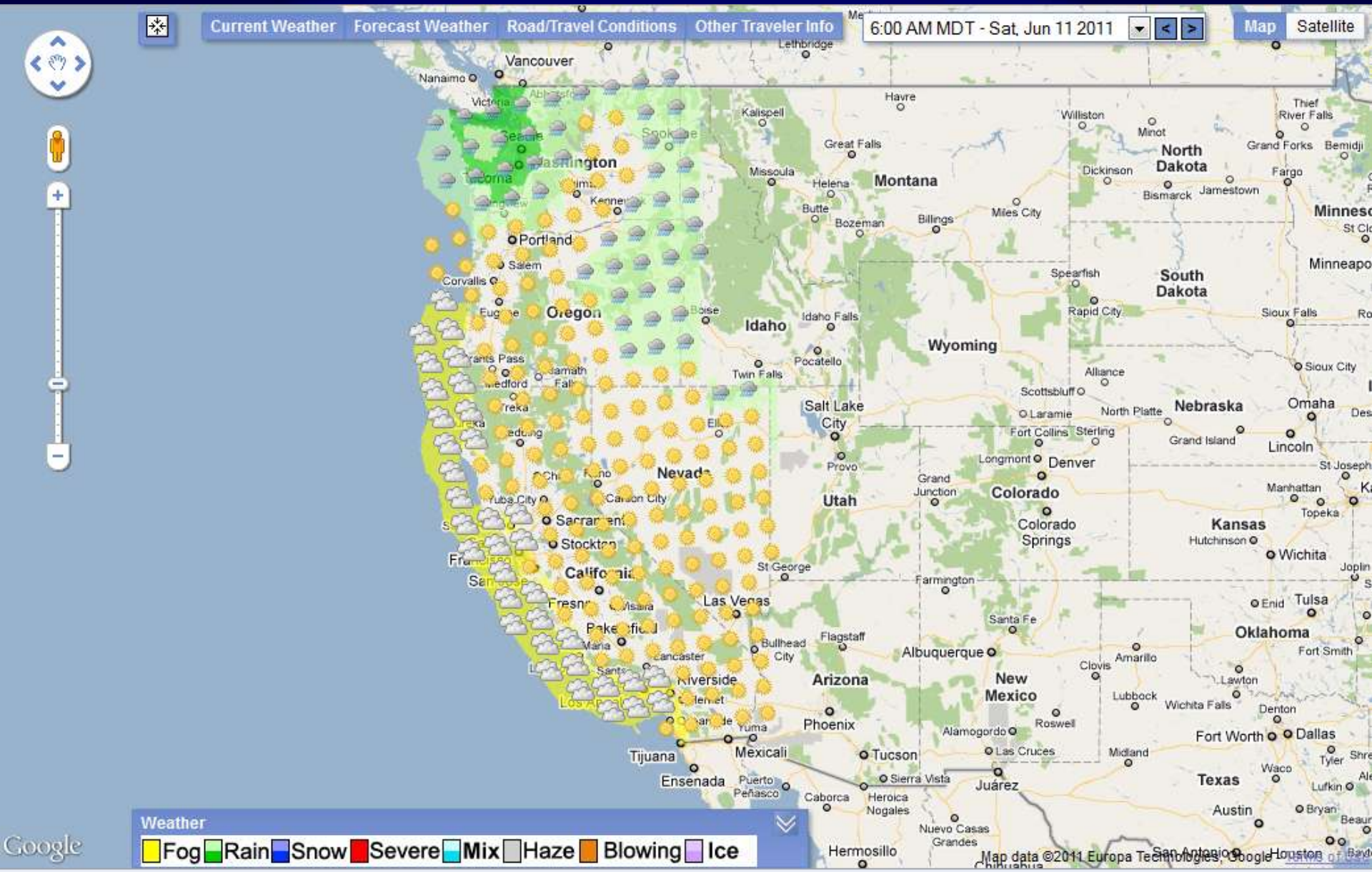
  - … to address the shortcomings of current (multi-state) web-based weather information sources for travelers (and DOT personnel) …

- Project awarded on 9/24/2010

Progress

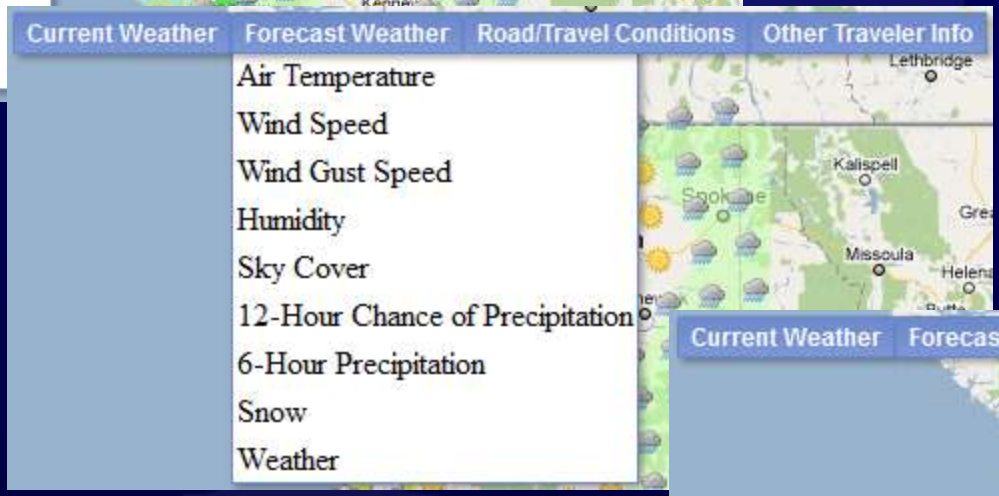
- We’re close to having the site ready for review by FHWA and Consortium members.
- We need to check functionality and address what is missing.
- In general, we have included all of the anticipated data sets, including coverage of Washington with nearly all layers.

A Preview …


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
6:00 AM MDT - Sat, Jun 11 2011
Map
Satellite
Weather
Fog
Rain
Snow
Severe
Mix
Haze
Blowing
Ice
Google
Map data ©2011 Europa Technologies, Google
Vancouver
Nanaimo
Victoria
Seattle
Spokane
Washington
Tacoma
Portland
Salem
Corvallis
Eugene
Oregon
Boise
Idaho
Idaho Falls
Pocatello
Twin Falls
Wyoming
Salt Lake City
Provo
Utah
Nevada
Reno
Carson City
Sacramento
Stockton
California
Fresno
Las Vegas
St George
Bullhead City
Flagstaff
Arizona
Phoenix
Yuma
Tijuana
Mexicali
Ensenada
Puerto Peñasco
Caborca
Heroica Nogales
Nuevo Casas Grandes
Hermosillo
Tucson
Sierra Vista
Juárez
Albuquerque
Santa Fe
Farmington
Grand Junction
Colorado
Denver
Colorado Springs
Longmont
Fort Collins
Laramie
Scottsbluff
North Platte
Nebraska
Omaha
Lincoln
Grand Island
Alliance
Sioux City
Rapid City
Spearfish
South Dakota
Sioux Falls
Minneapolis
Havre
Kalispell
Great Falls
Missoula
Helena
Montana
Butte
Bozeman
Billings
Miles City
Williston
Minot
North Dakota
Dickinson
Bismarck
Jamestown
Grand Forks
Fargo
Thief River Falls
Bemidji
Kansas
Hutchinson
Wichita
Topeka
Manhattan
Oklahoma
Tulsa
Enid
Fort Smith
Amarillo
Clovis
Lubbock
Lawton
Wichita Falls
Denton
Fort Worth
Dallas
Texas
Midland
Las Cruces
Alamogordo
Roswell
New Mexico
Austin
Waco
Tyler
Lufkin
Bryan
Houston
San Antonio

The Layers


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Air Temperature
Relative Humidity
1 Hour Precipitation
24 Hour Precipitation
AHPS 24 hr Precip.
Wind
Clarus Stations
Vancouver
Nanaimo
Victoria
Kalispell
Missoula
Helena
Lethbridge


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Air Temperature
Wind Speed
Wind Gust Speed
Humidity
Sky Cover
12-Hour Chance of Precipitation
6-Hour Precipitation
Snow
Weather
Lethbridge
Kalispell
Missoula
Helena


Current Weather
Forecast Weather
Road/Travel Conditions
Chain Requirements
Road Information
Incidents
CMS
CCTV
Nanaimo


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Rest Areas
Features of Interest
Truck Scales
Summit Locations
Vancouver
Nanaimo
Victoria

