Orientation

AWOC Winter Weather Track

For AWOC Facilitators and Managers

by

Warning Decision Training Branch

Your Instructors Today

- Brad Grant

- Ed Mahoney

- Jim LaDue

- Don Rinderknecht

Here is the Outline of the Orientation

Section 1: Purpose of Course

Section 2: Overview of the Course

Section 3: Roles and Responsibilities

Section 4: Timelines

Section 1: Purpose of the Course
Why a Winter Weather Track?

- Winter Weather Impacts on Transportation
  - Nearly 74% of nation's roads are located in snowy regions
  - 7000 deaths/year
  - 1.4 million crashes
  - $10 billion economic losses

Source: Federal Highway Administration (FHWA) 2004

Buffalo, New York, 1977, Photographer: American Red Cross

Section 1: Why a Winter Weather Track?

- Winter Weather Impacts on Transportation (cont.)
  - Freeway speed and traffic volume reduced by 16-30 % (ISU study)
  - 23% of travel time delays
  - Increased operating and maintenance costs (nearly 39% of road operating costs can be attributed to winter maintenance annually)

Chicago, IL, Jan. 26, 1967, Photographer: Dept. of Streets and Sanitation

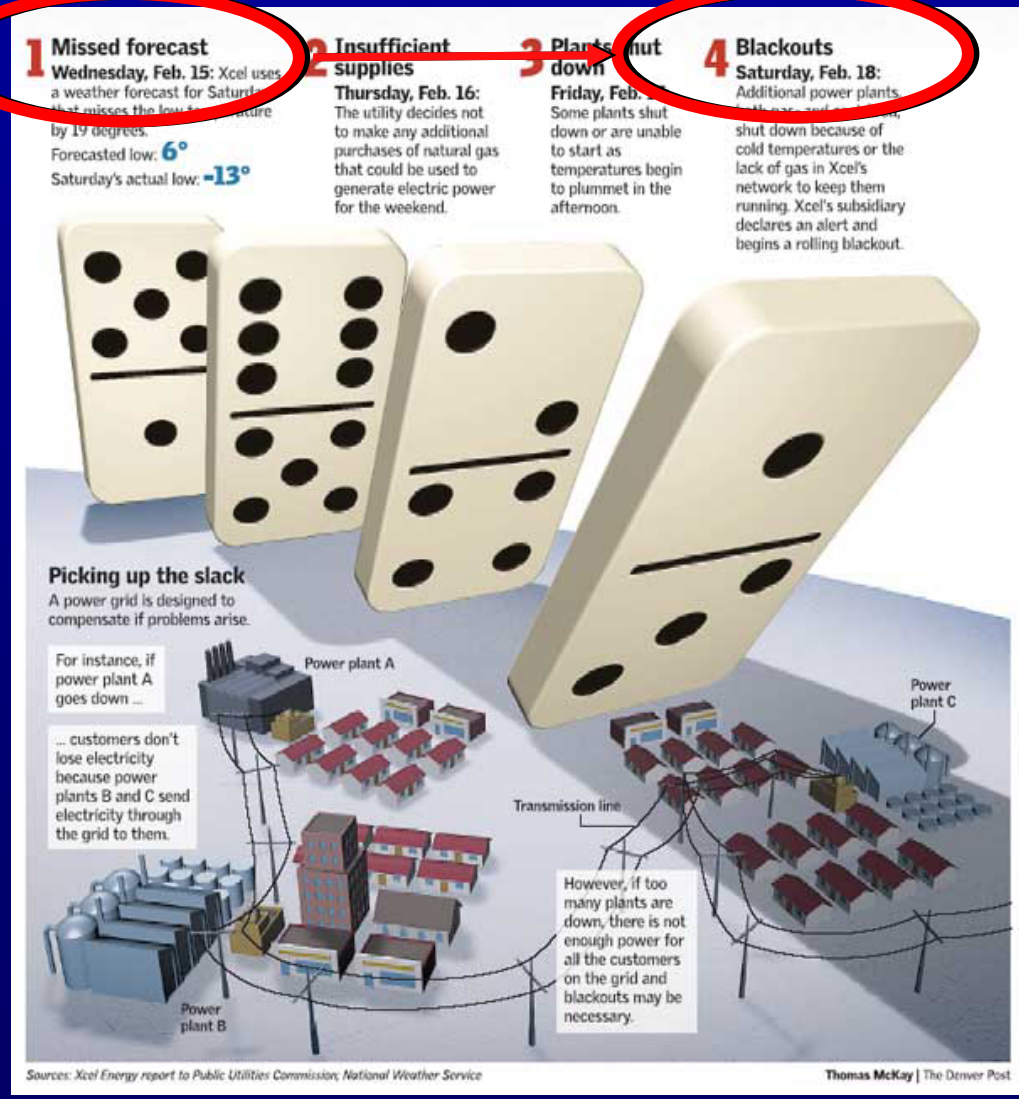
Section 1: Why a Winter Weather Track?

- Impacts on Public
  - No energy reserves
  - Heating costs
  - Snow-removal costs
  - Closures
  - Insurance losses

