Phase III/IV Planning EIs

Update and Status Report

Context – WRAP Modeling World

- Planning inventories
  - Inventories you can compare.
  - Projection (2018) inventory to quantify range of possibilities.
  - Use – quantitative reduction in emissions (ERTs, Alts to Burning, etc.) at some reasonable geographic scale.
  - Use – quantitative reduction in visibility impacts (modeling to show Reasonable Further Progress in controlling the controllable portion of fire emissions).

Status

- ✓ Initial Strawman ideas for baseline EIs
- ✓ Technical Workshop #1 (August 10-11)
- ✓ Categorize fire events as Natural / Anthropogenic based on FCCS and Fire Regime Classification
- ✓ Baseline scalars for Rx fire based on SIT data
- ✓ Develop scenarios (3) for projection inventories

Technical Workshop #1 - August

- About 12 participants in Ft. Collins, CO
- Goal - To build planning emission inventories (EI) of prescribed (Rx) fire for the WRAP.
  - Day 1 – Baseline (2000-2004) EI for Rx Fire
  - Day 2 – Projection (2018) EI for Rx Fire
- Results – Refined ideas for developing baseline and projection EI's, but fell short of building EIs.

Workshop #1 – Ongoing Action Items

- Baseline EIs
  - Qualify the historical data (Interagency Situation Report (SIT) Program) to use to establish baseline activity levels for Rx fire.
  - Accommodate any necessary changes to pile burning levels.
- Projection EIs
  - Obtain first cut projection numbers from Interagency Fuels Committee (P. Lahm)
    - 6 agencies
    - Data requested:
      - Acres planned for treatment w/ Rx
      - Acres planned for treatment w/ mech
      - Acres targeted for WFU

Baseline Scalars Strawman

- A proposed method to scale Phase II 2002 activity to be representative of annual activity for the Baseline Period (2000-2004) using Interagency Situation Report (SIT) Program SIT/ICS-209 reports.

  (Phase II 2002 - SIT 2002) + geomean(5 years of SIT)

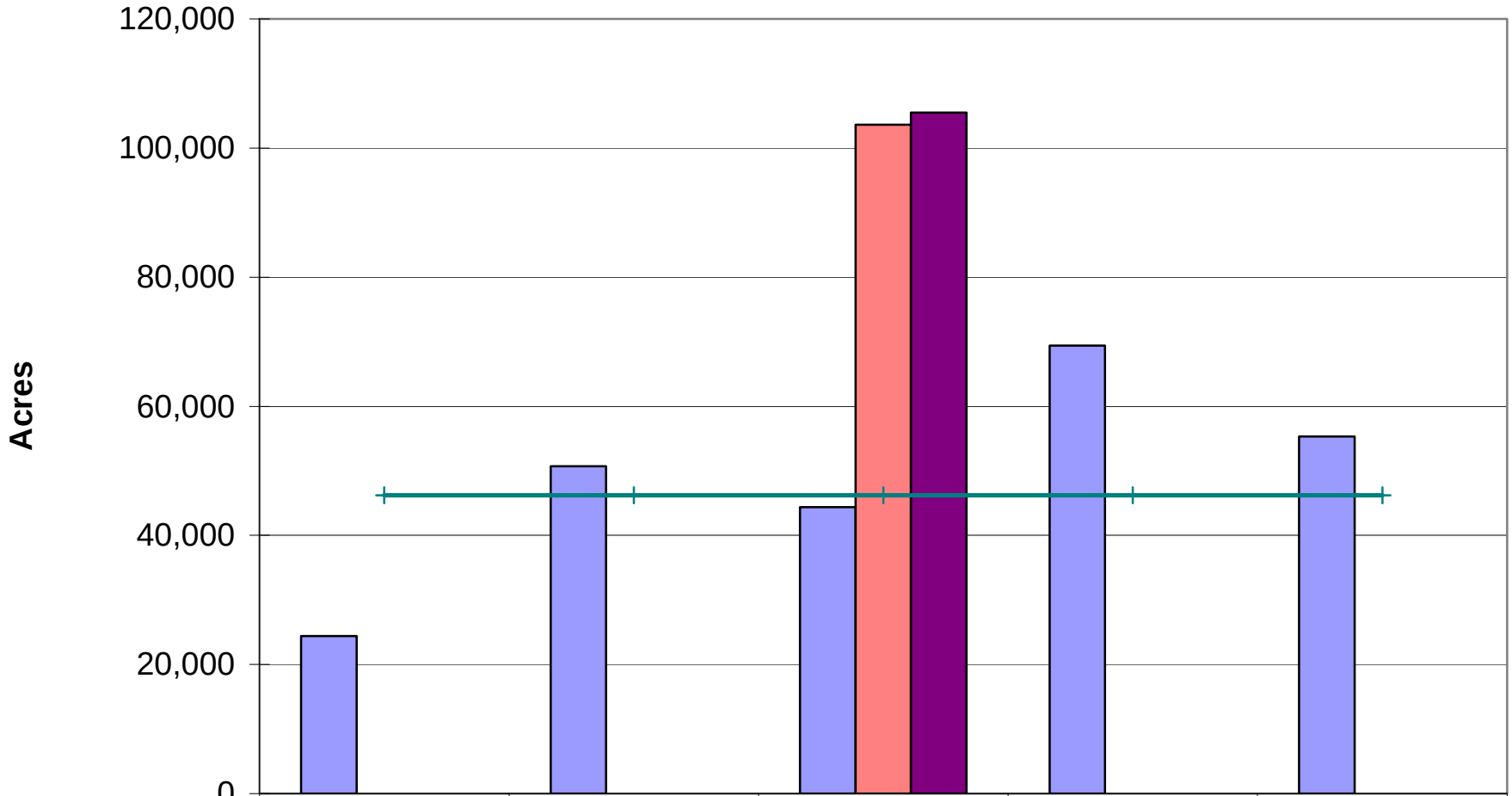
- "For each state, average out SIT for the baseline years then scale that average by the difference of QC'ed Phase II vs. SIT 2002."
- SIT-specific scalar would be applied to all agency/fuel model acre totals within the state boundary. More or fewer events than Phase II would then be generated from new totals.