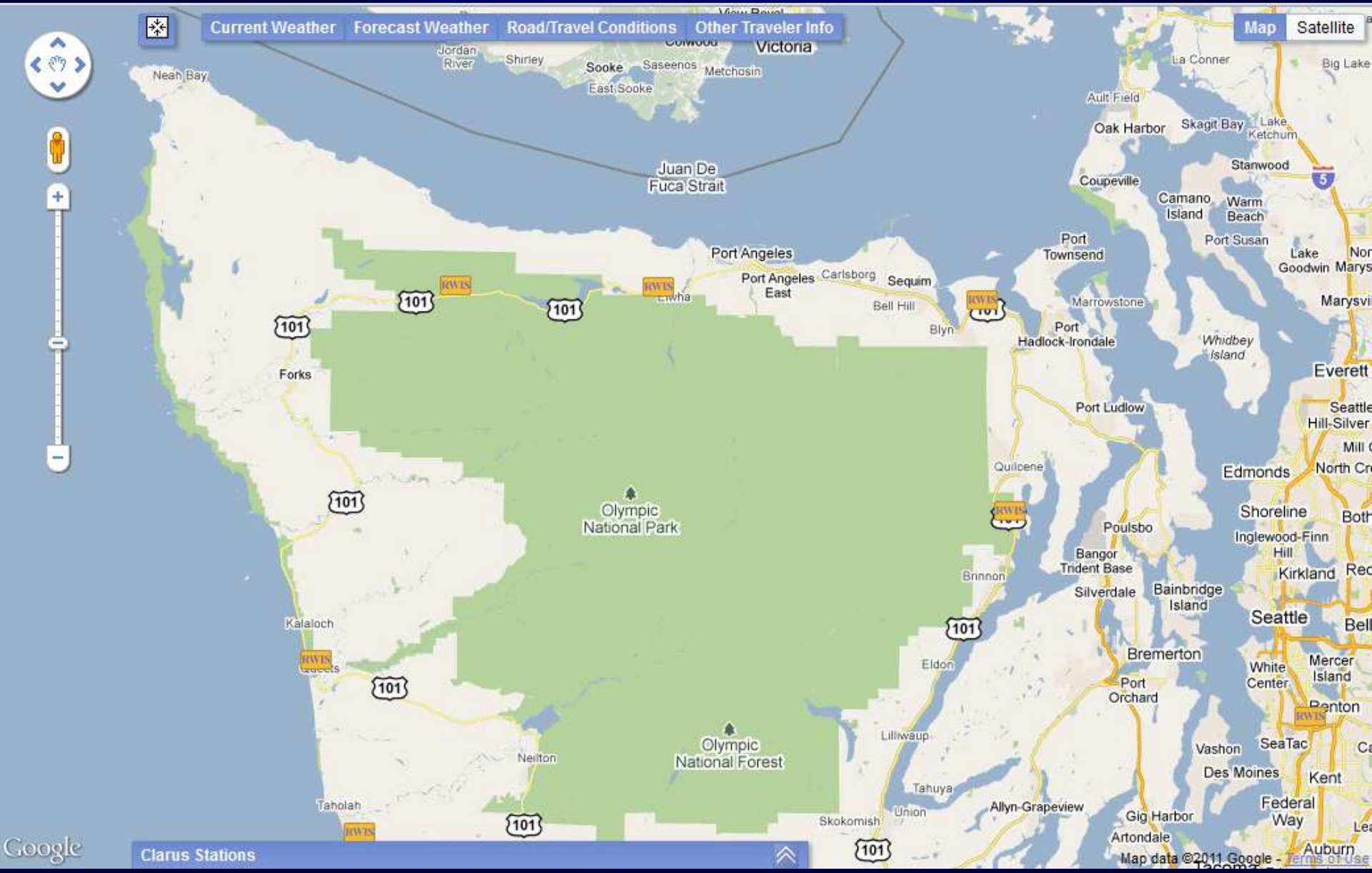
Clarus Data

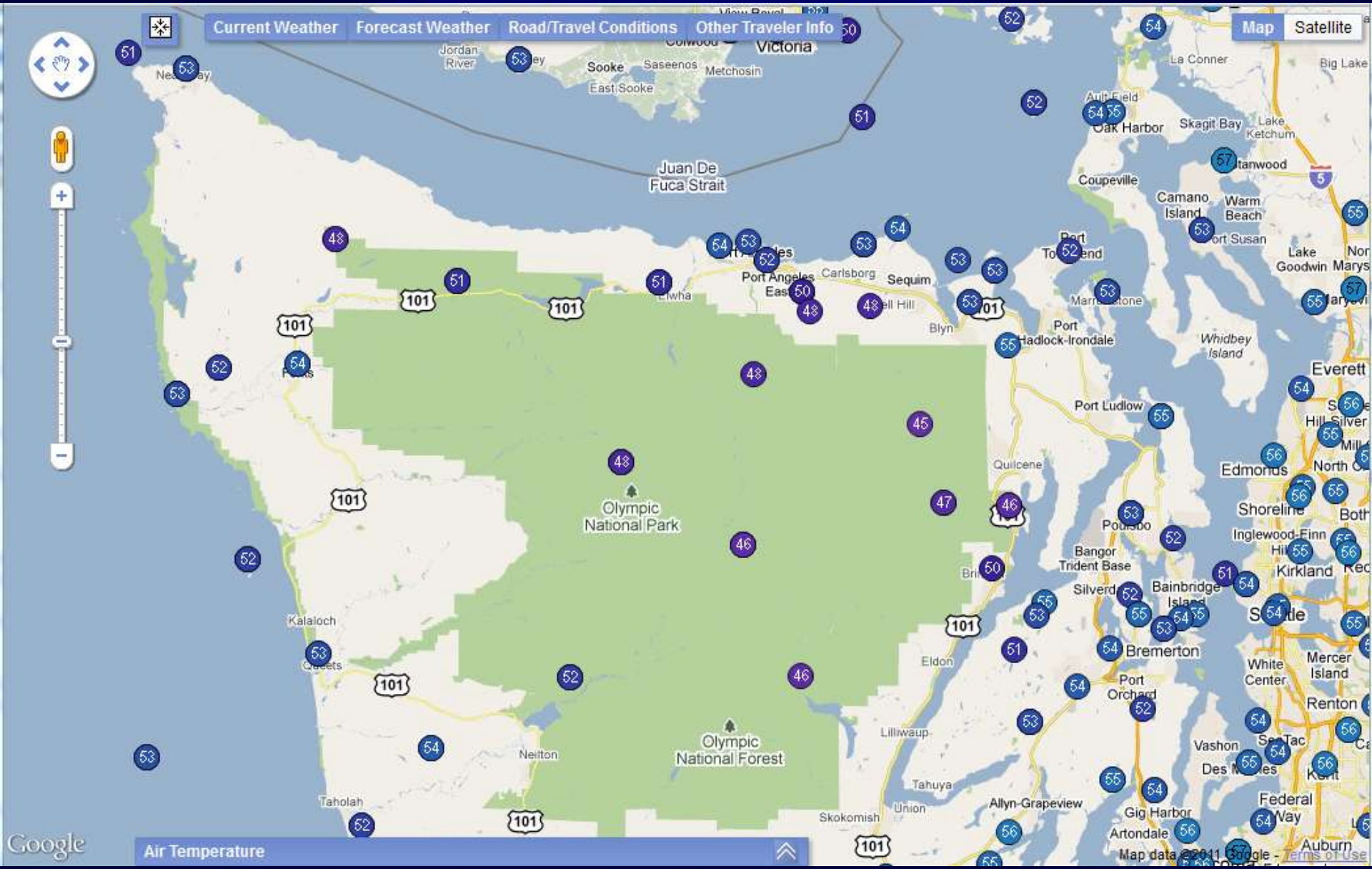
Station ID: 3048
Elevation: 1611 m
Source: CA State DOT

essRelativeHumidity	45.000 %	8:26 AM MDT - Thu, Jun 9 2011
essDewpointTemp	26.600 F	8:26 AM MDT - Thu, Jun 9 2011
precipType	1.000	8:26 AM MDT - Thu, Jun 9 2011
windSensorAvgSpeed	1.243 mph	8:26 AM MDT - Thu, Jun 9 2011
essSubSurfaceTemperature	61.160 F	8:26 AM MDT - Thu, Jun 9 2011
windSensorAvgDirection	75.000 deg	8:26 AM MDT - Thu, Jun 9 2011
windSensorGustDirection	68.000 deg	8:26 AM MDT - Thu, Jun 9 2011
essAirTemperature	46.400 F	8:26 AM MDT - Thu, Jun 9 2011
essSurfaceStatus	3.000	8:26 AM MDT - Thu, Jun 9 2011
essSurfaceTemperature	56.300 F	8:26 AM MDT - Thu, Jun 9 2011
precipIntensity	1.000	8:26 AM MDT - Thu, Jun 9 2011
windSensorGustSpeed	1.243 mph	8:26 AM MDT - Thu, Jun 9 2011

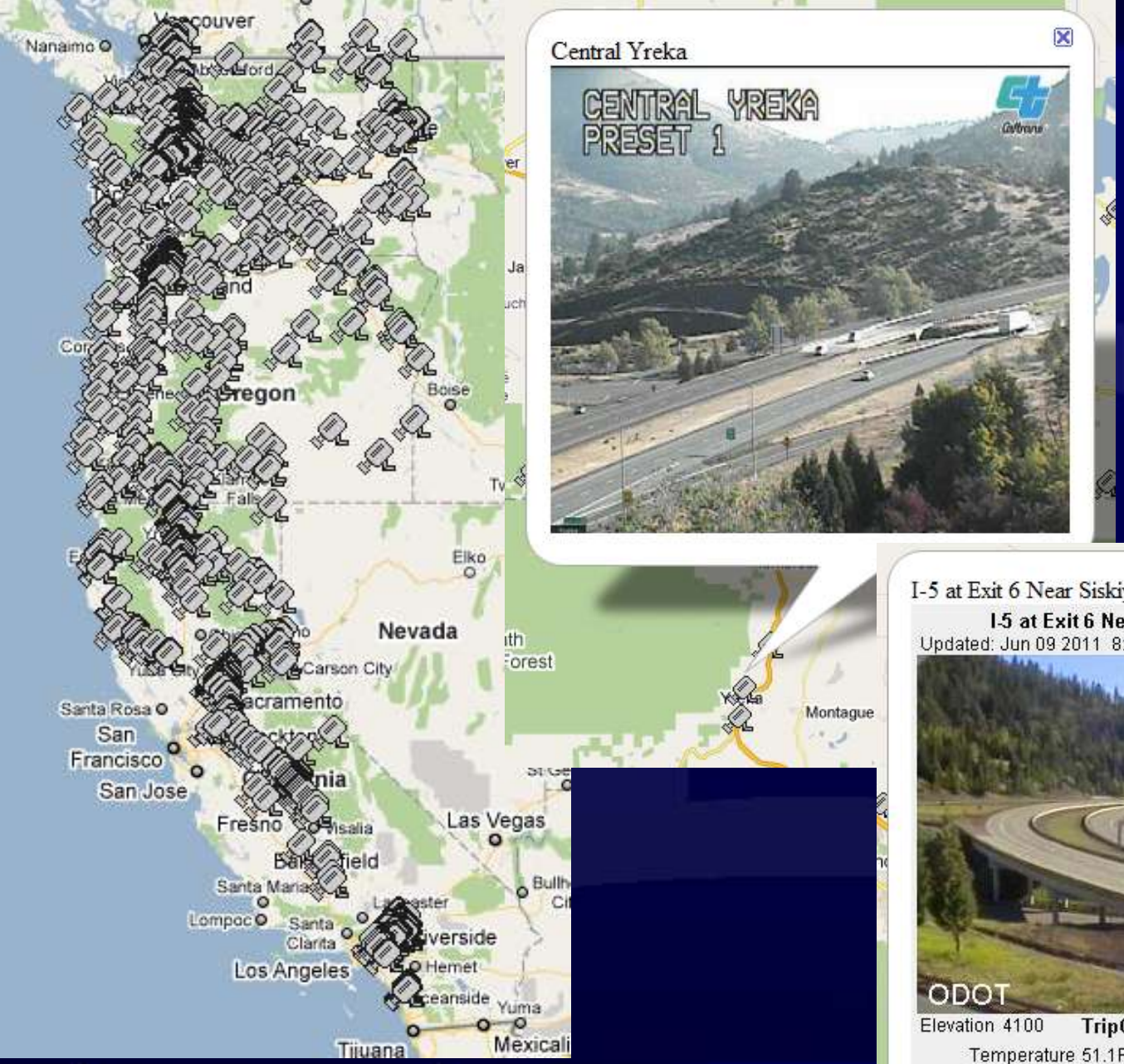
Station ID: 5762
Elevation: 1624 m
Source: NV State DOT

windSensorAvgSpeed	12.096 mph	17:32 MDT - Fri, Jun 3 2011
essDewpointTemp	31.800 F	17:32 MDT - Fri, Jun 3 2011
windSensorAvgDirection	28.000 deg	17:32 MDT - Fri, Jun 3 2011
windSensorGustDirection	66.000 deg	17:32 MDT - Fri, Jun 3 2011
essAirTemperature	46.400 F	17:32 MDT - Fri, Jun 3 2011
essPrecipRate	0.000 in/h	17:32 MDT - Fri, Jun 3 2011
essRelativeHumidity	57.000 %	17:32 MDT - Fri, Jun 3 2011
windSensorGustSpeed	19.712 mph	17:32 MDT - Fri, Jun 3 2011