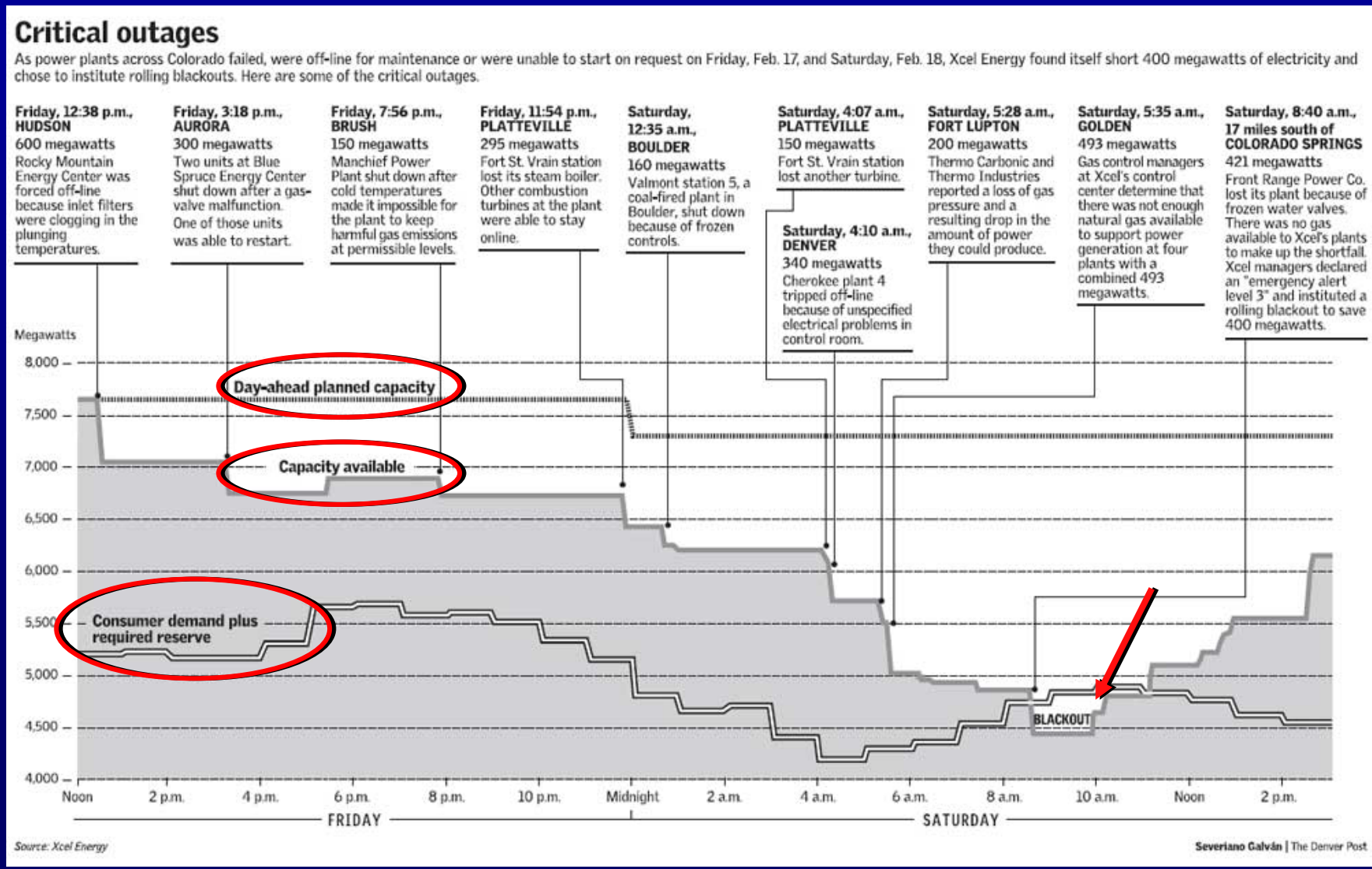
Courtesy Department of Sanitation, New York City

Rapidly Escalating Societal Demands

- Energy Industry has changed in just the past 10 years
- Has evolved to a “No Storage” model



Rapidly Escalating Societal Demands



Section 1: Why a Winter Weather Track?

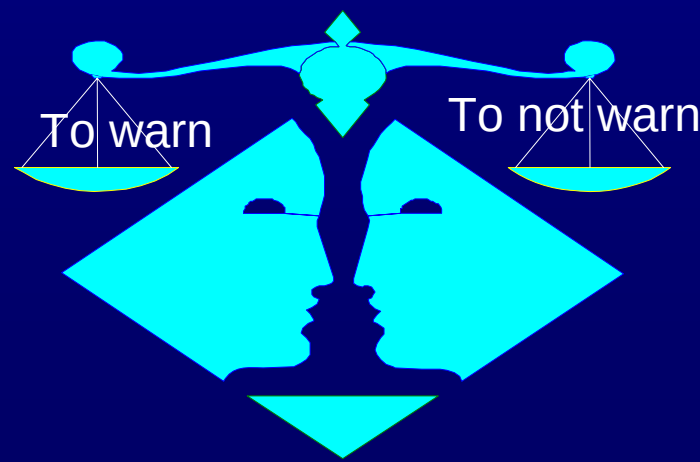
- Impacts on Schools

Image Source: Tulsa Union Public Schools

So, What are the Goals of the Course?

The Purpose Of AWOC

"To provide training to all warning forecasters on winter weather warning decision making principles"



We Use These Metrics to Report Our Performance to the Public and to Congress

EMAIL TO: All NWS Directors

FROM: David L. Johnson

SUBJECT: Advanced Warning Operations Course

Attainment of the highest levels of warning skill by our field staff is the cornerstone of our ability to protect lives and property. Our Government Performance Results Act (GPRA) goals reflect this high priority, as seven of our 14 goals are warning related. NWS conducts training programs to support the highest levels of quality and professionalism among its staff so that they, in turn, can best serve the public. The Office of Climate, Water, and Weather Service's new Advanced Warning Operations Course (AWOC) is a particularly important offering at this time with respect to the NWS Warning Program.

I consider mastery of the skills that are central to AWOC as critical for all forecasters with warning responsibility. This training is the first large-scale warning preparedness training available to all field staff in many years. Accordingly, we need to ensure all Meteorologists/Hydrologists-In-Charge incorporate AWOC into their Office Training Plans for the coming year.

AWOC training is accomplished via a combination of distance learning approaches (web and teletraining) and in-office facilitation. It addresses the science, technology and human factors necessary for an effective office warning program. The entire curriculum for the course can be accomplished in 24 to 28 hours – and all on station.

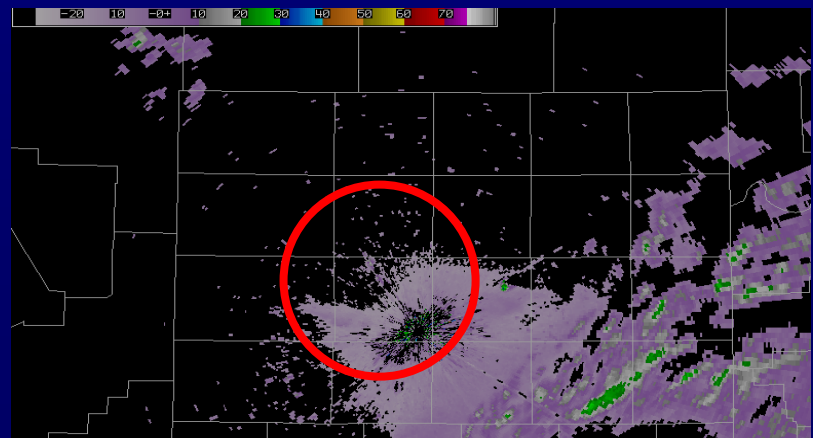
Thank you in advance for your assistance in making your staff aware of my high priority for completion of this course by all forecasters with warning responsibility.

Performance	2008	2009
Tornado Warni	76	76
Tornado Warni	68	67
Tornado Warni	15	16
Flash Flood Wa	90	91
Flash Flood Wa	58	59
Winter Storm W	90	91
Winter Storm W	15	16
Hurricane Track	126	125
Aviation Foreca	52	55
Aviation Foreca False Alarm Ra	66	65
U.S. Seasonal	23	24
Precipitation Fo	28	29
Marine Wind Sp	68	69
Marine Wave H	80	81

Section 1: Purpose of Course (cont.)