- ***EXAMPLE GRAPHS IN UPCOMING SLIDES***
  - "Acres" refers to online SIT Rx summary data
  - Averages include only SIT years 2000 – 2004.

SIT/ISC-209 Documentation

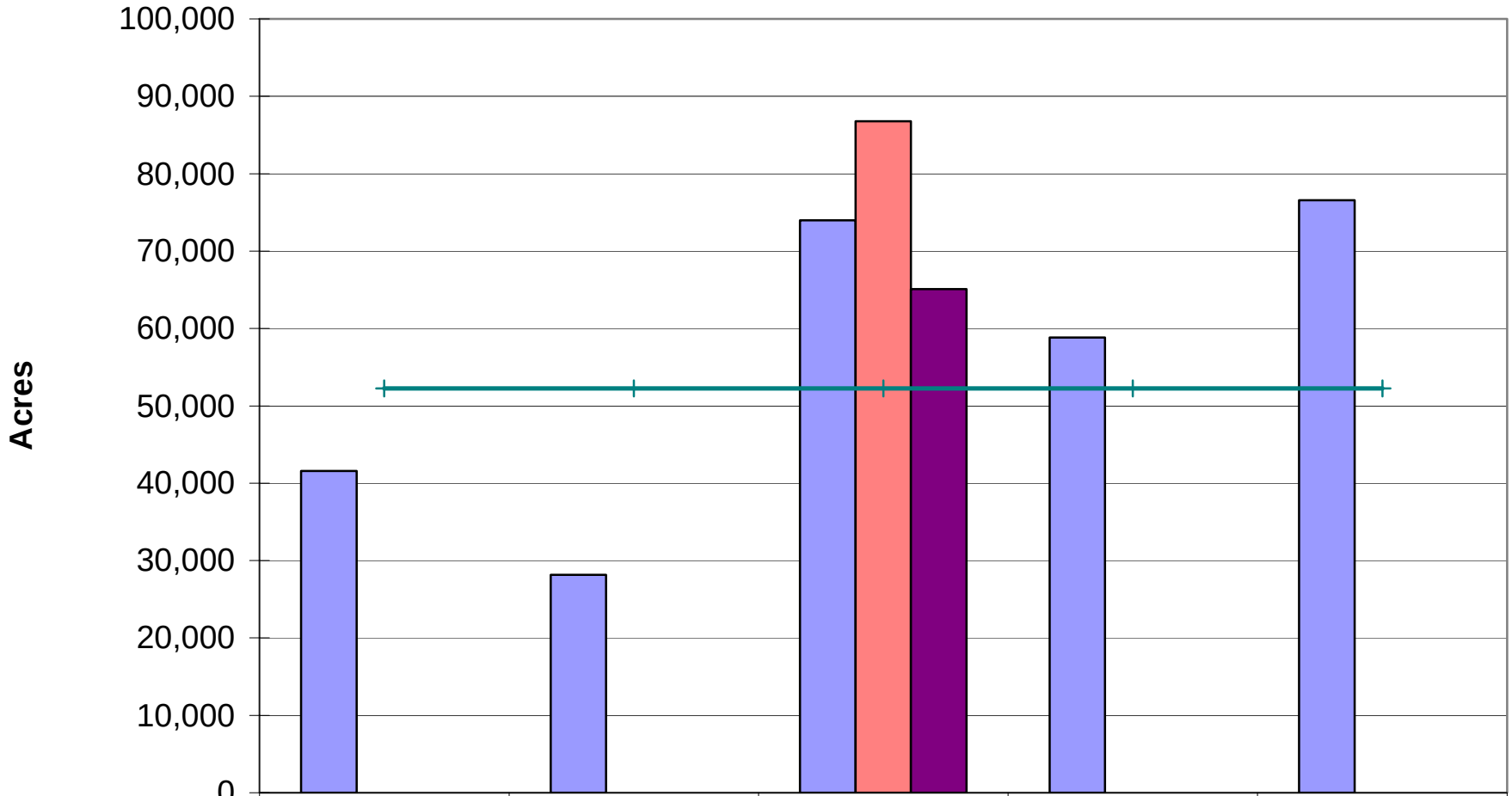
- Web-based application that captures incident activity and resource status information.
- Reporting is required for all prescribed fire activity year-round.
- The SIT Program uses incident information from the ICS-209 Program.
- The SIT/209 Programs “capture incident activity” as opposed to cataloging planned activity.
- ICS-209 submitted to the GACC to report significant fire events on lands under federal protection or federal ownership.
- Lands administered by states and other federal cooperators may also report to the ICS-209 Program.
- Significant events are
  - wildfires or WFU events > 100 acres in timber
  - > 300 acres In grass or brush fuel types
- ICS-209 is submitted by the agency with protection responsibility (regardless of who administers the land).