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Map
Satellite
Victoria
Sooke
East Sooke
Juan De Fuca Strait
Port Angeles
Port Angeles East
Sequim
Port Townsend
Forks
Olympic National Park
Olympic National Forest
Kalaloch
Neah Bay
Oak Harbor
Coupeville
Camano Island
Stanwood
Everett
Marysville
Edmonds
Shoreline
Lake Stevens
Lake Goodwin
Port Susan
Whidbey Island
Port Ludlow
Quilcene
Poulsbo
Bangor Trident Base
Silverdale
Bainbridge Island
Seattle
Bremerton
Port Orchard
Kirkland
Bellevue
Renton
Mercer Island
White Center
Vashon
SeaTac
Des Moines
Kent
Federal Way
Auburn
Gig Harbor
Allyn-Grapeview
Tahuya
Lilliwaup
Skokomish
Union
Brinnon
Eldon
Neilton
Taholah
Clarus Stations
Google
Map data ©2011 Google - Terms of Use


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Map
Satellite
Victoria
Juan De Fuca Strait
Port Angeles
Sequim
Port Townsend
Coupeville
Oak Harbor
Camano Island
Port Susan
Everett
Port Ludlow
Port Hadlock-Irondale
Whidbey Island
Olympic National Park
Olympic National Forest
Quilcene
Edmonds
Shoreline
Kirkland
Bainbridge Island
Bremerton
Port Orchard
Silverdale
Bangor Trident Base
Poulsbo
Eldon
Lilliwaup
Tahuya
Allyn-Grapeview
Gig Harbor
Federal Way
Auburn
Renton
Kalaloch
Neilton
Taholah
Skokomish
Blyn
Carlsborg
Elwha
Air Temperature
Google
Map data ©2011 Google - Terms of Use

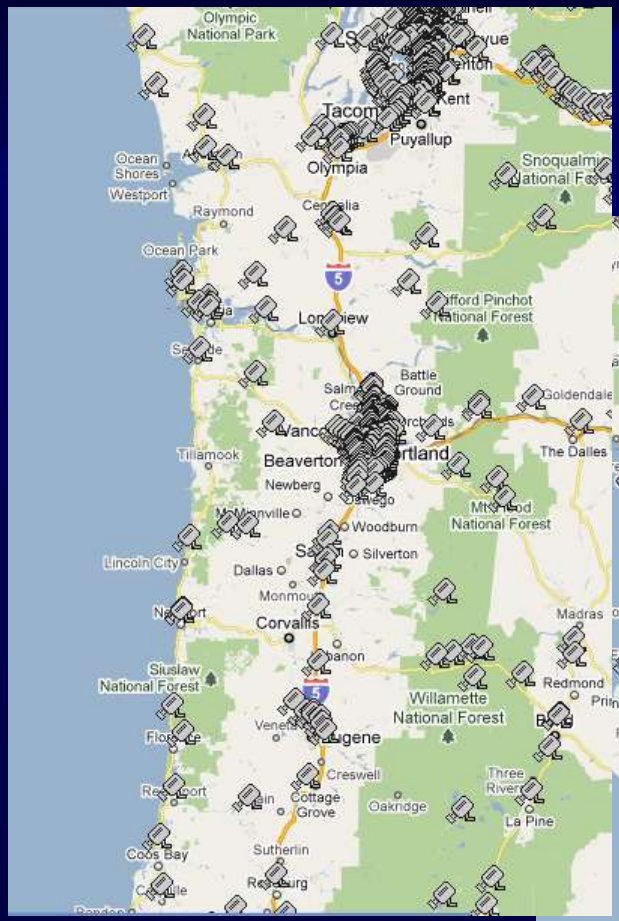
CCTV Images

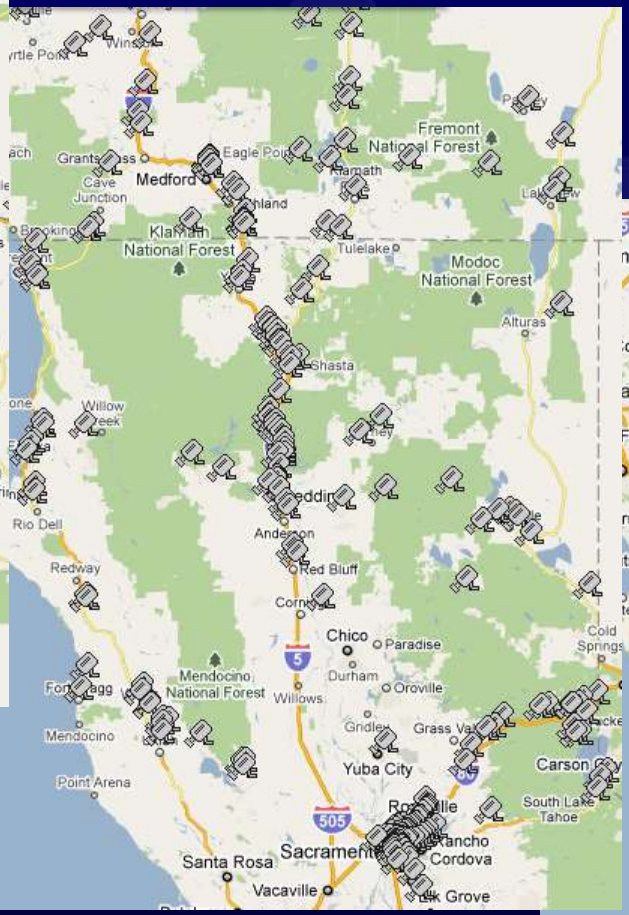

Vancouver
Nanaimo
Oregon
Boise
Nevada
Carson City
Elko
Santa Rosa
San Francisco
San Jose
Fresno
Las Vegas
Los Angeles
Tijuana
Mexicali
Montague

Central Yreka
CENTRAL YREKA
PRESET 1

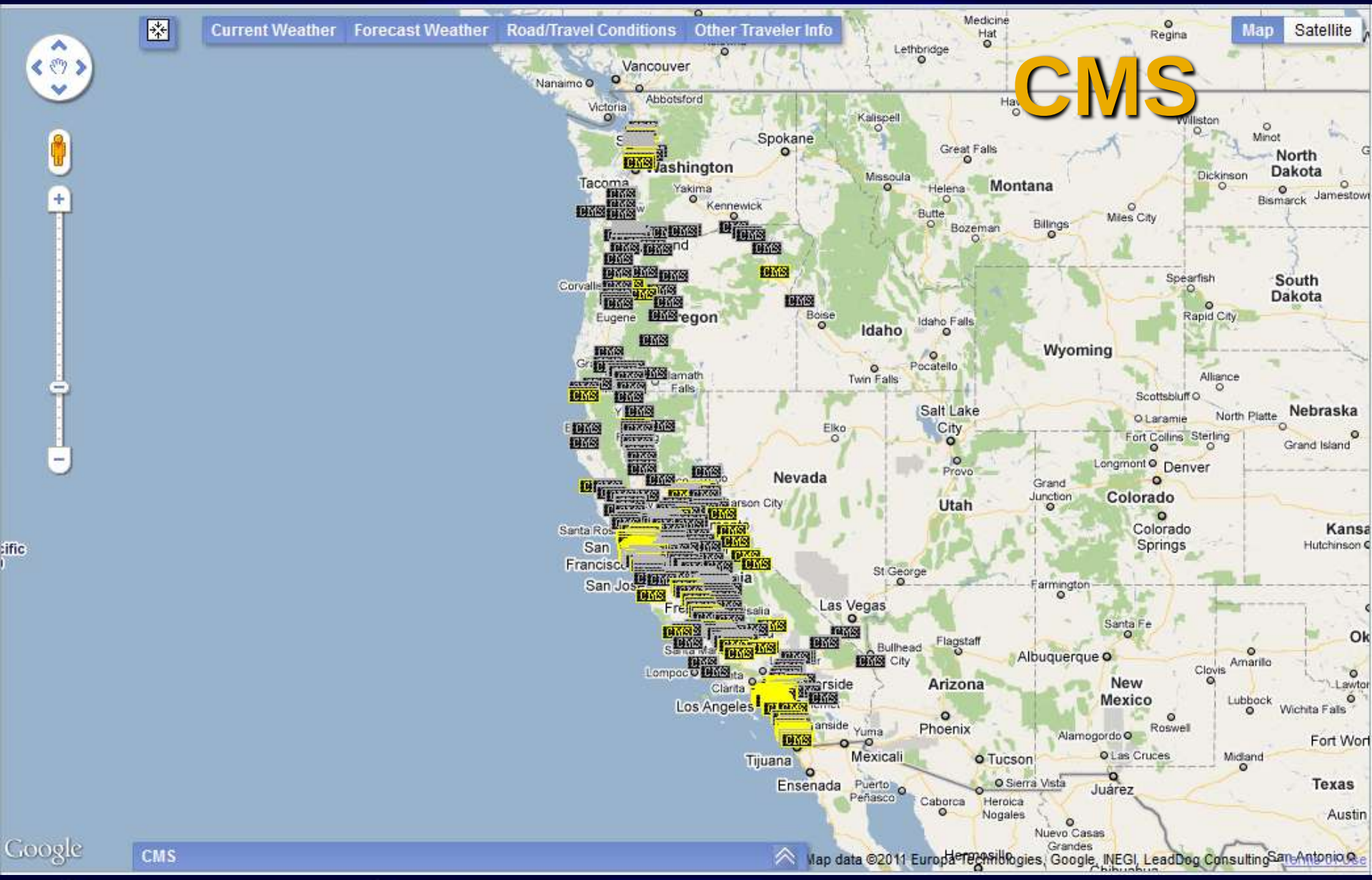

I-5 at Exit 6 Near Siskiyou Summit
I-5 at Exit 6 Near Siskiyou Summit
Updated: Jun 09 2011 8:05 AM
Looking North
ODOT
Elevation 4100
TripCheck.com
Milepost 5.00
Temperature 51.1F
Wind E
MPH 2

