United States Department of Agriculture
Forest Service

FOREST HEALTH TECHNOLOGY ENTERPRISE TEAM

Standard Reporting for Aerial Survey

Frank J. Sapio
Eric L. Smith

OK, How do we begin?

- Lets review we left off last year
- Demonstrate progress to date
- Develop a process for moving forward from here

ADS and Disturbance Tracking Focus Group

Consistency, Coverage and Quality

Resolutions from 2007

Whereas it has been 10 years since the National Reporting Standards for Aerial Survey have been established, be it resolved that we review and update the National Standards.

FHM MT recommendation: E*stablish federal and state group including FHTET, GIS and ADS representatives* to review and update the National Standards.

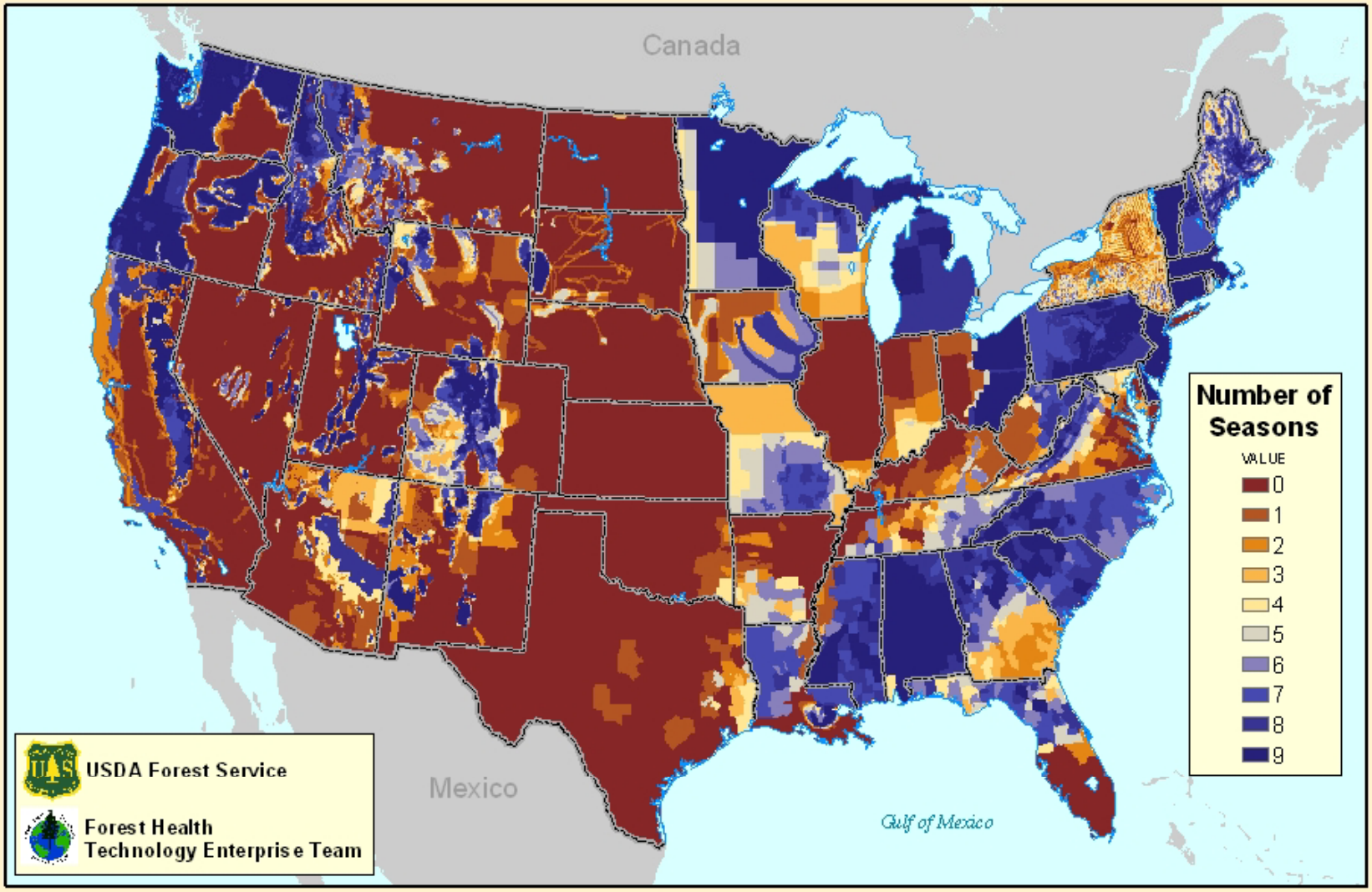
Whereas current National PTIPS list is conducive to error and confusion, be it resolved that ADS representatives & specialists work together to update PTIPS/damage agent list and codes to better address biological complexes and errors (needs regular maintenance).