- The training is also directly related to NOAA Commerce and Transportation Goals
  - Surface Weather Program
    - Accuracy of onset of event (frozen and freezing precip)
    - 0-6 hrs period: 85%
  - Aviation Program

	2005	2006	2007	2008	2009
Aviation Forecasts (Ceiling & Visibility) - Accuracy (%)	48	46	46	48	50	52	55
Aviation Forecasts - (Ceiling & Visibility) False Alarm Rate (%)	64	70	68	68	67	66	65



Section 2 : Overview of the AWWT

- Collaborative Development Process
- What's in the Course?

Partnerships

Peter Manousas (HPC)

Dan Peterson (HPC)

Paul Stokols (OCWWS)

Richard Grumm (CTP)

Eric Stevens (AFG)

Phil Schumacher (RAP)

David Schultz (NSSL)

Michael Evans (BGM)

Tom Niziol (BUF)

Randy Graham (GRR/SLC)

Ken Harding (ABR)

Dan Cobb (CAR/GRR)

Dan Baumgardt (ARX) review team

Carl Dierking (JNU)

Bruce Smith (APX)

Peter Banacos (SPC/BTV)

Pat Market (Univ. of Missouri-Columbia)

Brian Motta (FDTB)

John McLaughlin (Des Moines TV station)

Julie Adolphson (GGW)

Doug Wesley (COMET)

Dan Bikos (VISIT/CIRA)

Mike Myers (GJT)

Dave Reynolds (MTR)

Shannon White (OCWWS) review team

Section 2: Here is the AWWT

- Intended Audience
  - NOAA/NWS Forecasters with Winter Weather Warning Responsibility
  - WFOs/National Centers (HPC, SPC)
- Pre-requisites
  - DLOC or WSR-88D Ops Course Graduate
- Deliverables
  - Approx. 20 hours of instructional online courses on the LMS
  - Printed materials with binder (slides and notes)
  - Optional materials (job sheets, software applications, online courses)
  - Winter Weather WES Version (WES6.0ww)

So, What Will the AWOC Winter Weather Track Look Like?

AWOC Winter Track

Total = 20.5 hours*

- **IC 1**
  Orientation (30 min)
- **IC 2**
  Products and Services (1.5 hrs)
- **IC 3**
  Societal Impacts (1 hr)
- **IC 4**
  Climatology (3 hrs)
- **IC 5**
  Precipitation Forcing Mechanisms (3.5 hrs)
- **IC 6**
  Forecasting P-type and QPF (3 hrs)
- **IC 7**
  Monitoring (3 hrs)
- **IC 8**
  WES (5 hrs)

*includes 3 “optional” lessons

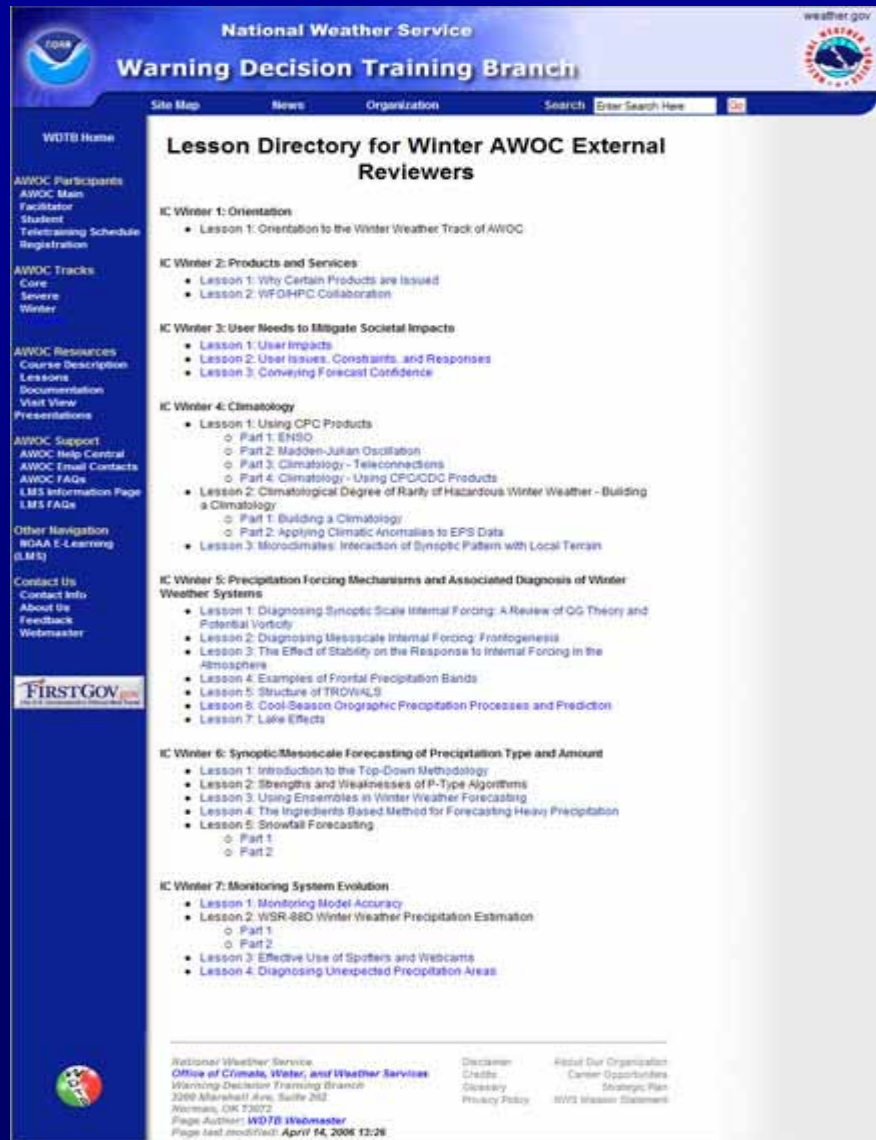
Section 2: How are the ICs Structured?

Instructional Component 3
Societal Impacts of Winter Weather

- Lesson 1: Significant Impacts to Users (20-30 minutes)
- Lesson 2: User Issues, Constraints, and Responses (20-30 minutes)
- Lesson 3: Conveying Forecaster Confidence (20-30 minutes)

AWOC Winter Wx Web Site

- Training materials are still under construction
  - http://wdtb.noaa.gov/courses/winterawoc/underreview/
- OLT “courses” (we call them lessons) available on LMS on June 5



What are Learning Objectives?

- Learning objectives are defined for each Instructional Component (IC).

- Learning objectives describe what learners should be able to do at the end of each lesson (and are testable via the OLT final tests in the LMS).

"Identify the key elements of the top-down approach to predict precipitation type and amounts in the watch and warning phases."