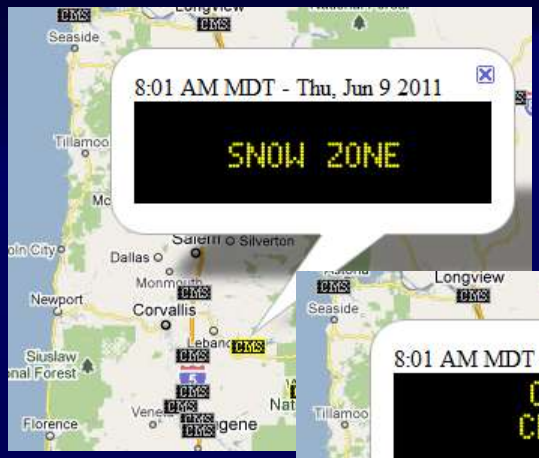
Route Coverage: Los Angeles to Seattle





CCTV Images convey a lot of information …


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Map
Satellite
CMS
Vancouver
Nanaimo
Victoria
Abbotsford
Spokane
Tacoma
Yakima
Kennewick
Eugene
Corvallis
Boise
Idaho
Idaho Falls
Twin Falls
Pocatello
Wyoming
Montana
Kalispell
Great Falls
Missoula
Helena
Butte
Bozeman
Billings
Miles City
Williston
Minot
North Dakota
Dickinson
Bismarck
Jamestown
Spearfish
South Dakota
Rapid City
Alliance
Scottsbluff
Laramie
North Platte
Nebraska
Grand Island
Fort Collins
Sterling
Longmont
Denver
Colorado
Colorado Springs
Grand Junction
Salt Lake City
Provo
Utah
Nevada
Elko
St George
Farmington
Las Vegas
Flagstaff
Bullhead City
Albuquerque
Santa Fe
Arizona
New Mexico
Clovis
Amarillo
Lubbock
Wichita Falls
Roswell
Alamogordo
Las Cruces
Midland
Phoenix
Yuma
Tucson
Mexicali
Tijuana
Ensenada
Puerto Peñasco
Caborca
Heroica Nogales
Sierra Vista
Juárez
Texas
Austin
San Antonio
Nuevo Casas Grandes
Hermosillo
Chihuahua
Lompoc
Clarita
Los Angeles
San Francisco
San Jos
Santa Ros
Google
CMS
Map data ©2011 Europa Technologies, Google, INEGI, LeadDog Consulting