FHM MT recommendation: E*stablish group including Entomologists and Pathologists to complete this work*.

Whereas it is acknowledge that current ground check guidelines meet the intent of honing ADS observer skills, be it resolved that ground checking shall be encouraged and the guidelines made available to all regions and states (it is also recognized other ground check methods are beneficial).

After I show this next slide….

- I'm not going to talk about "flown not flown or surveyed not surveyed any more.
  - And I should not have to…



Reported Number of Seasons Flown 1999-2007

Source: USDA-FS FHTET ADS Database

0 100 200 400 600 800 Miles

Map Preparation
John R. Withrow
Eric L. Smith

Albers Projection
Central Meridian: -96
1st SM Parallel: 20
2nd SM Parallel: 60
Latitude of Origin: 40

Consistency

- Difference in Mortality Coding:
  - Mortality w/ TPA/Number of trees in west
  - Mortality with combinations of PATTERN and SEVERITY codes in east.
- Multi-Agent/Multi-damage/Complexes/:
  - Should summaries of specific agents (like mpb) also include complexes that are known to contain the specific agent in the mix. How does FHTET know and decide?

Consistency

- Coding of similar phenomena in different ways makes reporting tasks equally difficult: Are they the same?
  - pinyon pine mortality(80004) vs. pinyon ips (11019)
  - Western balsam bark beetle(11015) on subalpine fir vs. subalpine fir mortality(80002)
  - Mountain pine beetle (11006) on mixed conifer (high elevation) vs. 5-needle pine decline(80003) on bristlecone/limber
  - Decline (24008) on aspen vs. dieback (90010) of aspen vs. aspen defoliation (80001) vs. defoliators (12000) on aspen.

Progress to date

- Pest List, New and Improved
  - Manfred!
- Metadata

DASM Metadata

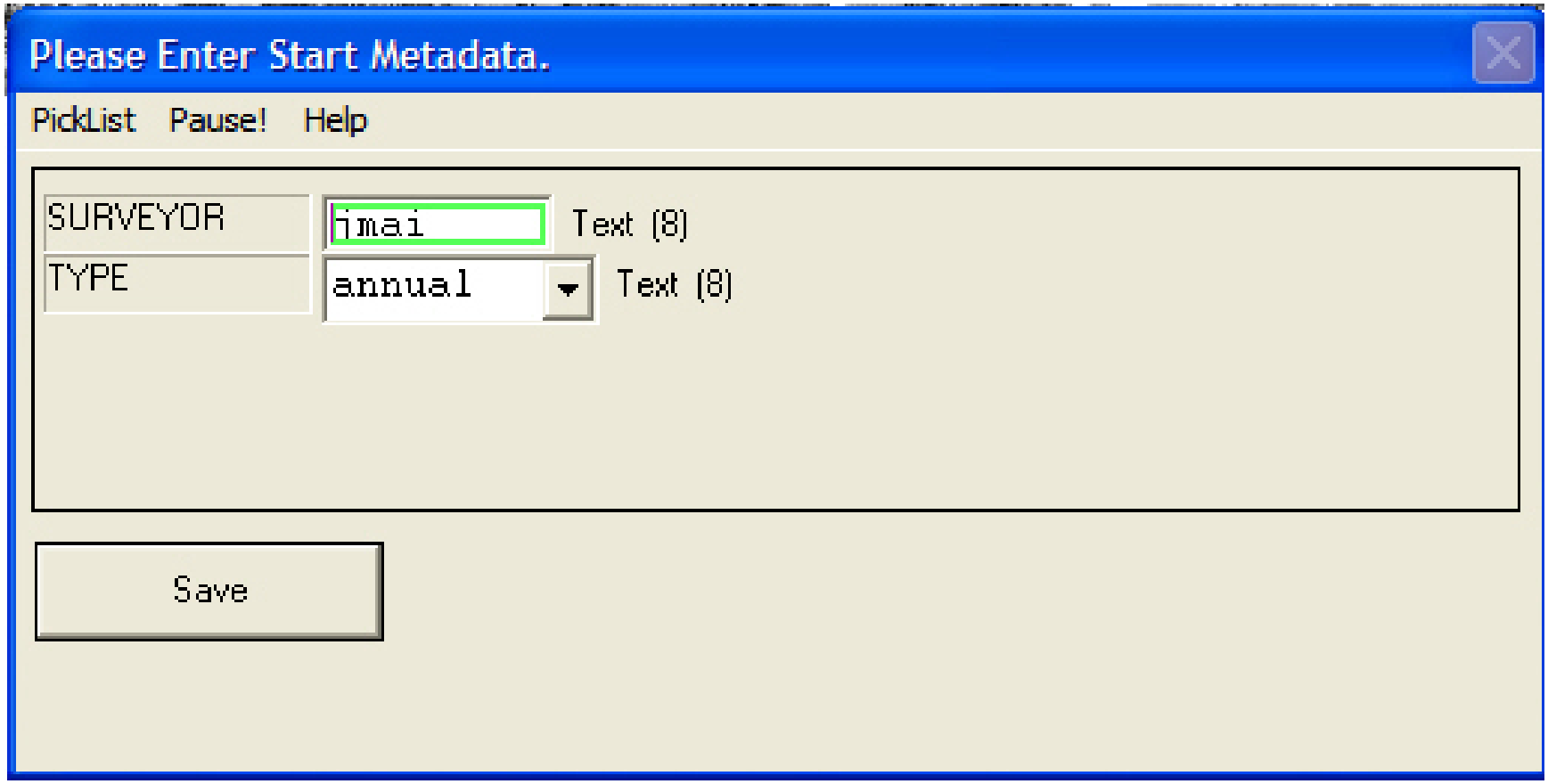
- The purpose of this metadata is to assist users of ADS data in determining the utility of the data for a specific analysis or mapping process.