Arizona



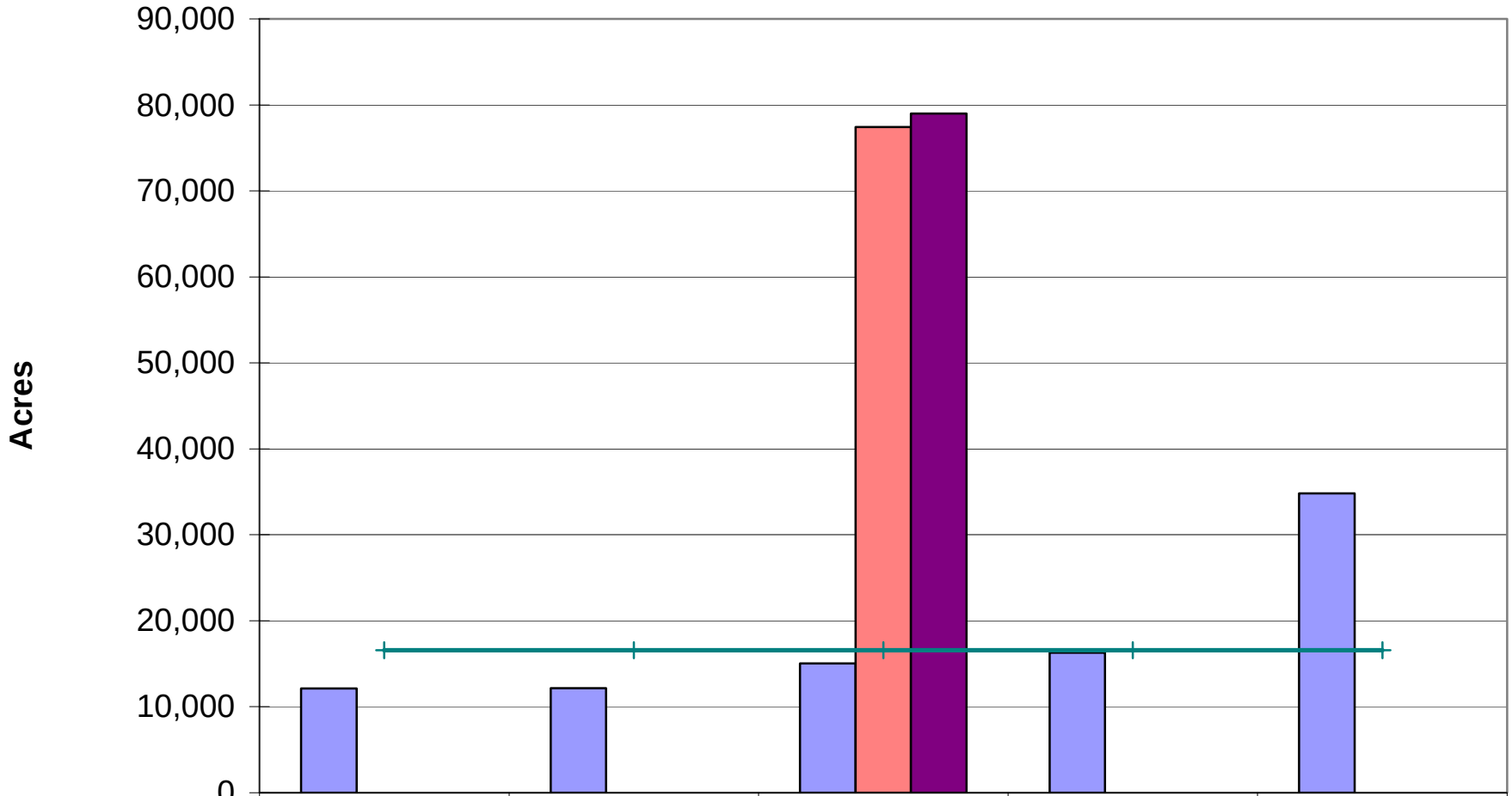
	2000	2001	2002	2003	2004
SIT Acres	24,393	50,726	44,347	69,405	55,310
Phase 2	0	0	103,619	0	0
BASELINE	0	0	105,479	0	0
Geo Mean	46,207	46,207	46,207	46,207	46,207