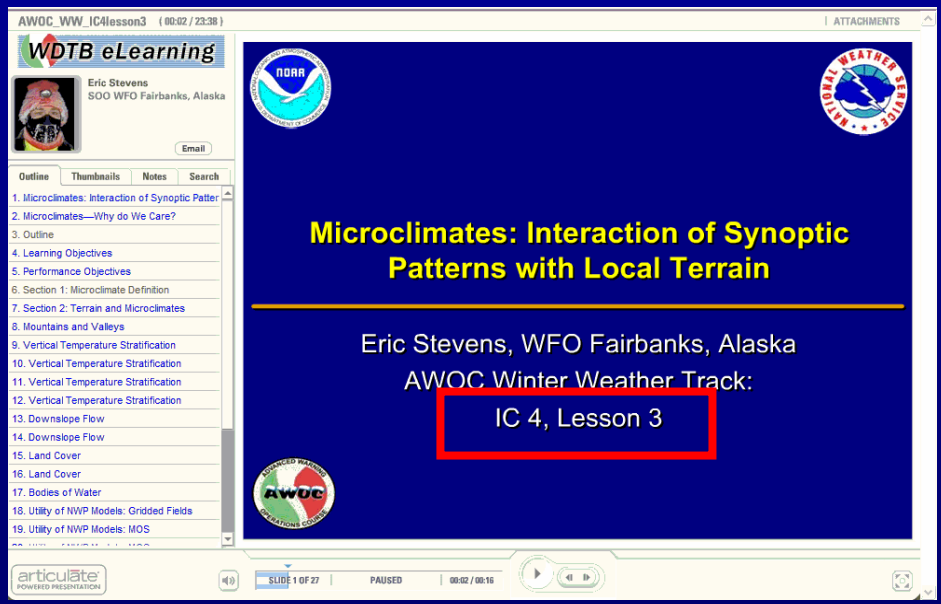
What are Performance Objectives?

- Performance objectives are defined for each IC.
- Performance objectives provide precise, measurable statements of the behaviors that course participants will be able to demonstrate on the job.

"For a given event, be able to disseminate pertinent products and event information to the user community in a timely fashion and update that information at appropriate intervals."

Learning Activities for Each IC?

Articulate Presentations



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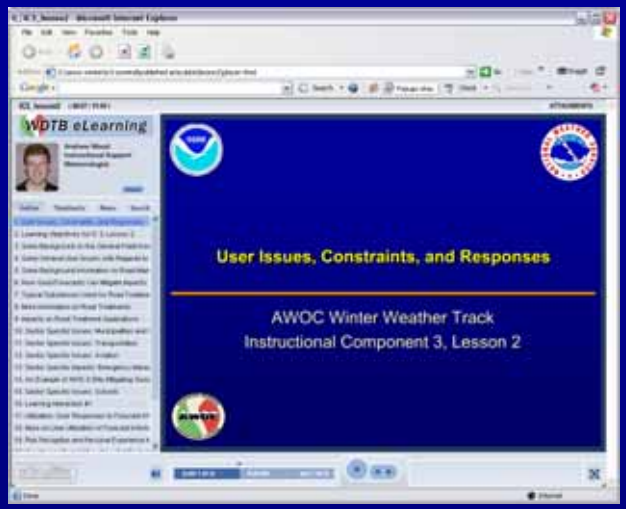
WES Application

Two 2.5 hr Simulations

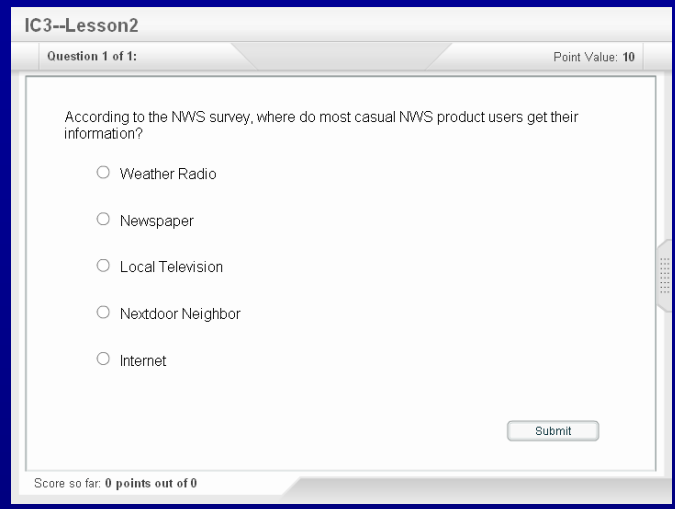
+

Increased Interactivity

Interactivity Increases Knowledge Retention



Throughout Presentations



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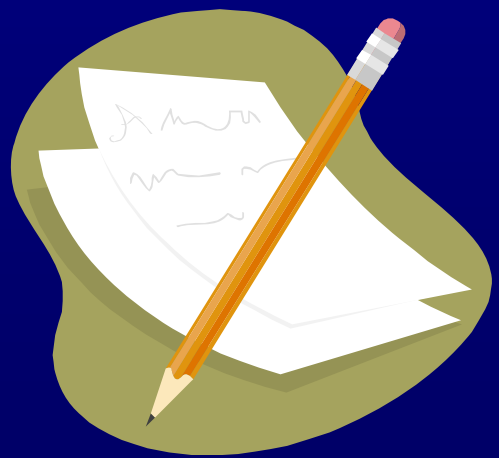
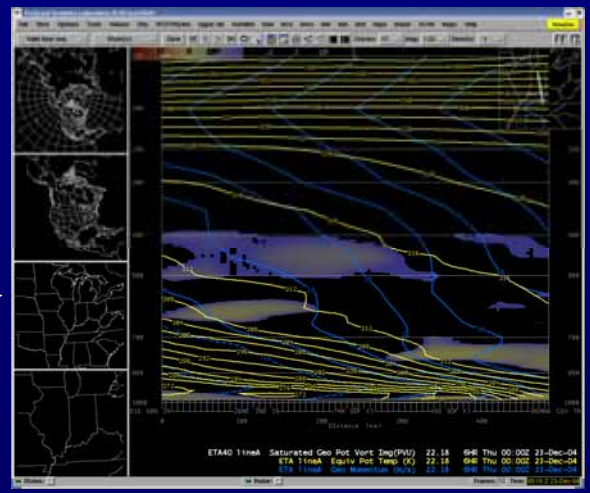


JOB SHEET
(Optional, ~15 min)

With



SEPARATE MINI-CASE – Review Mode

What are Job Sheets?