- The metadata will be entered by the aerial surveyor at the start and end of each logging session.

- The metadata is added to the attribute file for each mapped feature and remains a permanent part of the data record.

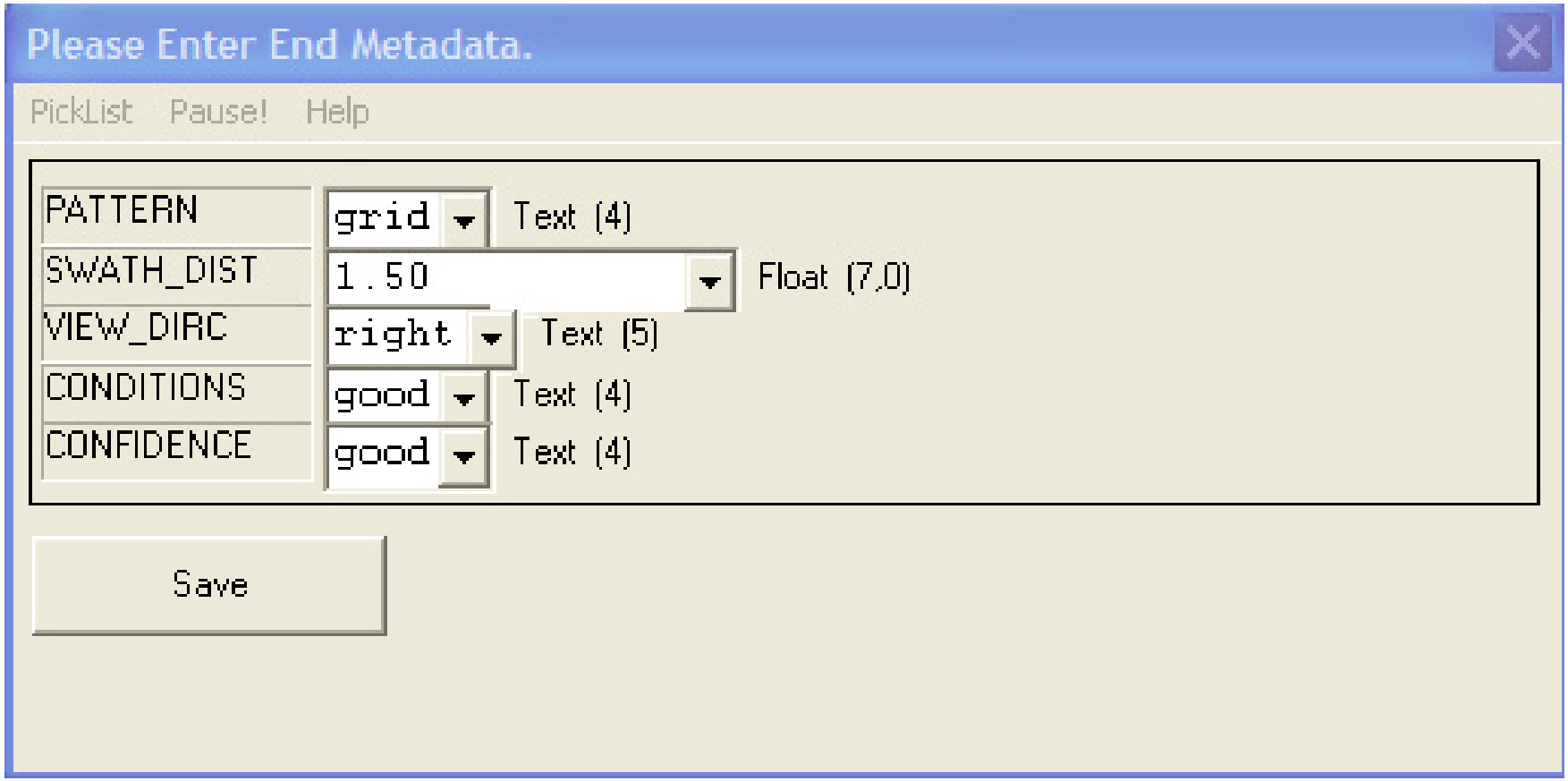
DASM Metadata

- Metadata Start input screen



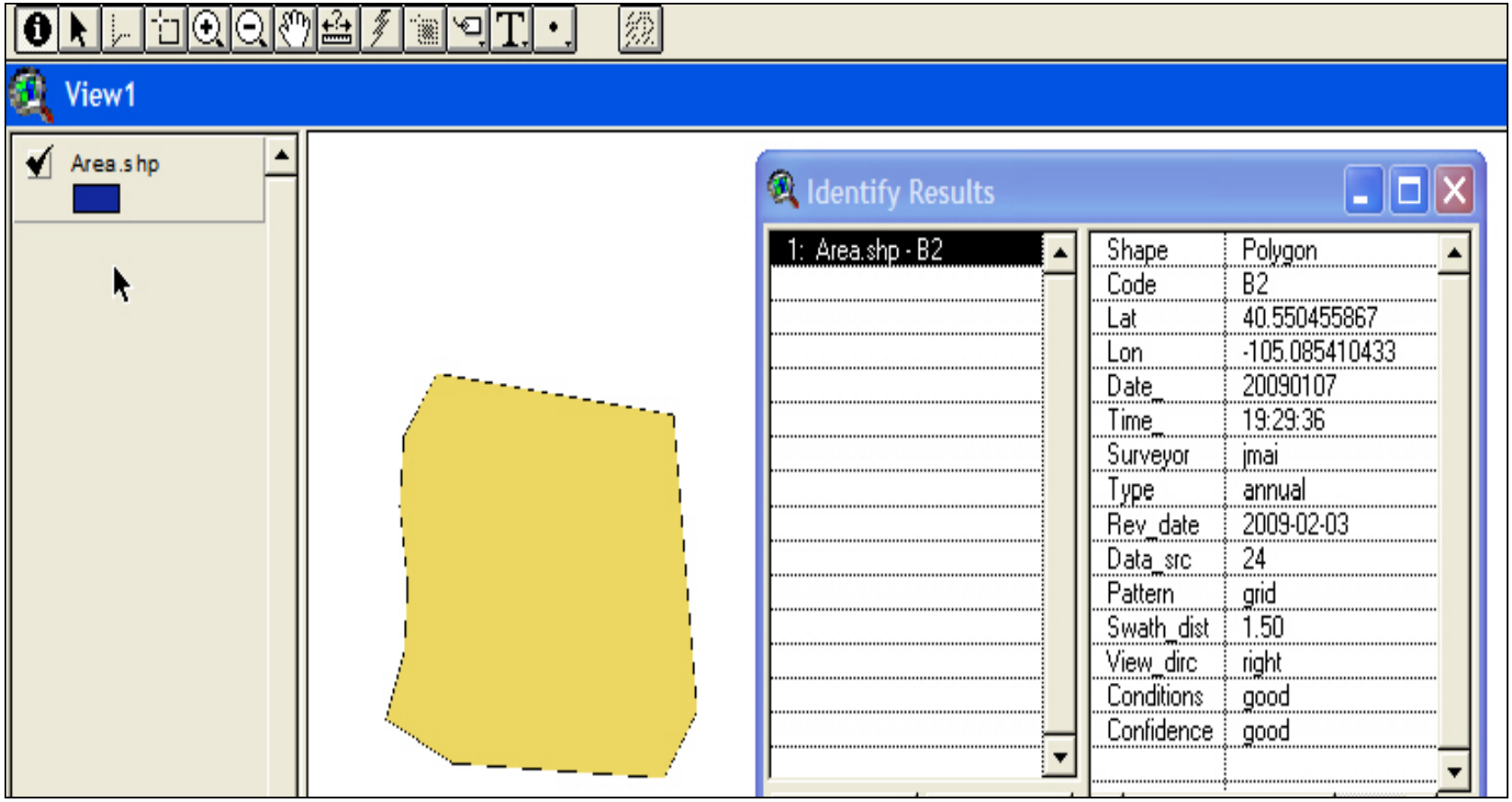