California



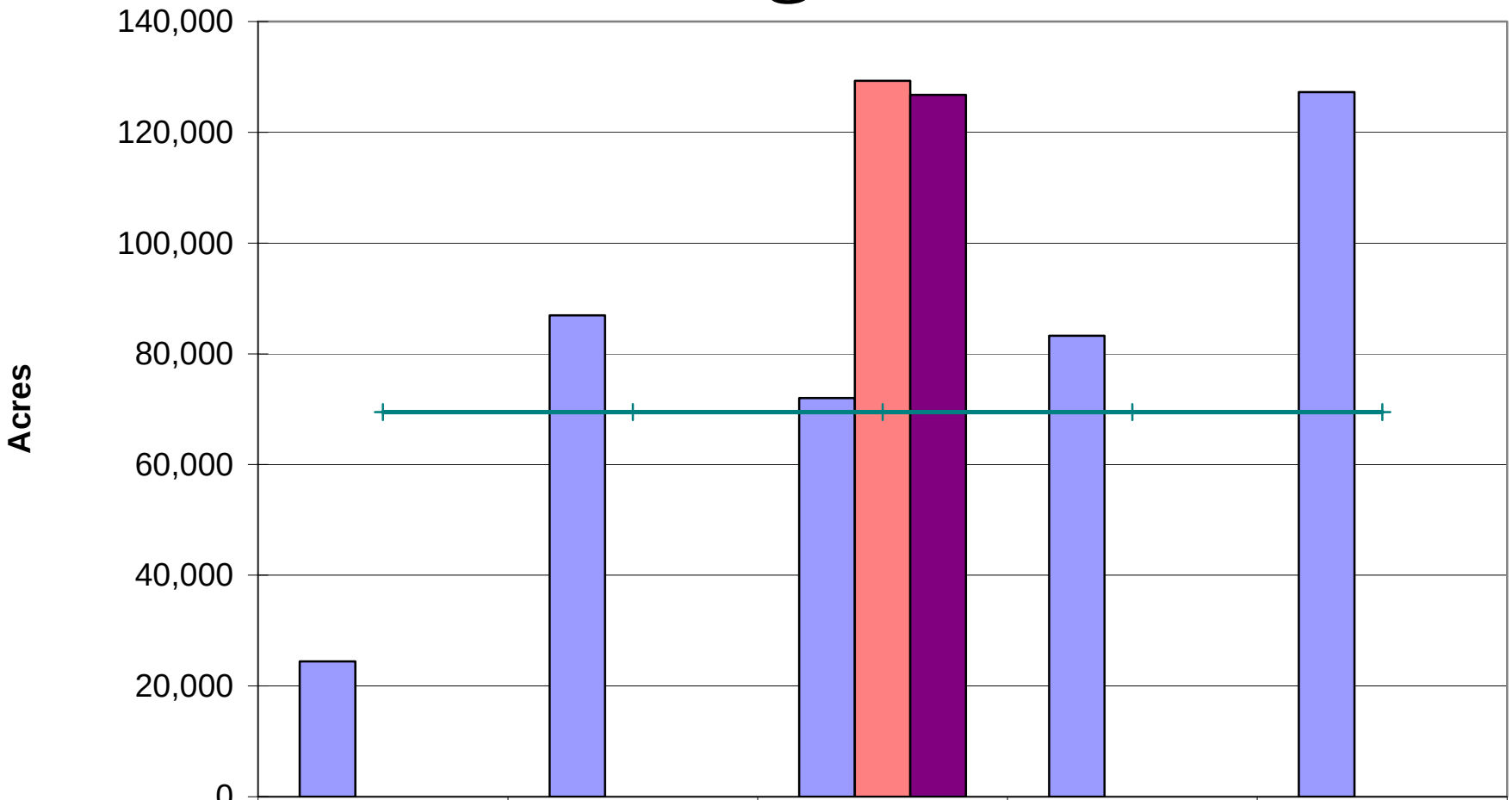
	2000	2001	2002	2003	2004
SIT Acres	41,598	28,146	73,962	58,840	76,586
Phase 2	0	0	86,785	0	0
BASELINE	0	0	65,094	0	0
Geo Mean	52,271	52,271	52,271	52,271	52,271