- Application with 10 mini-cases on WES
  - Case Study Mode
- One job sheet per lesson (IC 5-7)
- Several job sheets can be applied to each case
- Jobs sheets and case data shipped by June 1

Job Sheets—An Example

Winter Weather AWOC IC 5 Lesson 1
Job Sheet

IC 5 Lesson 1 Performance Objectives

1) What grid resolution to examine Q-vectors within AWIPS
2) How to recognize jets, fronts, troughs, and ridges on a tropopause map
    i. How to use tropopause maps to observe short waves
    ii. How to use tropopause maps to recognize convectively created "vorticity maximum"
3) Understand how upper level potential vorticity can impact the low-level wind fields

Case Review Mode Procedures and Questions

On your WES machine, load the case 2004Mar15, FSD localization, and set the clock to 15 March 2004, 13:00 UTC.

A. On the Regional map scale, load a GFS 90 500mb Height, V_g, V_{ag}, then answer the following questions.
    1) Where are the QG assumptions valid and invalid (location detail such as "northern Missouri" would suffice)? Explain why.

    2) What does the change in V_{ag} in the loop say about the development of the system?

B. Load GFS 90 Cross Section with Θ_{es}, Q vectors, Q_n, and Q_s at 3 layers: 850-700 mb (or 900-800 mb), 600-500 mb, and 400-300 mb. Answer the following questions.
    1) Focusing on each layer, where is the upward forcing located? If there is no upward forcing, answer "None".

Sample Quiz Question

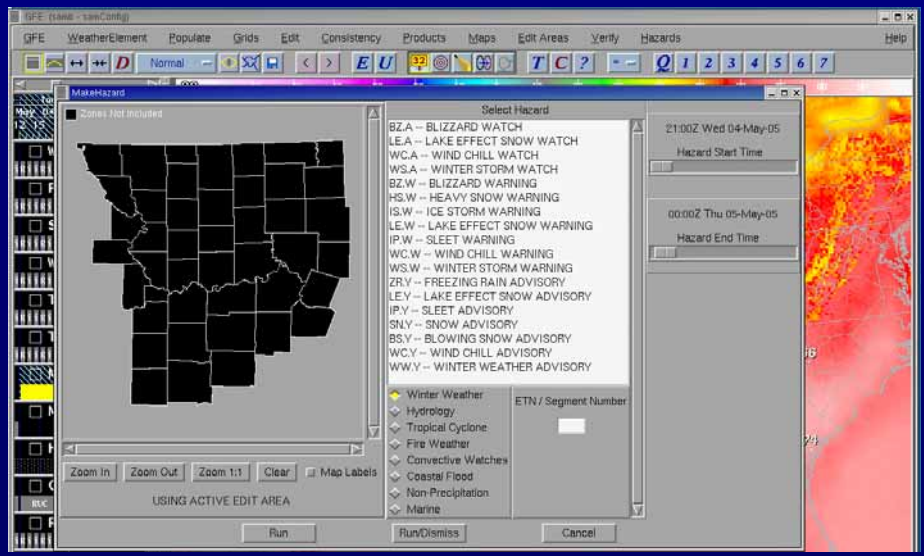
- A complex winter storm event is expected to produce 8” of snow in the northern part of your CWA, 1-2” of sleet and 4 inches of snow in central part of your CWA, and ½” of ice in the southern part of your CWA. Winds are expected to be 10 to 20 mph across the north with some local blowing snow.

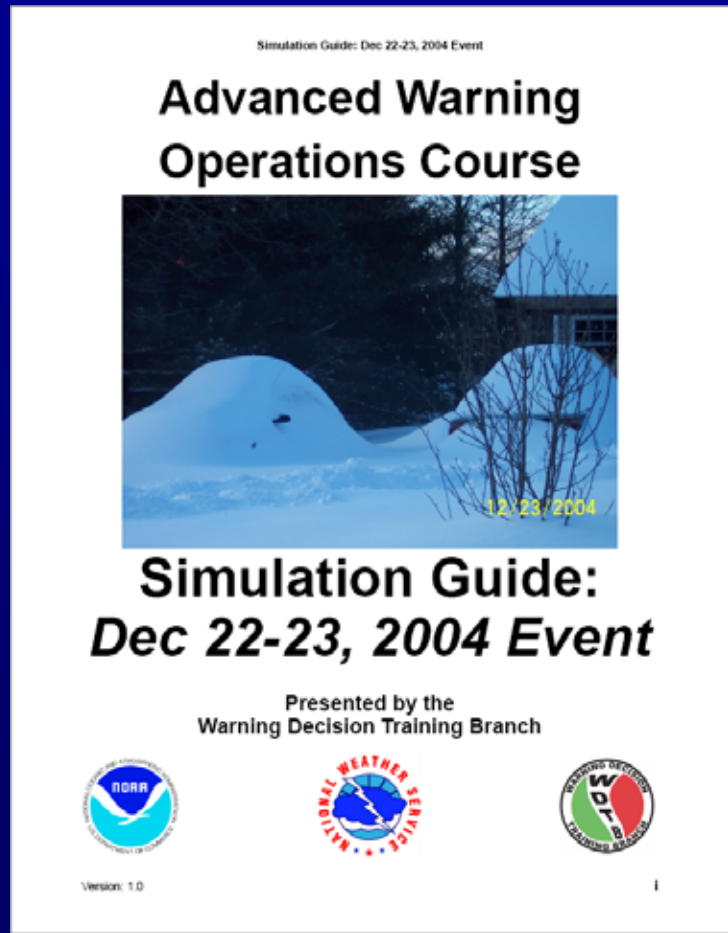
- What product (s) should be issued?

- A) Three separate warnings – Heavy Snow Warning north, Winter Storm warning central, and Ice Storm Warning south
- B) Two separate warnings – Winter Storm Warning north and central, and Ice Storm Warning south.
- C) Single Winter Storm Warning for the entire CWA

Simulation Case

- 22-23 Dec. 2004 heavy snow (IND) and snow/sleet/ice (LMK)
  - SREF, WESSL
- Can use your own local case
- Utilize GFE*