DASM Metadata

- Metadata End Input Screen

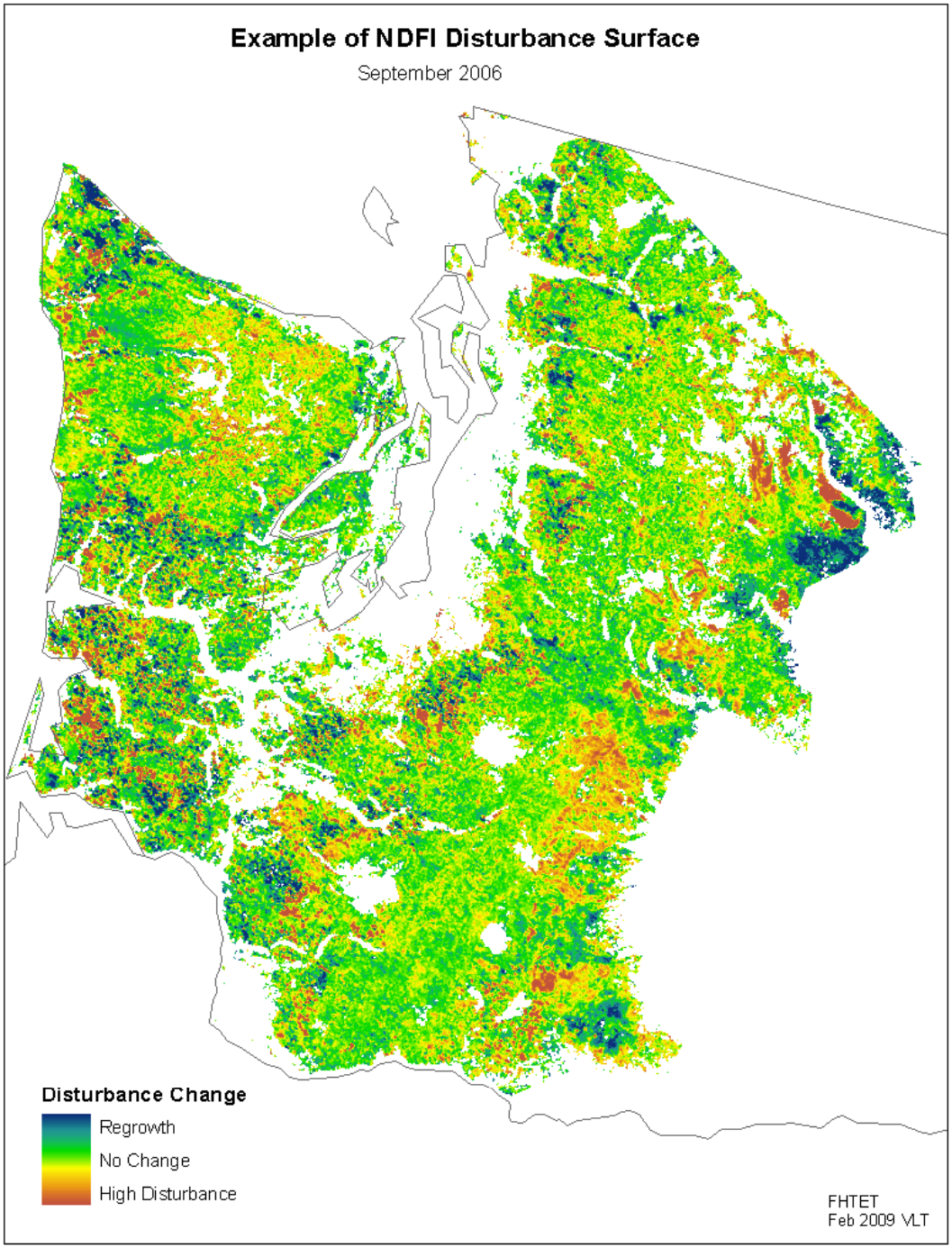


DASM Metadata

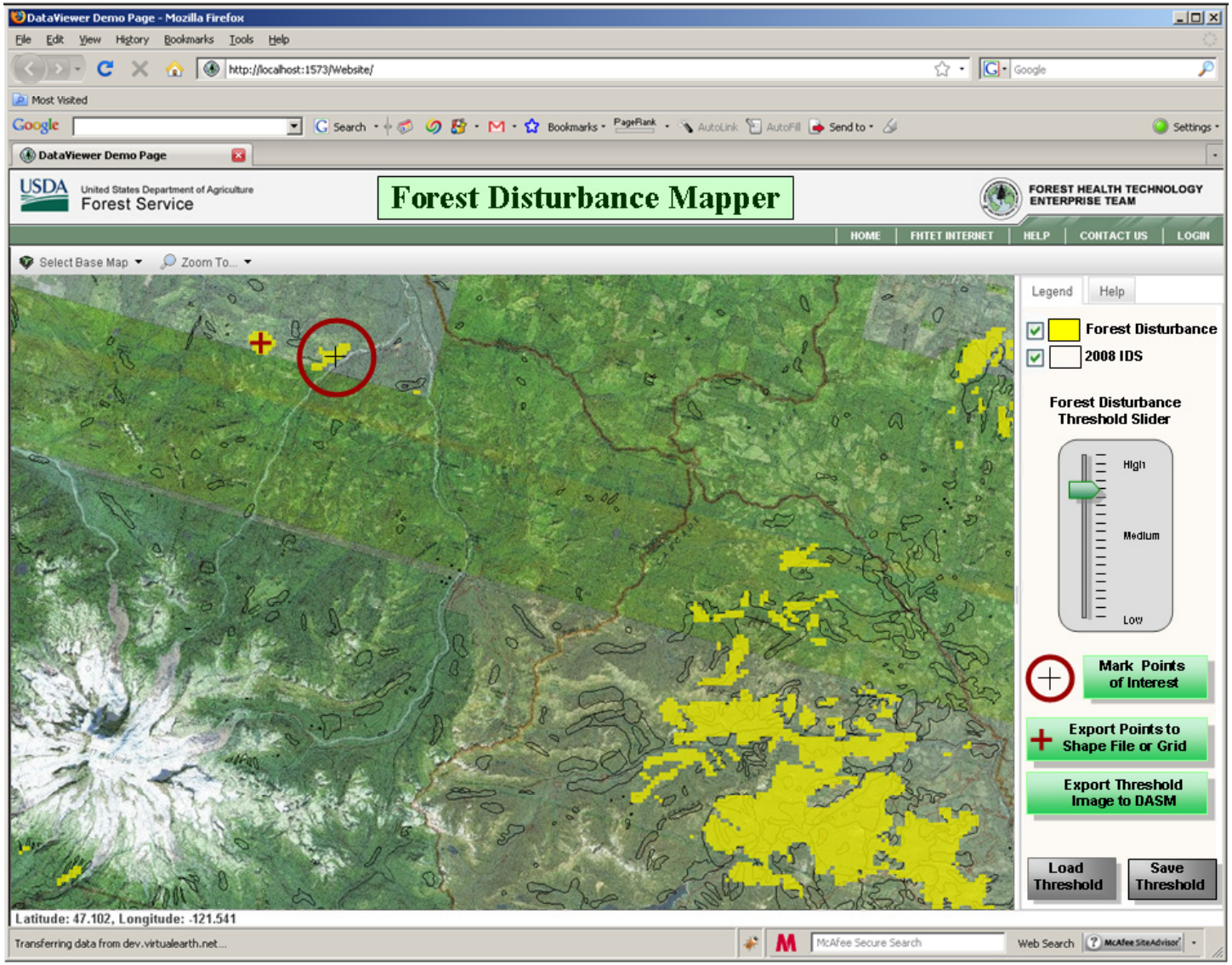
- Permanent Attribute file for ADS polygons



de for ADS


Example of NDFI Disturbance Surface
September 2006
Disturbance Change
Regrowth
No Change
High Disturbance
FHTET
Feb 2009 VLT