Montana



	2000	2001	2002	2003	2004
SIT Acres	12,137	12,143	15,022	16,297	34,802
Phase 2	0	0	77,419	0	0
BASELINE	0	0	78,985	0	0
Geo Mean	16,587	16,587	16,587	16,587	16,587

Oregon



	2000	2001	2002	2003	2004
SIT Acres	24,427	86,951	72,005	83,260	127,260
Phase 2	0	0	129,290	0	0
BASELINE	0	0	126,776	0	0
Geo Mean	69,491	69,491	69,491	69,491	69,491

Nat/Anth Assignment

- Like the Ph II EI, each event must be categorized as Natural or Anthropogenic.
- Ph II events categorized based on National Fire Danger Rating System (NFDRS) fuel model.
  - Heavy fuel loads/restoration → ANTH
  - Lighter fuel loads/maintenance → NAT

Nat/Anth Assignment

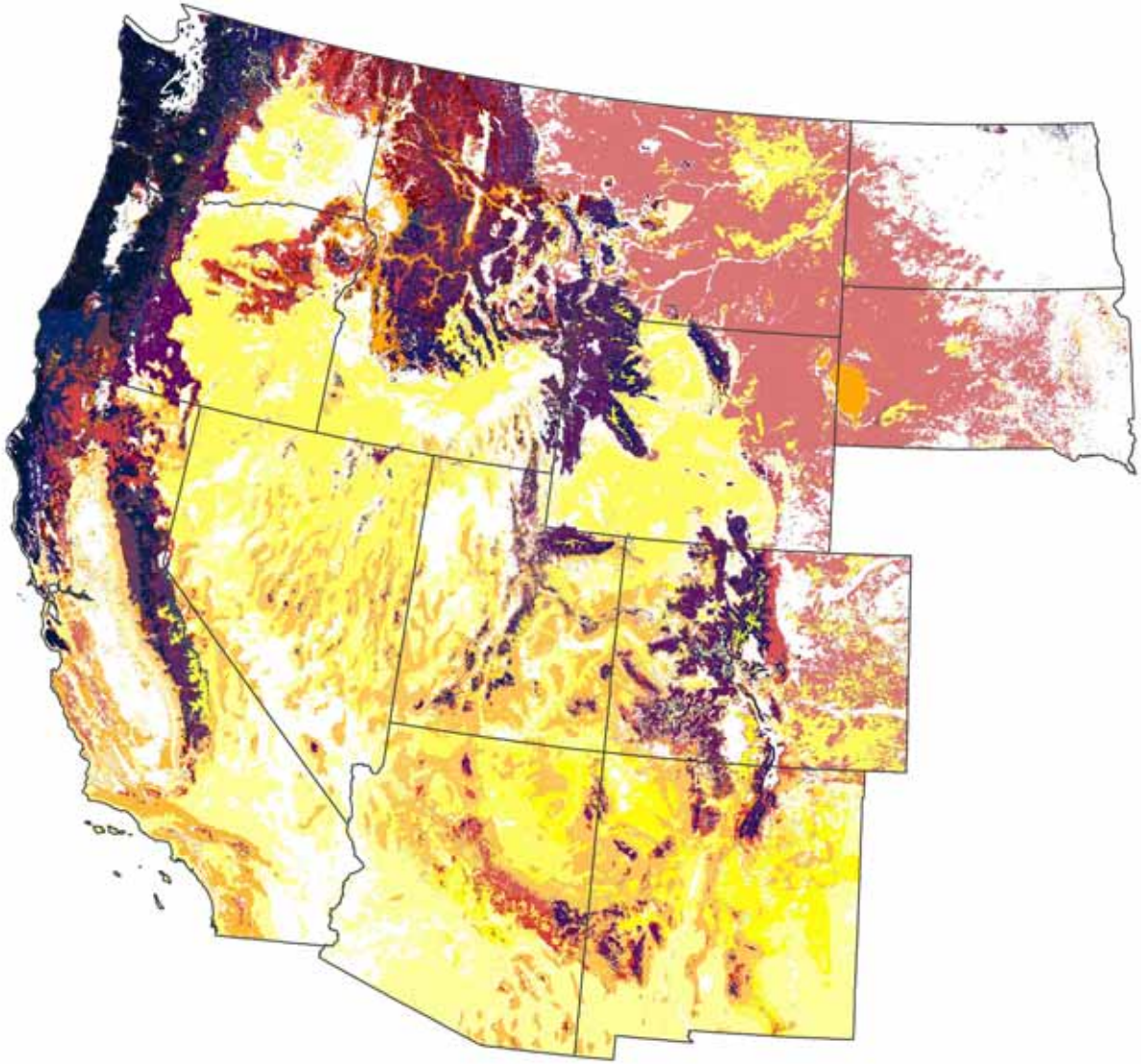
- Participants at Ph III/IV Workshop #1 proposed using National System of Fuel Characteristic Classification (FCCS) and Fire Regime Condition Class (FRCC) to categorize events
- Info for FCCS and FRCC available at:
  - http://www.fs.fed.us/pnw/fera/fccs/index.html
  - http://www.frcc.gov/