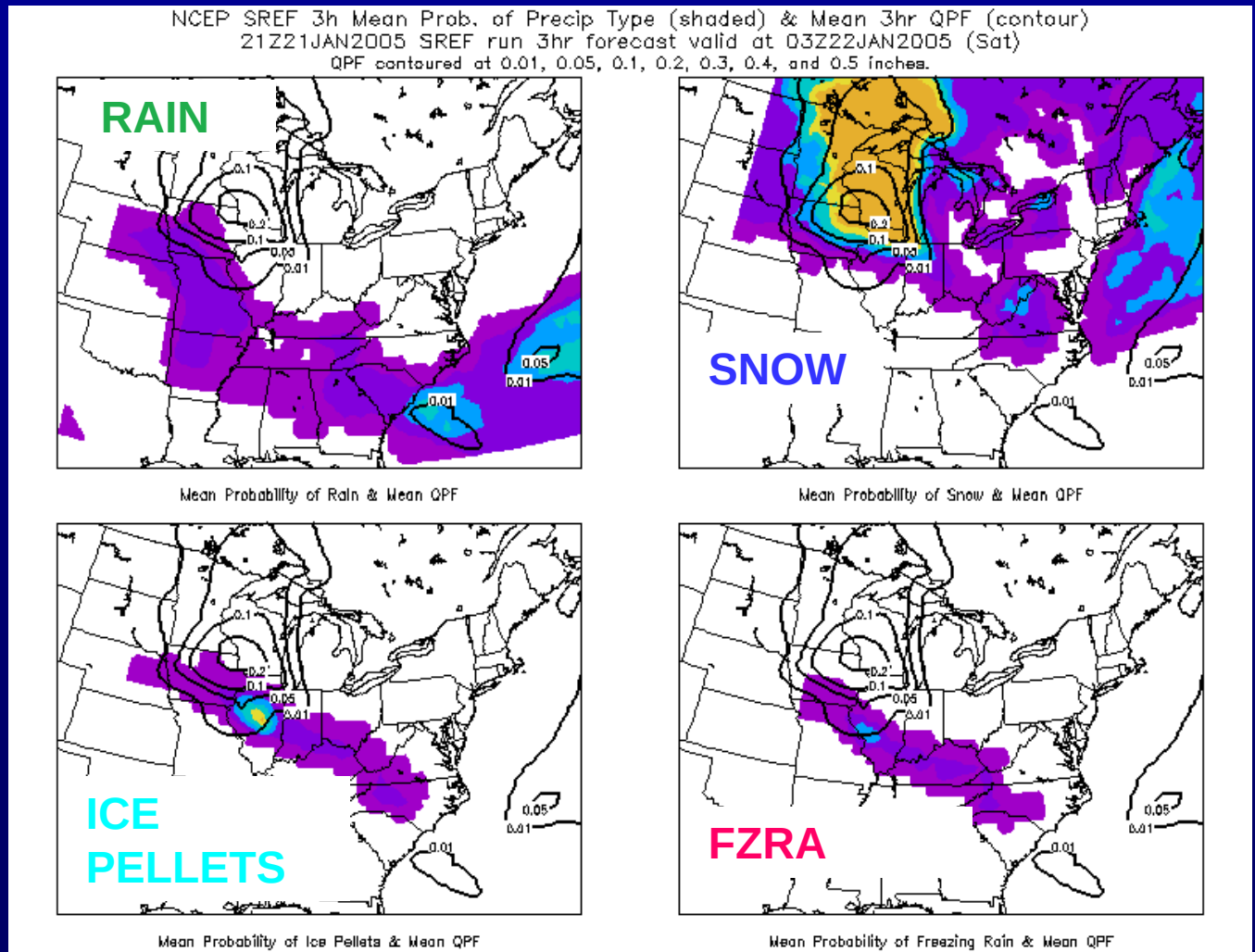




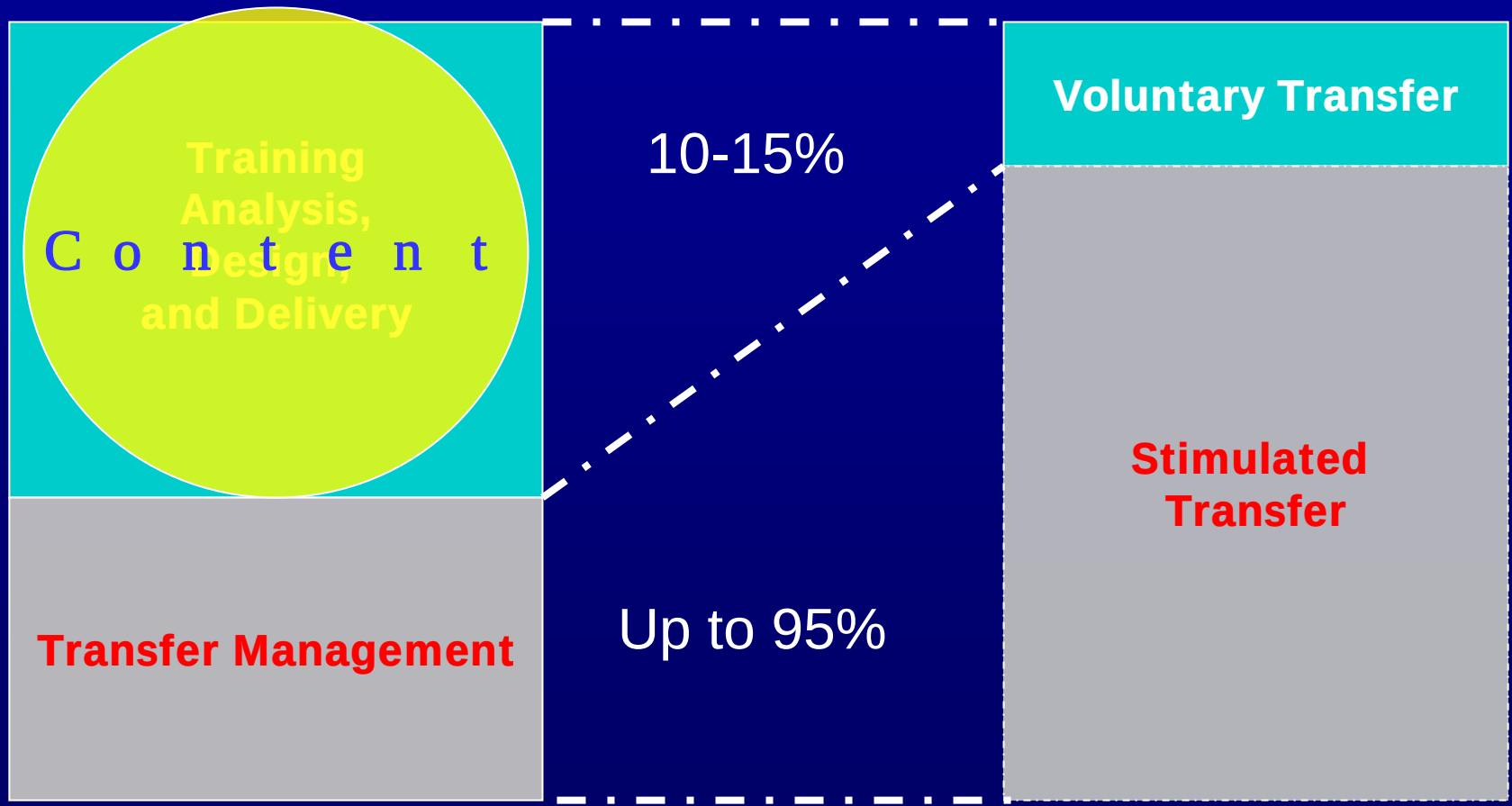
* Special Spring WES release

How Difficult are the Lessons?