8:01 AM MDT - Thu, Jun 9 2011
SNOW ZONE

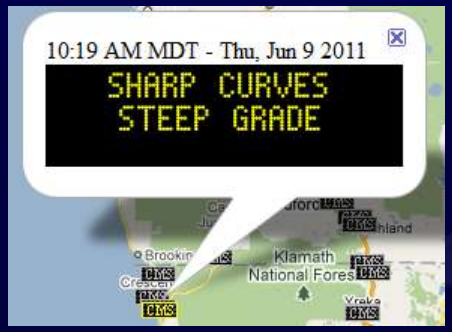

8:01 AM MDT - Thu, Jun 9 2011
CARRY
CHAINS


10:24 AM MDT - Thu, Jun 9 2011
CAUTION ROADWORK
3 MILES AHEAD
NO SHOULDER


8:01 AM MDT - Thu, Jun 9 2011
ROAD CONSTRUCTION
REDUCED SPEED
3 MILES AHEAD

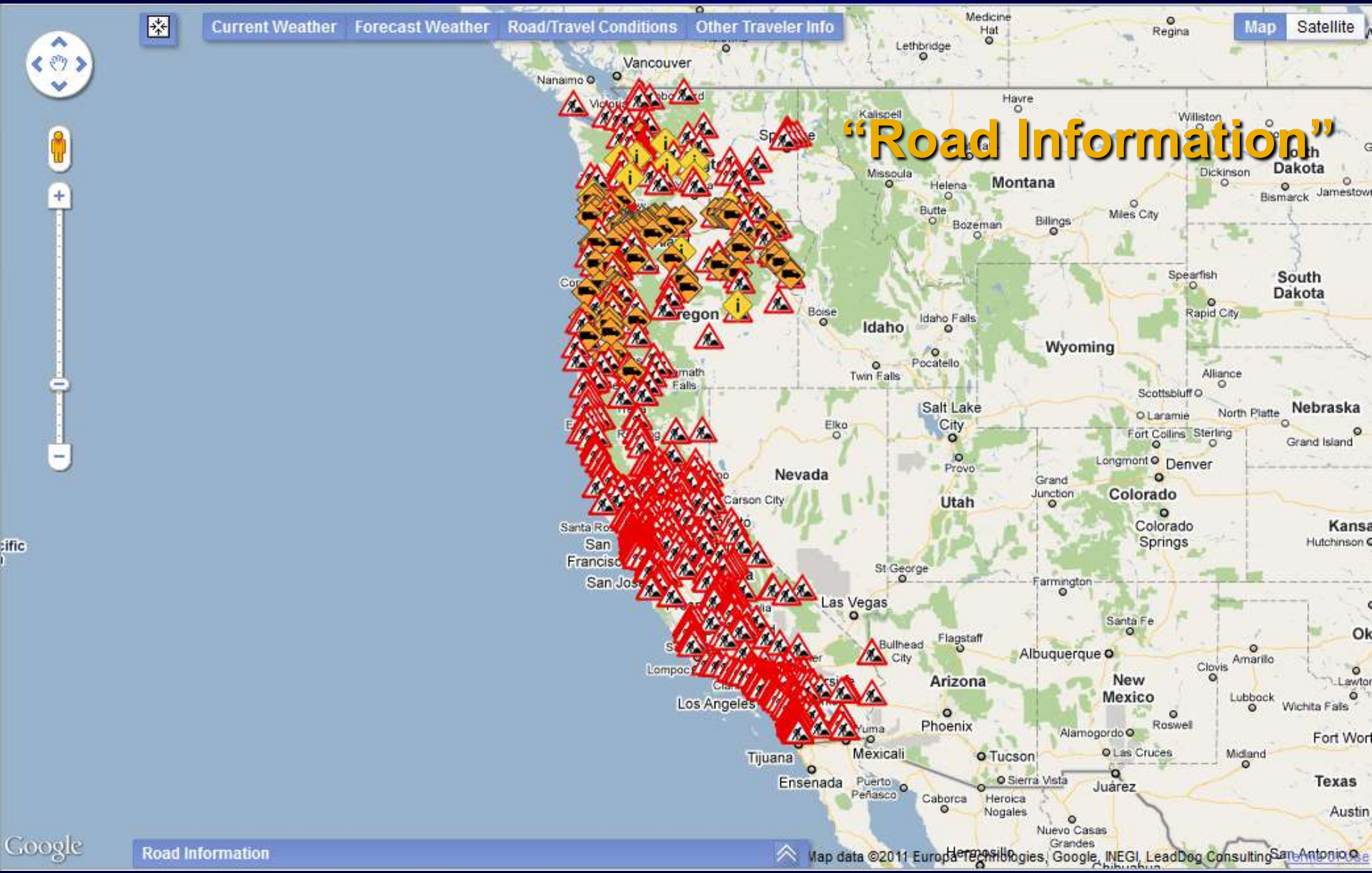

3:23 PM MDT - Wed, Jun 8 2011
TUKWILA 16 MIN
SEATTLE 49 MIN
BELLEVUE 47 MIN
WSDOT 005vm13939
Jun 9, 2011 8:41 AM


8:01 AM MDT - Thu, Jun 9 2011
2-WAY
TRAFFIC


10:19 AM MDT - Thu, Jun 9 2011
SHARP CURVES
STEEP GRADE


10:24 AM MDT - Thu, Jun 9 2011
DONNER SUMMIT
REST AREA
CLOSED


10:24 AM MDT - Thu, Jun 9 2011
SR 120 - CLOSED
SR 108 - OPEN
SR 89 - OPEN


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Map
Satellite
"Road Information"
Road Information
Google
Map data ©2011 Europa Technologies, Google, INEGI, LeadDog Consulting
Vancouver
Nanaimo
Lethbridge
Medicine Hat
Regina
Havre
Kalispell
Missoula
Helena
Montana
Butte
Bozeman
Billings
Miles City
Williston
Dickinson
Bismarck
Jamestown
South Dakota
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Rapid City
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Pocatello
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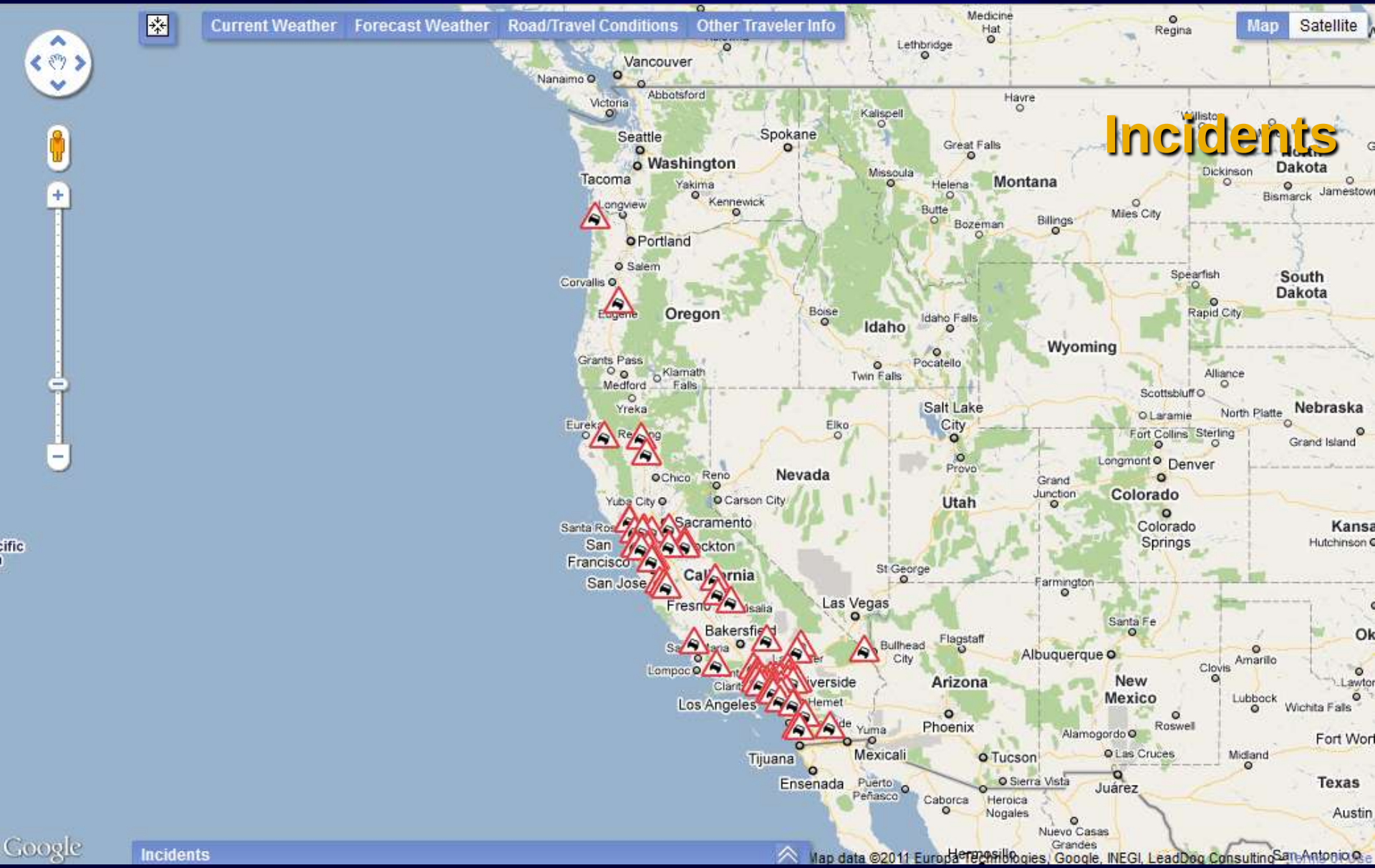
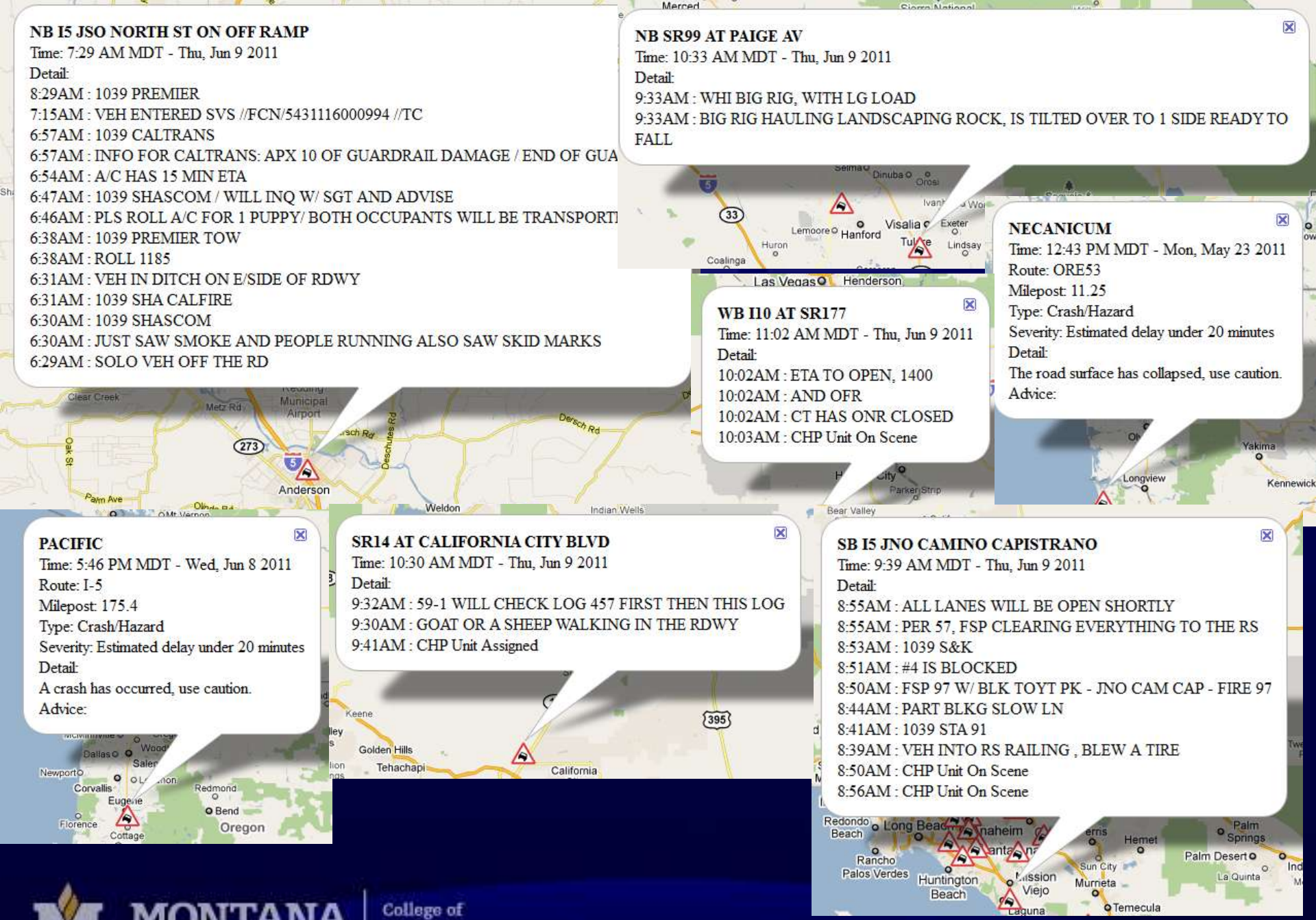
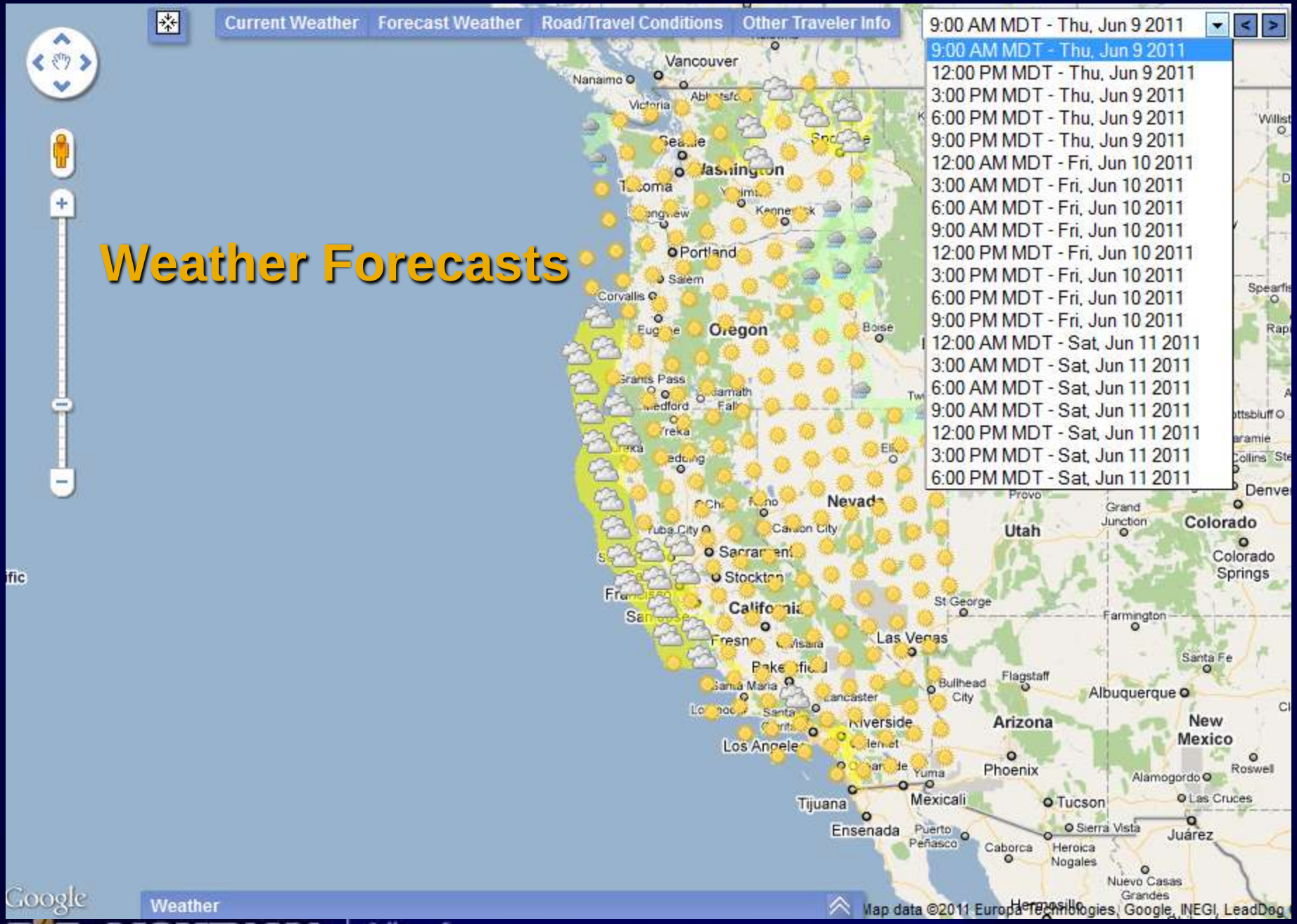
Wyoming
Alliance
Scottsbluff
Laramie
North Platte
Nebraska
Grand Island
Fort Collins
Sterling
Longmont
Denver
Salt Lake City
Provo
Elko
Nevada
Carson City
Utah
Grand Junction
Colorado
Colorado Springs
Hutchinson
San Francisco
San Jose
St George
Farmington
Las Vegas
Santa Fe
Flagstaff
Bullhead City
Albuquerque
Amarillo
Clovis
Arizona
New Mexico
Lubbock
Wichita Falls
Los Angeles
Phoenix
Roswell
Alamogordo
Las Cruces
Midland
Tucson
Mexicali
Tijuana
Ensenada
Puerto Peñasco
Sierra Vista
Juárez
Caborca
Heroica Nogales
Texas
Austin
Nuevo Casas Grandes
Hermosillo
San Antonio