Nat/Anth Assignment

- FRCC is an assessment of the departure from the central tendency of the natural (historical) regime:
  - FRCC 1 – low…within the natural range of variability
  - FRCC 2 – moderate…may require fire, hand, or mechanical treatment to restore to natural fire reqime
  - FRCC 3 – high…areas may need high levels of restoration

Nat/Anth Assignment

- Each fuel model in the FCCS has been assigned an FRCC. For the Ph III/IV project, NAT/ANTH assignments will be made based on the FRCC for the FCCS fuel model in which the event takes place:
  - FRCC 1 – NAT
  - FRCC 2 – NAT or ANTH, based on review of FCCS fuel model info (fuel loading, duff depth, description, etc.)
  - FRCC 3 – ANTH



FCCS Fuel Models Ordered by Ascending Fuel Loading

- Agricultural / Barren / Urban / Water
- Tobosa - Grama grassland
- Wheatgrass - Cheatgrass grassland
- Vaccinium - Heather shrublands
- Creosote bush shrubland
- Idaho fescue - Bluebunch wheatgrass grassland
- Coastal sage shrubland
- Sagebrush shrubland
- Western Juniper / Sagebrush - Bitterbrush shrubland
- Showy sedge - Alpine black sedge grassland
- Mesquite savanna
- Turbinella oak - Ceanothus - Mountain mahogany shrubland
- Red fescue - Oatgrass grassland
- Scrub oak - Chaparral shrubland
- Bluestem - Indian grass - Switchgrass grassland
- Pinyon - Juniper forest
- Western juniper / Sagebrush savanna
- Chamise chaparral shrubland
- Arizona white oak - Silverleaf oak - Emory oak woodland
- Ponderosa pine savanna
- Gambel oak / Sagebrush shrubland
- Bluebunch wheatgrass - Bluegrass grassland
- Live oak - Blue oak woodland
- Interior ponderosa pine forest
- Pacific ponderosa pine - Douglas-fir forest
- Ponderosa pine - Two-needle pine - Juniper forest
- Western juniper / Huckleberry oak forest
- Bur oak savanna
- Pine - Oak forest
- Oregon white oak - Douglas-fir forest
- Black oak woodland
- Jeffrey pine - Ponderosa pine - Douglas-fir - Black oak forest
- Douglas-fir / Oceanspray forest
- Douglas-fir - ponderosa pine forest
- Interior Douglas-fir - Ponderosa pine / Gambel oak forest
- Sugar pine - Douglas-fir - Ponderosa pine - Oak forest
- Ponderosa pine - Jeffrey pine forest
- Trembling aspen / Engelmann spruce forest
- Green ash - American elm - Silver maple - Cottonwood forest
- Lodgepole pine forest
- Sugar maple - Basswood forest
- Balsam fir - White spruce - Mixed Hardwoods forest
- Engelmann spruce - Douglas-fir - White fir - Interior ponderos
- Pacific ponderosa pine forest
- Trembling aspen - Paper birch forest
- Trembling aspen forest
- Douglas-fir - Madrone / Tanoak forest
- White oak - Northern red oak forest
- Red pine - White pine forest
- Mountain hemlock - Red fir - Lodgepole pine - White pine fores
- Grand fir - Douglas-fir forest
- Tanoak - California bay - Madrone forest
- Subalpine fir - Engelmann spruce - Douglas-fir - Lodgepole pin
- Subalpine fir - Lodgepole pine - Whitebark pine - Engelmann sp
- Douglas-fir - White fir forest
- Pacific silver fir - Mountain hemlock forest
- Black cottonwood - Douglas-fir - Quaking aspen
- Douglas-fir - Sugar pine - Tanoak forest
- Douglas-fir - White fir - Interior ponderosa pine forest
- Whitebark pine / Subalpine fir forest
- Western hemlock - Western redcedar - Douglas-fir forest
- Red fir forest
- Redwood - Tanoak forest
- Western hemlock - Douglas-fir - Western redcedar / Vine maple
- Western hemlock - Douglas-fir - Sitka spruce forest