Disturbance Mapping Assistance



Reporting Standards and Roll up

- Why is this a problem?
  - Inconsistent national roll ups by different analysts
  - National and Regional Rollups vary

Reporting Standards and Roll up

- Single Agent Issues
- Groups of Agents Issues
- Complex Forest Resource Issues

Roll up Strategy

- **Single Agent Issues:**
  Phenomena which relates to a single, primarily to causal agent, or which are commonly referred to as the result of a single agent (mountain pine beetle), even though there may be multiple underlying factors involved. Database queries using a single causal agent may miss damage which include this and other interacting agents as a complex, and can miss damage by this agent coded as a more generic agent (bark beetles) because of observer uncertainly.

Roll up Strategy

- **Groups of Agents Issues:**
  Phenomena relating to a group of agents, either taxonomic (bark beetles) or resulting in similar tree damage (defoliators). Such groupings may more realistically reflect the range of uncertainly in ascribing causal agents where different levels of knowledge and information about the actual agents exists among surveyors. Summary queries can be straight forward if the groups of damage codes included are explicit.

Roll up Strategy

- **Complex Forest Resource Issues**
  Issues which involve pest complexes or declines and which are recognized as having significant management or ecological impacts on specific tree species or forest types. The complexity of the agent interactions is often recognized in assignment of special damage agent codes (five needle pine decline, pinyon pine mortality) or recognition of fundamental causes (drought). These issues present the largest challenges in producing consistent summaries because of the need to not only determine what agent codes should be used but also the need to employ some judgment what host or forest types (including missing data) should be included.

Reporting Standards and Roll up

- Single Agent Issues
  - Gypsy Moth Defoliation
  - Mountain Pine Beetle Mortality

Reporting Standards and Roll up

- Group of Agents Examples
  - Exotic Insect Caused Tree Mortality
    - EAB,ALB,SIREX,GOB….
  - Exotic Pathogen Caused Tree Mortality
  - Bark Beetles of Western Pines
  - Budworm Defoliation (Nationally)

Reporting Standards and Roll up

- Complex Forest Resource Examples
  - Decline of western 5 needled pine
  - Oak Decline and Mortality
  - Pinyon Pine Decline and Mortality
  - Subalpine Fir Decline and Mortality
  - Aspen Decline and Mortality
    - SAD-West
    - Aspen Decline-West?
    - Aspen Decline-East
  - Northern Hardwood Decline and Mortality

Reporting Standards and Roll up

- How do we handle regulated pests?
  - Is it unverified SOD or Oak Decline??
  - Is it EAB or Ash Decline??
  - ….

The State of Things

Example of some of the DCA agents used by Regions to describe pinyon pine damage, (in acres, for 1997-2007)

Forest Type	Host Species	pinyon ips	pinyon pine mortality	drought	needlecast	Multi-Damage (Insect/ Disease)	mortality	black stain root disease	Unknown (mortality)	Bark Beetles	Total
Pinyon-Juniper	Common Pinyon	534,863	1,515,730	485,910	202,883			34,096	1,126		2,774,608
	Singleleaf pinyon	2,551	63,579				4,434	31,546	1,103		103,212
	No Data										0
Singleleaf pinyon	Common Pinyon										0
	Singleleaf pinyon										0
	No Data	742,613				114,639			53,073	1,678	912,003
No Data/Other	Common Pinyon	2,431,564			5,745		84,733	2,616			2,524,658
	Singleleaf pinyon										0
	No Data	724,389	0								724,389
Total	Common Pinyon	2,966,427	1,515,730	485,910	208,628	0	84,733	36,712	1,126	0	5,299,265
	Singleleaf pinyon	2,551	63,579	0	0	0	0	31,546	1,103	0	98,778
	No Data	1,467,002	0	0	0	114,639	0	0	53,073	1,678	1,636,392
	Total	4,435,980	1,579,308	485,910	208,628	114,639	84,733	68,258	55,302	1,678	7,034,435
	Regional code users	Region 2	Region 3	Region 4	Region 5						

The table only contains values for pinyon ips and pinyon pine mortality for Forest type= No Data, Host Species= No data, since these are the only codes here unique to pinyon pine hosts.