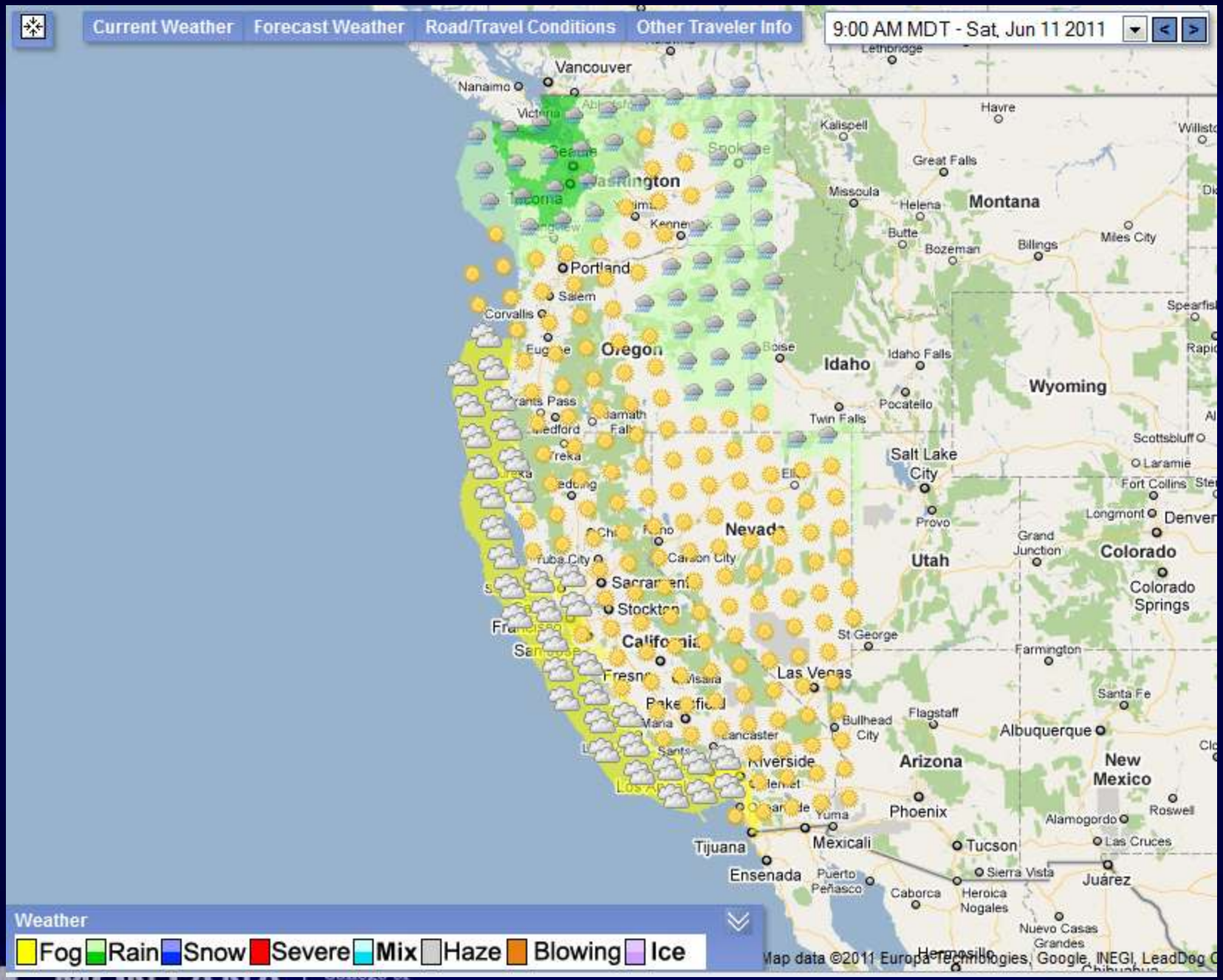

HATCHERY CREEK RD
Updated: 5:17 PM MDT - Mon, Jun 6 2011
Type: Construction
Route: 002
Milepost: 91.00
Description: On US 2, west of Leavenworth in Tumwater Canyon Wednesday and Thursday ONLY from 7 a.m. to 4 p.m., on Wednesday and 7 a.m. to noon , on Thursday, expect up to 20 minute delays with single lane flagger controlled traffic while WSDOT Geotech Engineers measure the slope for the steel netting that will be hung when these slopes are stabilized later this summer.
Advice:
UMPQUA
Updated: 8:05 AM MDT - Thu, Jun 9 2011
Type: Maintenance Work
Route: ORE38
Milepost: 18
Severity: Estimated delay under 20 minutes
Description: Traffic control with flaggers for brush cutting crew.
Advice:
Junction w/Route 395 to End of Pavement
Updated: 8:01 AM MDT - Thu, Jun 9 2011
Type: Highway Construction
Route: 270
Milepost: 0
Description: Estimated delay: 20
Advice:
None
Updated: 8:42 AM MDT - Thu, Jun 9 2011
Type: Lane Closure
Route: 090
Milepost: 111.00
Description: Lane Closure for maintenance work on I-90 west bound between milepost 111 to milepost 110 beginning at 7:40 AM on June 09, 2011 until 3:11 AM.
Advice:
PACIFIC
Updated: 8:00 PM MDT - Wed, Jun 8 2011
Type: Commercial Vehicle Information
Route: I-5
Milepost: 0
Severity: Informational only
Description: Effective May 24, 2011, this section of I-5 will be restricted to 16 feet 00 in. in width between the hours of 7:00 AM & 7:00 PM (DAYTIME). Estimated date of completion is June 30, 2011.
Advice:
THE DALLES-CALIFORNIA
Updated: 11:46 AM MDT - Tue, Jun 7 2011
Type: Information
Route: US97
Milepost: 68.9
Severity: Informational only
Description: Cow Canyon Rest Area closed for construction 3/7/11 through 6/25/11.
Advice:

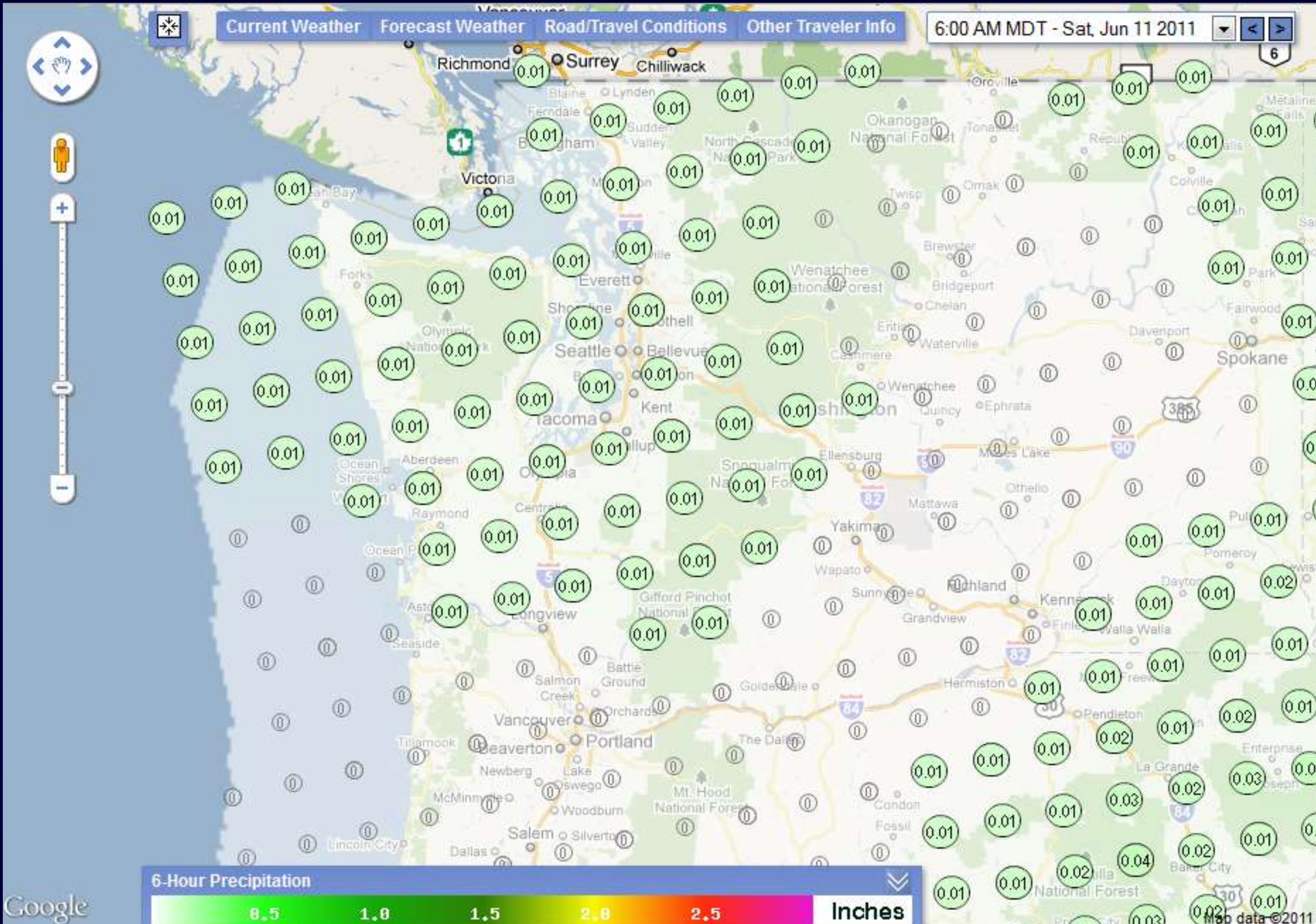

Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
Map
Satellite
Incidents
Vancouver
Seattle
Spokane
Washington
Portland
Oregon
Idaho
Montana
Wyoming
Nevada
Utah
Colorado
Arizona
New Mexico
California
Sacramento
San Francisco
San Jose
Las Vegas
Phoenix
Albuquerque
Los Angeles
Tijuana
Mexicali
Tucson
Denver
Salt Lake City
Boise
Reno
Fresno
Bakersfield
Riverside
Yuma
Juárez
Nebraska
South Dakota
Texas
Google
Incidents
Map data ©2011 Europa Technologies, Google, INEGI, LeadDog Consulting