0 200 400 Miles

1 inch equals approximately 225 miles

N

Natural vs Anthropogenic Categorization Method
FCCS Fuel Models

Version: 8/26/04

WRAP Ph III/IV Fire EI

Project No. 178-8

Air Sciences Inc.
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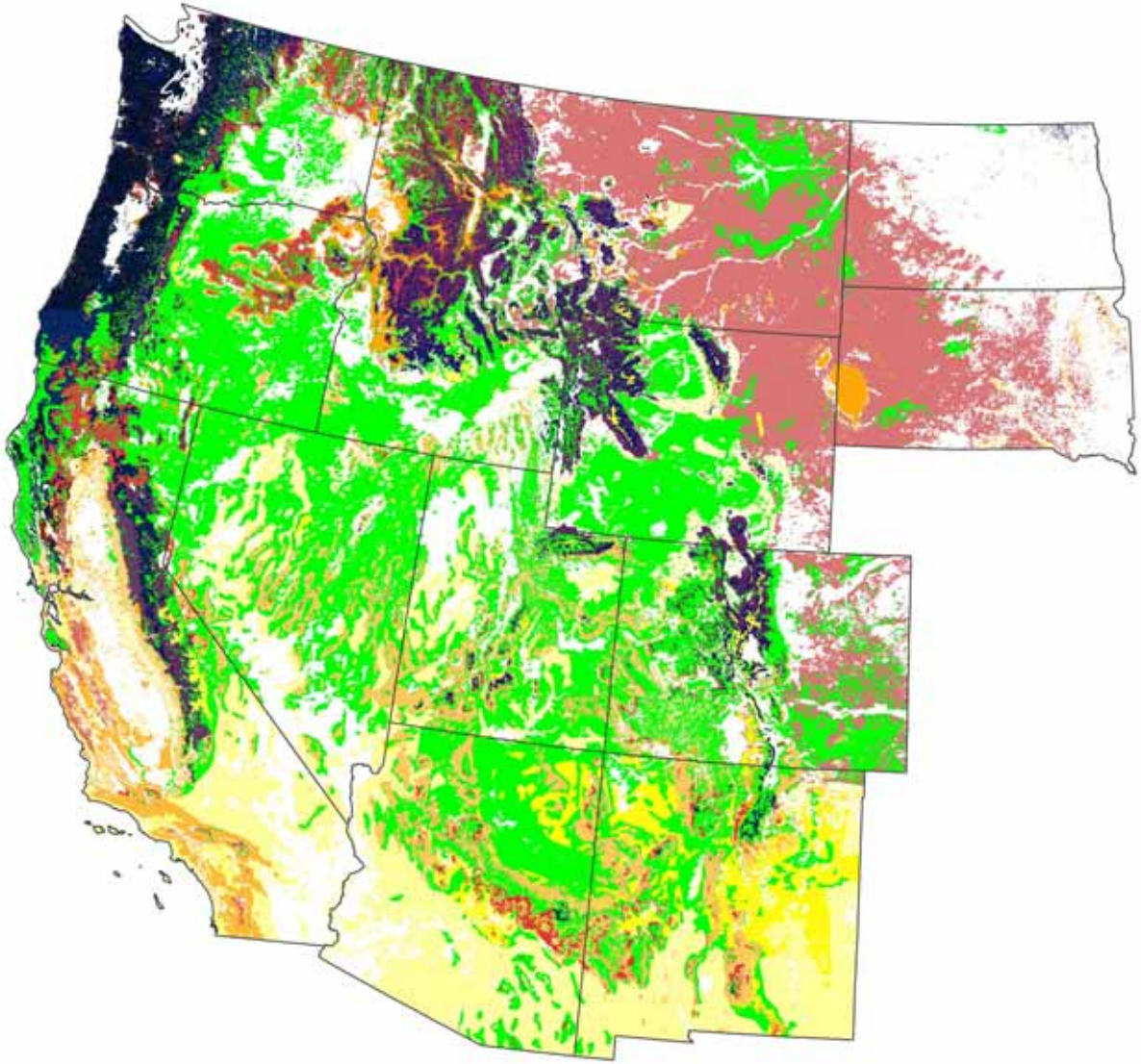