136,454	Number of acres coded by R-3 as "drought", damage type "mortality" or "no data". Much of this is likely pinyon mortality.

The State of Things

Example of some of the DCA agents used by Regions to describe pinyon pine damage, (in acres, for 1997-2007)

Forest Type	Host Species	pinyon ips	pinyon pine mortality	drought	needlecast	Multi-Damage (Insect/ Disease)	mortality	black stain root disease	Unknown (mortality)	Bark Beetles	Total
Pinyon-Juniper	Common Pinyon	534,863	1,515,730	485,910	202,883			34,096	1,126		2,774,608
	Singleleaf pinyon	2,551	63,579				4,434	31,546	1,103		103,212
	No Data										0
Singleleaf pinyon	Common Pinyon										0
	Singleleaf pinyon										0
	No Data	742,613				114,639			53,073	1,678	912,003
No Data/Other	Common Pinyon	2,431,564			5,745		84,733	2,616			2,524,658
	Singleleaf pinyon										0
	No Data	724,389	0								724,389
Total	Common Pinyon	2,966,427	1,515,730	485,910	208,628	0	84,733	36,712	1,126	0	5,299,265
	Singleleaf pinyon	2,551	63,579	0	0	0	0	31,546	1,103	0	98,778
	No Data	1,467,002	0	0	0	114,639	0	0	53,073	1,678	1,636,392
	Total	4,435,980	1,579,308	485,910	208,628	114,639	84,733	68,258	55,302	1,678	7,034,435
	Regional code users	Region 2	Region 3	Region 4	Region 5						
The table only contains values for pinyon ips and pinyon pine mortality for Forest type= No Data, Host Species= No data, since these are the only codes here unique to pinyon pine hosts.											
136,454	Number of acres coded by R-3 as "drought", damage type "mortality" or "no data". Much of this is likely pinyon mortality.										

The State of Things

Western 5-Needle Pine Example

FOREST TYPE	HOST SPECIES	mountain pine beetle	white pine blister rust	five-needle pine decline	Bark Beetles	Multi-Damage (Insect/ Disease)	black stain root disease	Mortality	Ips engraver beetles	Forest Type Total
Bristlecone pine	No data						40			40
Sugar pine	No data	3,579			35,184	43			11	35,237
Western white pine	western white pine	55,043								1,498
	No data	457			1,233	192			73	
Whitebark pine	No data	2,882			1,135					1,135
MAJOR PINE TYPE GROUP	limber pine		14,292							727,013
	pine		628,237							
	western white pine		390							
	whitebark pine		20,622							
	No data		63,472							
MIXED CONIFERS	Bristlecone pine		9,470	119,307	2,219	261				873,322
	Limber Pine	18,257	38,455	463,397		34,419				
	Whitebark pine	72,075	10,686	195,108						
WESTERN FIR-SPRUCE GROUP	Bristlecone pine			839						839
No data	Bristlecone pine	429								133,224
	Limber Pine	31,580						936		
	Sugar pine	21,135								
	western white pine	84,111								
	Whitebark pine	1,331,933	5,761							
	No data		125,862				666			
Totals		1,621,480	917,246	778,651	39,771	34,915	706	936	84	3,393,786
Colored are exclusive to one or two	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6				
Forest Service Regions										
Forest type + Host species	Bristlecone pine	429	9,470	120,146	2,219	261	40	0	0	1,772,307
(Assumes type=species when	Limber Pine	49,836	52,747	463,397	0	34,419	0	936	0	1,640,172
there is no data for species)	Sugar pine	24,714	0	0	35,184	43	0	0	11	1,088,673
	western white pine	139,611	390	0	1,233	192	0	0	73	1,053,436
	Whitebark pine	1,406,899	37,069	195,108	1,135	0	0	0	0	1,051,548
	Unknown 5-needle pine	0	817,570	0	0	0	666	0	0	818,236
										3,393,786

Even with this creative accounting…

Where do we go from here?

- We need a process and consensus to sort this out.

- The Mother of all Pivot Tables
- Roger we have not forgot Alaska.

Trees per..

- We need a more consistent way to log number of trees or intensity for each polygon?
  - T/A or T/P is difficult in mixed hardwood types

- A suggested Approach