NB I5 JSO NORTH ST ON OFF RAMP
Time: 7:29 AM MDT - Thu, Jun 9 2011
Detail:
8:29AM : 1039 PREMIER
7:15AM : VEH ENTERED SVS //FCN/5431116000994 //TC
6:57AM : 1039 CALTRANS
6:57AM : INFO FOR CALTRANS: APX 10 OF GUARDRAIL DAMAGE / END OF GUA
6:54AM : A/C HAS 15 MIN ETA
6:47AM : 1039 SHASCOM / WILL INQ W/ SGT AND ADVISE
6:46AM : PLS ROLL A/C FOR 1 PUPPY/ BOTH OCCUPANTS WILL BE TRANSPORT
6:38AM : 1039 PREMIER TOW
6:38AM : ROLL 1185
6:31AM : VEH IN DITCH ON E/SIDE OF RDWY
6:31AM : 1039 SHA CALFIRE
6:30AM : 1039 SHASCOM
6:30AM : JUST SAW SMOKE AND PEOPLE RUNNING ALSO SAW SKID MARKS
6:29AM : SOLO VEH OFF THE RD
NB SR99 AT PAIGE AV
Time: 10:33 AM MDT - Thu, Jun 9 2011
Detail:
9:33AM : WHI BIG RIG, WITH LG LOAD
9:33AM : BIG RIG HAULING LANDSCAPING ROCK, IS TILTED OVER TO 1 SIDE READY TO FALL
NECANICUM
Time: 12:43 PM MDT - Mon, May 23 2011
Route: ORE53
Milepost: 11.25
Type: Crash/Hazard
Severity: Estimated delay under 20 minutes
Detail:
The road surface has collapsed, use caution.
Advice:
WB I10 AT SR177
Time: 11:02 AM MDT - Thu, Jun 9 2011
Detail:
10:02AM : ETA TO OPEN, 1400
10:02AM : AND OFR
10:02AM : CT HAS ONR CLOSED
10:03AM : CHP Unit On Scene
PACIFIC
Time: 5:46 PM MDT - Wed, Jun 8 2011
Route: I-5
Milepost: 175.4
Type: Crash/Hazard
Severity: Estimated delay under 20 minutes
Detail:
A crash has occurred, use caution.
Advice:
SR14 AT CALIFORNIA CITY BLVD
Time: 10:30 AM MDT - Thu, Jun 9 2011
Detail:
9:32AM : 59-1 WILL CHECK LOG 457 FIRST THEN THIS LOG
9:30AM : GOAT OR A SHEEP WALKING IN THE RDWY
9:41AM : CHP Unit Assigned
SB I5 JNO CAMINO CAPISTRANO
Time: 9:39 AM MDT - Thu, Jun 9 2011
Detail:
8:55AM : ALL LANES WILL BE OPEN SHORTLY
8:55AM : PER 57, FSP CLEARING EVERYTHING TO THE RS
8:53AM : 1039 S&K
8:51AM : #4 IS BLOCKED
8:50AM : FSP 97 W/ BLK TOYT PK - JNO CAM CAP - FIRE 97
8:44AM : PART BLKG SLOW LN
8:41AM : 1039 STA 91
8:39AM : VEH INTO RS RAILING , BLEW A TIRE
8:50AM : CHP Unit On Scene
8:56AM : CHP Unit On Scene

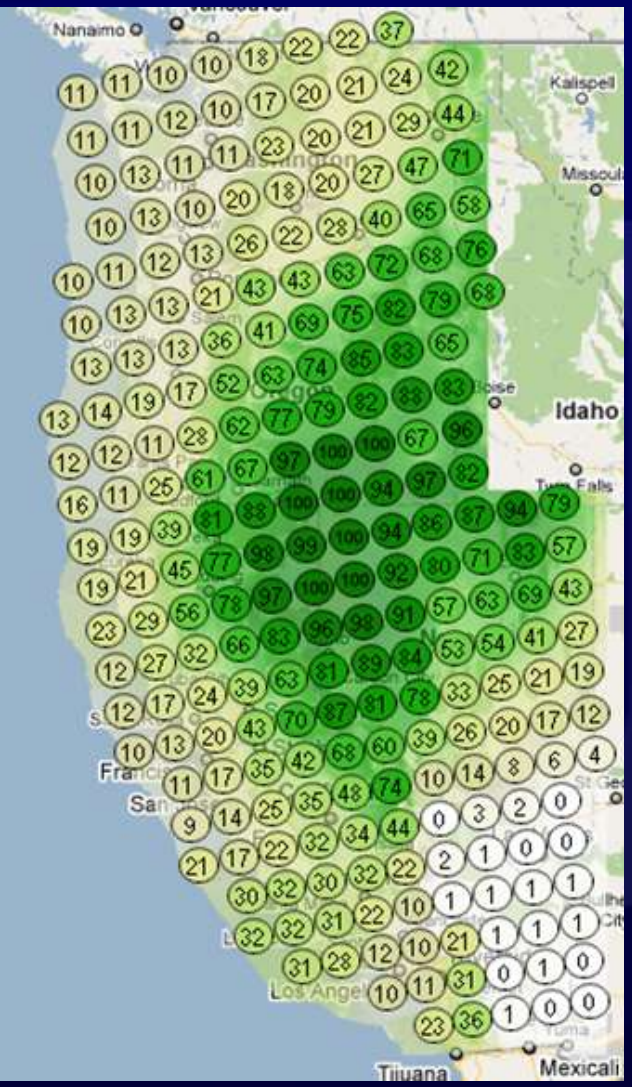
Weather Forecasts

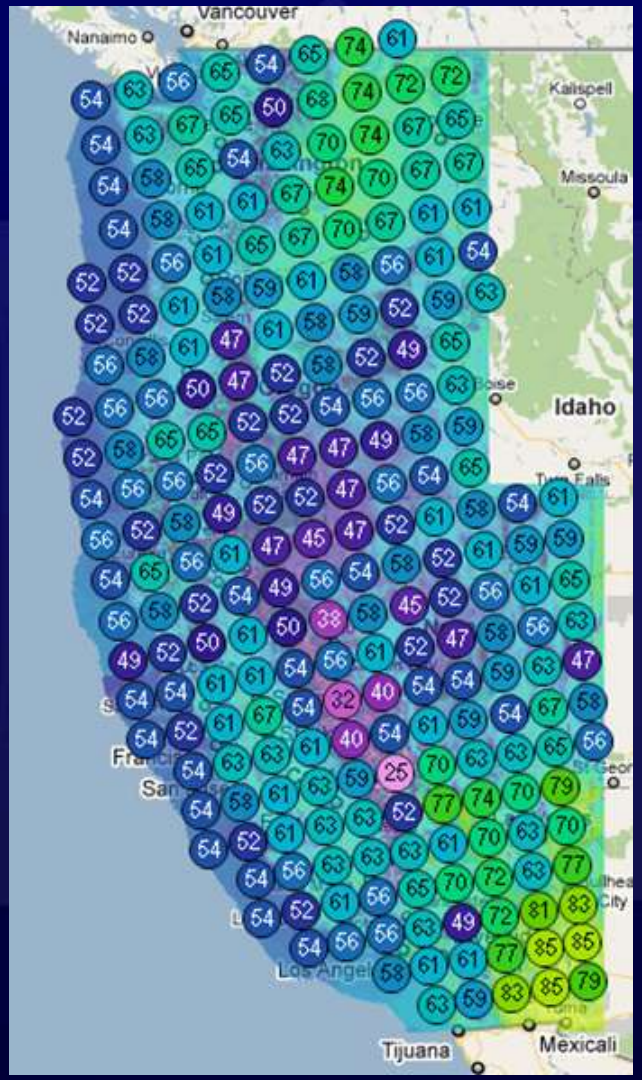


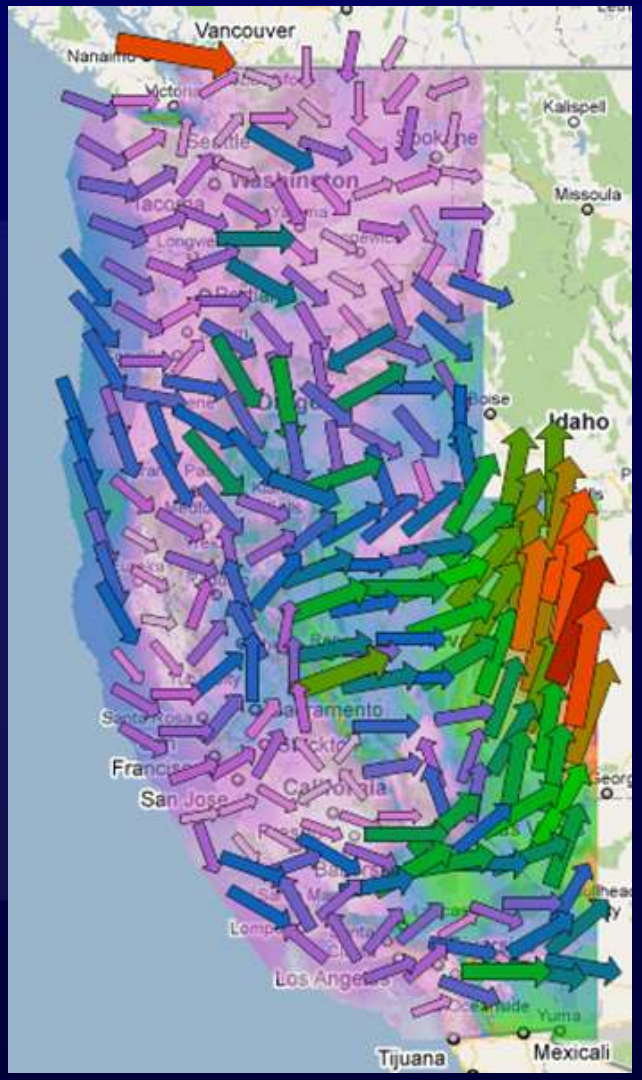

Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
9:00 AM MDT - Sat, Jun 11 2011
Vancouver
Nanaimo
Victoria
Seattle
Spokane
Tacoma
Portland
Salem
Corvallis
Eugene
Oregon
Medford
Grants Pass
Klamath Falls
Redding
Reno
Carson City
Yuba City
Sacramento
Stockton
San Francisco
San Jose
California
Fresno
Visalia
Bakersfield
Las Vegas
Nevada
Lancaster
Riverside
Santa Ana
Los Angeles
Tijuana
Ensenada
Mexicali
Yuma
Phoenix
Arizona
Tucson
Flagstaff
Bullhead City
St George
Salt Lake City
Provo
Utah
Grand Junction
Colorado
Colorado Springs
Denver
Fort Collins
Longmont
Laramie
Scottsbluff
Cheyenne
Pocatello
Idaho Falls
Boise
Idaho
Twin Falls
Wyoming
Montana
Kalispell
Havre
Great Falls
Missoula
Helena
Butte
Bozeman
Billings
Miles City
Lethbridge
Farmington
Santa Fe
Albuquerque
New Mexico
Roswell
Alamogordo
Las Cruces
Sierra Vista
Juárez
Caborca
Puerto Peñasco
Heroica Nogales
Nuevo Casas Grandes
Hermosillo
Weather
Fog
Rain
Snow
Severe
Mix
Haze
Blowing
Ice
Map data ©2011 Europa Technologies, Google, INEGI, LeadDog