- Advanced Warning Operations Course



Transfer of Training into Performance Requires Management Support



Broad and Newstrom (1992), Newstrom (1995), Stolovitch (2000), Ford (2004)

Who's Responsible for Performance Improvement? (Broad, 2005)

Top 6 Factors	Instructors	Students	Managers
Clear performance specifications	I	S	(M)
Necessary support	I	S	(M)
Clear consequences	I	S	(M)
Prompt feedback	(I)	S	(M)
Individual capability	I	(S)	M
Necessary skills and knowledge	(I)	(S)	M

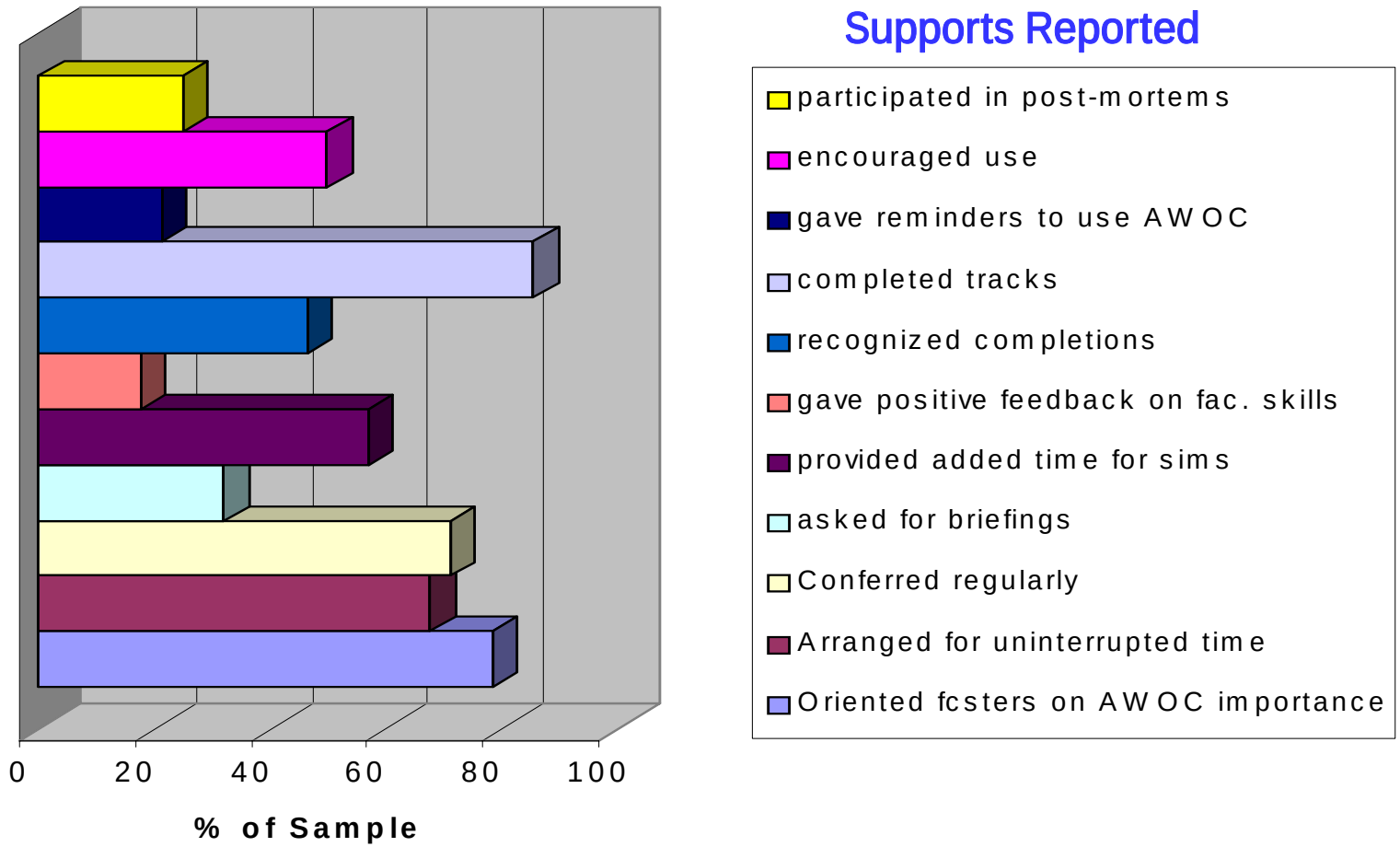
New Research on Autonomous Learners

- 3 factors determine extent of transfer
  - Credibility of information (who is saying it)
  - Practicality (how easy to apply it)
  - Recognition (need to improve their own performance)

All 3 stakeholder groups play a role in supporting these factors!