Current Weather
Forecast Weather
Road/Travel Conditions
Other Traveler Info
6:00 AM MDT - Sat, Jun 11 2011
Richmond
Surrey
Chilliwack
Victoria
Everett
Seattle
Bellevue
Kent
Tacoma
Aberdeen
Raymond
Longview
Vancouver
Portland
Beaverton
Salem
Yakima
Wenatchee
Ellensburg
Richland
Kennewick
Walla Walla
Hermiston
Pendleton
La Grande
Spokane
Okanogan National Forest
Moses Lake
The Dalles
Mt. Hood National Forest
Gifford Pinchot National Forest
6-Hour Precipitation
0.5
1.0
1.5
2.0
2.5
Inches
Map data ©2011

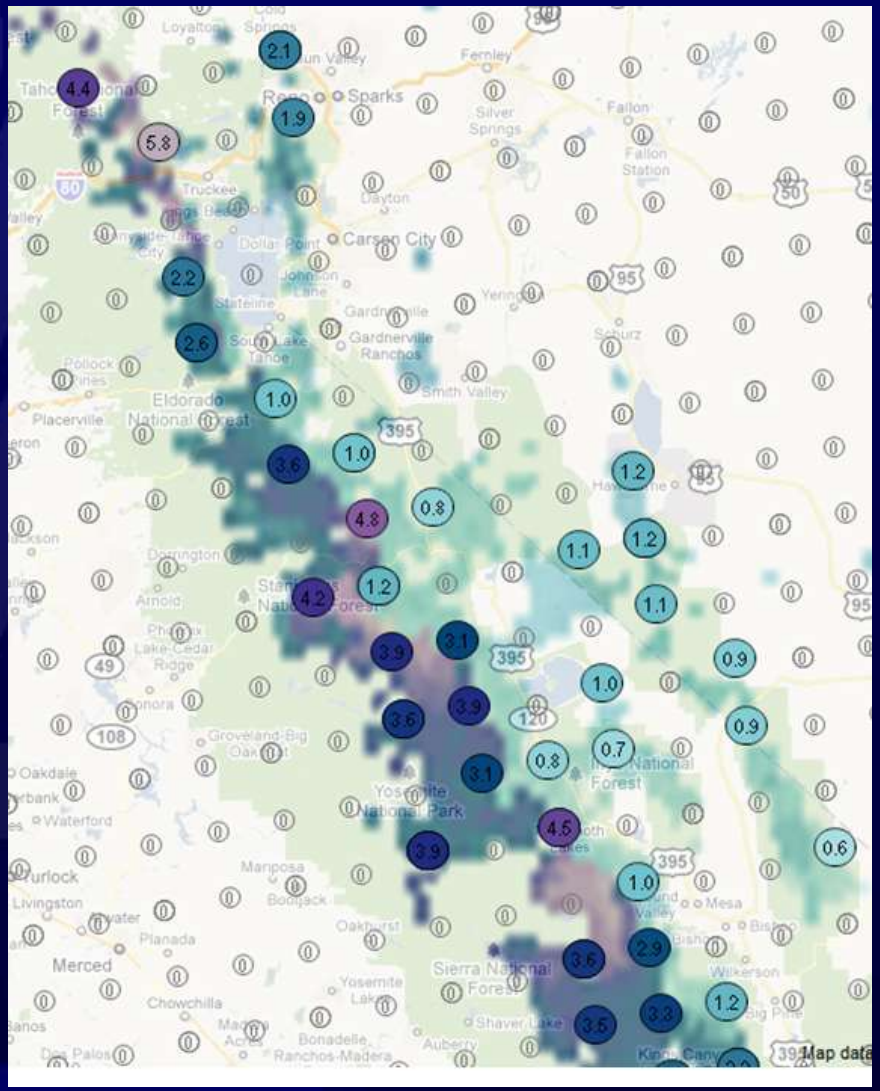
Information at a Glance







Further Detail Upon Zoom



Brief Live Demonstration

- If time, network, etc. allow …

Tasks and Deliverables

Contract Start = 9/24/2010 Actual Start = 11/1/2010 End=9/23/2011

project month	1	2	3	4	5	6	7	8	9	**10**	11	12
System Concept												
• Concept Report	D✓											
Requirements												
• Technical Memorandum – Requirements		D✓										
Design and Development												
• Technical Memorandum – System Design				D✓								
• Technical Memorandum – System Documentation								D				
• Completed System								D				
• User Guide								D				
Evaluation/User Survey												
• Survey Instrument									D			
• Final Report										D	⇦	D

Duration = 12 months

Amount of Award = $79,995

Year 1 Incubators

Year One Projects

- Survey of Western State Safety Warning Devices
- Regional Integrated Corridor Management Planning
- Status – Startup pending contract execution, anticipated June/July
- Workplans finalized

Survey of Safety Warning Devices

- Synthesis of existing safety warning devices in the western U.S.
- Contact entities to obtain specific information of interest
  - Identify location of existing deployments, their function/purpose, and other info

Survey of Safety Warning Devices

- Approach
  - Identify devices of interest and develop questionnaire
    - Work in conjunction with WSRTC members
  - Identify and contact agencies/staff
    - Personal contact via telephone calls
  - Summarize data and produce report
  - 12 month timeline

Regional ICM Planning

- Revised based on steering comm. Feedback at November meeting
- Establish guidance and criteria to initiate, plan and develop rural ICM plans
  - Define what rural ICM is and establish factors to consider
- Apply results of USDOT Integrated Corridor Management initiative to the rural environment

Regional ICM Planning

- Approach
  - Literature review
  - Document current ICM planning protocols
    - i.e. USDOT ICM initiative
  - Document current emergency operations center protocols
    - i.e. what are WSRTC agencies doing
  - Develop rural ICM planning protocols/ process
    - Solicit Steering Comm. feedback on candidate test route(s)

Regional ICM Planning

- Approach cont'd
  - Route inventory for selected route(s)
  - Apply developed criteria to study route(s)
  - Final report
- Timeline – 12 months

COATS Phase 4 Project Updates

- Rural Deployment Assistance
- Fredonyer Pass Icy Curve Warning System (ICWS)

Rural Deployment Assistance:

Analysis and Recommendations for Optimization and Deployment of WeatherShare and Related Web-Based Projects

Multiple Projects on a Similar Platform

- WeatherShare
- Integrated Corridor Management Clearinghouse (ICM)
- Caltrans One Stop Shop for Traveler Information
- Integration of Aviation Automated Weather Observation Systems (AWOS) with Roadside Weather Information Systems (RWIS)
- Clarus One Stop Shop
- WSRTC One Stop Shop (Phase 2)

Challenges

- Still in research and development mode – need to move to production
- Fragmented code-base with a lot of redundant code, data, etc.
- Non-optimal code
- Lack of scalability
- Poor logging/tracking – made analysis difficult.
- Hard to characterize use – seasonal components, mixed user types, etc.
- Use has been relatively limited
- Need to plan for expanded coverage area
- Hosted at Montana State University

Analysis

- System Performance
  - Networking (incoming and outgoing)
  - Storage
  - CPU
  - Memory
- Implementation
  - Software
  - Database
  - Documentation
  - Support

Hosting Alternatives

- Dedicated Server
- Dynamic Cloud Server
- Elastic Cloud Server

Recommendations

- Implement optimizations such as server-side compression of text files
- Determine whether or not archiving is necessary
- Re-factor code
- Put greater emphasis on system documentation, on-going support, maintenance, re-use and scalability
- Investigate hosting options further, particularly “elastic” options – dynamic expansion

Fredonyer Pass Icy Curve Warning System

Fredonyer ICWS

- Project objective: evaluate the operational, safety and maintenance aspects of the ICWS
- Status: Revising analysis to incorporate chain control data and finishing report
- Preliminary results: indicate system appears to have reduced crashes and lowered speeds

Fredonyer ICWS

- Tasks:
  - Literature review update
  - Analysis of radar speed data
  - Analysis of crash data
  - Document maintenance aspects

Fredonyer ICWS Crash Analysis

- Examine crash data and trends before and after the deployment of ICWS
- Used observational before-after study method employing the Empirical Bayes technique
  - Addresses concerns such as regression to the mean, changes in traffic flow, and other factors
  - Used 4.5 years of before data (January 1, 1998 – June 30, 2002) and 1.5 years of after data (July 1, 2008 – December 31, 2009)

Fredonyer ICWS Crash Analysis

- Results
  - Calculating the index of effectiveness (θ), ICWS reduced crashes by 18% during after period (annual)
    - Assumption that changes in crashes attributed to presence of the ICWS, as no other geometric or safety improvements were made during the study period
    - Ongoing work examining chain control status and crashes has indicated that only two crashes occurred shortly before R-1 chain control implemented (data available from 2008-2009)

Fredonyer ICWS Crash Analysis

- Observed crash rates by severity also improved

Study Period	Crash Rate (ice-related crashes per winter season)				
	Total	PDO	Injury	Fatality	Fatality + Injury (F+I)
Before	8.38	5.51	2.42	0.44	2.86
After	6.67	4.00	2.67	0	2.67

- Indicates that vehicles may be traveling slower = lower severity
- Based on these improvements, estimated safety benefit of $1.7 million

Fredonyer ICWS Speed Analysis

- T-tests employed to determine statistical significance between speeds
- Speeds differences of 0 mph, 3 mph and 5 mph examined
- Speeds evaluated for system state (on/off), day/night and weather

Fredonyer ICWS Speed Analysis

- System state
  - Speeds were significantly lower at 0 mph, 3 mph and 5 mph when system was on
- Day/Night
  - Speeds were significantly lower at 0 mph, 3 mph and 5 mph when system was on during both day and night

Fredonyer ICWS Speed Analysis

- Weather
  - Speeds were significantly lower at 0 mph, 3 mph and 5 mph when system was on during both day and night
  - Day - mean speeds fell between 6.20 mph and 10.73
  - Night - mean speeds fell between 10.34 mph and 16.14 mph

Fredonyer ICWS Speed Analysis

- Clear Cold Dry/Not Dry
  - Mean speeds different at 0 mph during day and night when signs on
  - Mean speeds different at 3 mph during day and night when signs on
  - Only limited number of mean speed differences greater than 5 mph
  - Appears ICWS prompts approximately 3 mph speed reductions when icy roads are not necessarily expected

Fredonyer ICWS Conclusions

- Crashes – initial results indicate that crashes have been reduced by approximately 18%
  - Only evaluated 1 ½ years of “after” data
- Speeds – system appears to reduce speeds by approximately 3 mph during clear, cold and not dry conditions
  - Results pertain to sites prior to curves; greater reductions are possible/hypothesized as vehicles traverse curves

Discussion

Items

- Upcoming meetings
  - Next Consortium meeting – August at NRITS in Coeur d'Alene, Idaho
    - Scheduled for Wednesday, August 31st from 1:00 – 4:00 PDT
  - November Steering Committee Meeting – tentatively scheduled for November 8, 2011 in Yreka

Wrap-up