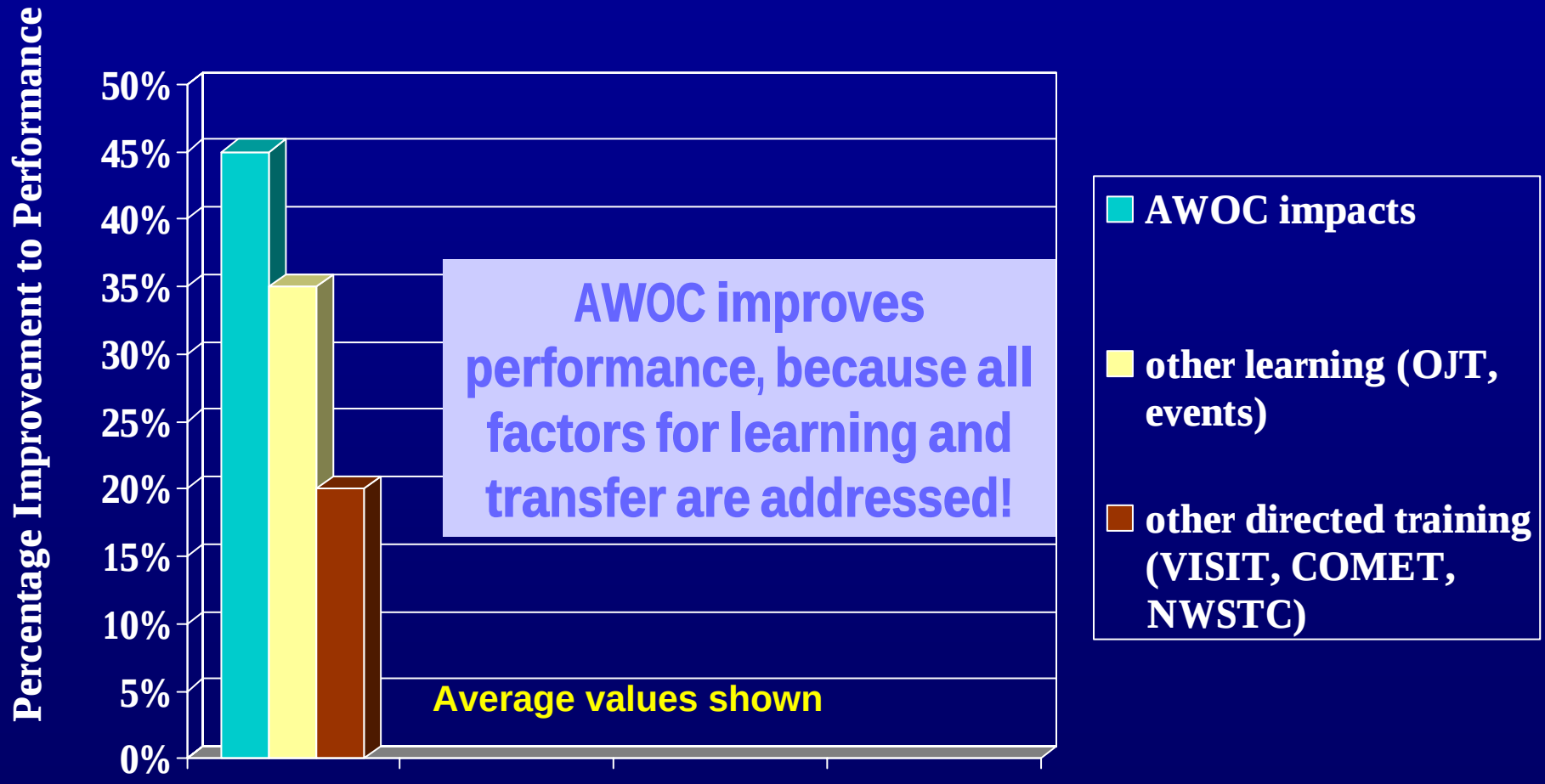
Research conducted by Yelon, Sheppard, Sleight, and Ford (2004)

What Were MIC Supports that Helped the SOO During AWOC?



This Can Be Winter Wx AWOC's Impact

From AWOC post-training survey Sept-Oct. 2005



260 Meteorologists from all regions surveyed!

What Can Facilitators Do to Help AWOC?

- Make the learning easier
  - Meet with each forecaster to determine needs/goals
  - Assign Winter AWOC learning paths
  - Set up a training completion schedule

SOO Transfer Strategies for AWOC

Stakeholder Group	Before Training	During Training	After Training
SOO	Provide advanced information about upcoming course – so they know it's coming. Get them excited about what they'll learn. Describe a scenario that they'll be better equipped to handle operationally, thanks to what they'll learn in the course.	Provide adequate time to complete course. Provide each forecaster with 1-2 WW AWOC training days (with management filling in on shift).	**Reinforce course content in real-time as much as possible. Look for examples of how to directly apply course content to real world cases. Share this with the entire staff. Make a clear connection between course content and the improved forecast.**

Example provided by Bruce Smith (WFO APX)

Facilitator and Learning Management System

- LMS Duties

  (See Job Sheets in “LMS Resources” links below)

  – NOTE: Must be “Facility Instructor” in LMS.

  1. Assign a Learning Path (NWS AWOC FY06 Winter Weather Track)
  2. Mark User Defined Tasks Complete (Simulations)
  3. “Complete” the Track

- LMS Resources
  - AWOC Documents Page: http://wdtb.noaa.gov/courses/awoc/documents.html
  - LMS Support Page: http://wdtb.noaa.gov/LMS/index.asp

- LMS URL: http://e-learning.doc.gov/

Course Completion Requirements

- Prerequisites (DLOC or WSR-88D Ops)
- All 28 required lessons
  - Complete LMS OLT final tests
- 2 WES simulations
- Notify WDTB when completion certificate is awarded

Certificate of Completion

This Certificate Is Awarded To

Student Name

For Completing The
Advanced Warning Operations Course
Winter Weather Track

Facilitator's Name
Local AWOC Facilitator

Date

Edward Mahoney, Chief
Warning Decision Training Branch


BLIZZARD '77
BLIZZARD CARDS
DRUG STORE
FOOD
BANK
HARDWARE
WORK
JAIL
GAS
SKID
U TURN ALLOWED
FINISH
HOME
SEMI-TRAILER JACK KNIFED
ACCIDENT!
STALLED CARS
OUT OF GAS go to gas station
HIGH DRIFTS
YOUNGMANN HIGHWAY

Section 4: Timelines
AWOC Winter Wx Delivery Schedule

A M J J A S O N D

Facilitator

Teletraining

Forecasters Complete Winter Weather ICs

Training Materials Released

Local Winter Wx Training

2006

Who Can Help?

- WDTB (LMS problems, etc.)
  - 405-573-3321 (Linda Curtis)
- awochelp@wdtb.noaa.gov
  - Just WDTB sees these
- awocfac@wdtb.noaa.gov
  - All facilitators see these
- icwinterX@wdtb.noaa.gov
  - Particular questions about lesson X
- WDTB.NOAA.GOV

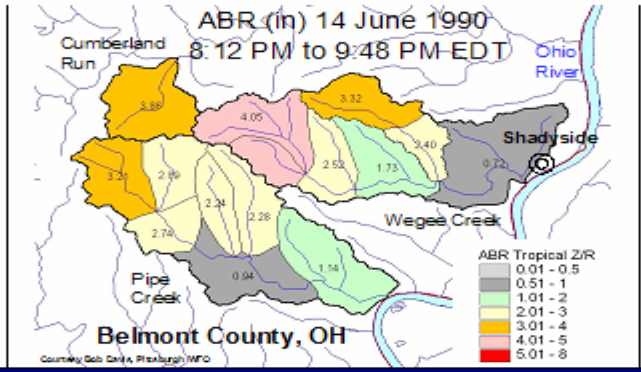
Summary and Questions

- AWOC will provide an excellent opportunity for improvement in warning performance
- But…

Success Depends on All of Us!

How Many Handouts Do You Need?

Slide 5
Belmont County ABR: Tropical Z/R
Advance mode: Auto



Notes:
Shadyside Ohio ~90min ABR using the tropical Z/R relationship. Amounts are over twice as much in many instances.

- **Estimate your # of handouts**
- **Email linda.j.curtis@noaa.gov by May 31 the names as you want them to appear on the Certificate**
- **ftp://ftp.wdtb.noaa.gov/Pub/WDTB/Courses/AWOCwinter/orientation/AWOCWWFacOrientation_Print.pdf**

(for a copy of this presentation)