Anthropogenic Fuel Types
FCCS Fuel Models Ordered by Ascending Fuel Loading
Agricultural / Barren / Urban / Water
Tobosa - Grama grassland
Wheatgrass - Cheatgrass grassland
Vaccinium - Heather shrublands
Creosote bush shrubland
Idaho fescue - Bluebunch wheatgrass grassland
Coastal sage shrubland
Sagebrush shrubland
Western Juniper / Sagebrush - Bitterbrush shrubland
Showy sedge - Alpine black sedge grassland
Mesquite savanna
Turbinella oak - Ceanothus - Mountain mahogany shrubland
Red fescue - Oatgrass grassland
Scrub oak - Chaparral shrubland
Bluestem - Indian grass - Switchgrass grassland
Pinyon - Juniper forest
Western juniper / Sagebrush savanna
Chamise chaparral shrubland
Arizona white oak - Silverleaf oak - Emory oak woodland
Ponderosa pine savanna
Gambel oak / Sagebrush shrubland
Bluebunch wheatgrass - Bluegrass grassland
Live oak - Blue oak woodland
Interior ponderosa pine forest
Pacific ponderosa pine - Douglas-fir forest
Ponderosa pine - Two-needle pine - Juniper forest
Western juniper / Huckleberry oak forest
Bur oak savanna
Pine - Oak forest
Oregon white oak - Douglas-fir forest
Black oak woodland
Jeffrey pine - Ponderosa pine - Douglas-fir - Black oak forest
Douglas-fir / Oceanspray forest
Douglas-fir - ponderosa pine forest
Interior Douglas-fir - Ponderosa pine / Gambel oak forest
Sugar pine - Douglas-fir - Ponderosa pine - Oak forest
Ponderosa pine - Jeffrey pine forest
Trembling aspen / Engelmann spruce forest
Green ash - American elm - Silver maple - Cottonwood forest
Lodgepole pine forest
Sugar maple - Basswood forest
Balsam fir - White spruce - Mixed Hardwoods forest
Engelmann spruce - Douglas-fir - White fir - Interior ponderos
Pacific ponderosa pine forest
Trembling aspen - Paper birch forest
Trembling aspen forest
Douglas-fir - Madrone / Tanoak forest
White oak - Northern red oak forest
Red pine - White pine forest
Mountain hemlock - Red fir - Lodgepole pine - White pine fores
Grand fir - Douglas-fir forest
Tanoak - California bay - Madrone forest
Subalpine fir - Engelmann spruce - Douglas-fir - Lodgepole pin
Subalpine fir - Lodgepole pine - Whitebark pine - Engelmann sp
Douglas-fir - White fir forest
Pacific silver fir - Mountain hemlock forest
Black cottonwood - Douglas-fir - Quaking aspen
Douglas-fir - Sugar pine - Tanoak forest
Douglas-fir - White fir - Interior ponderosa pine forest
Whitebark pine / Subalpine fir forest
Western hemlock - Western redcedar - Douglas-fir forest
Red fir forest
Redwood - Tanoak forest
Western hemlock - Douglas-fir - Western redcedar / Vine maple
Western hemlock - Douglas-fir - Sitka spruce forest

0 200 400 Miles

1 inch equals approximately 225 miles

N

Natural vs Anthropogenic Categorization Method
Anthropogenic Overlay

Version: 8/26/04

WRAP Ph III/IV Fire EI
Project No. 178-8

AIR SCIENCES INC.
1301 Washington Ave
Suite 200
Golden, Colorado
303-988-2960

FRCC C1 Fuel Models (NAT)

FRCC	C1

Sum of Fuel Load		
fuelbed.name	inwrap	Total
Tobosa - Grama grassland	TRUE	0.07
Vaccinium - Heather shrublands	TRUE	0.16
Showy sedge - Alpine black sedge grassland	TRUE	1.34
Turbinella oak - Ceanothus - Mountain mahogany shrubland	TRUE	2.34
Scrub oak - Chaparral shrubland	TRUE	3.2
Chamise chaparral shrubland	TRUE	8.48
Arizona white oak - Silverleaf oak - Emory oak woodland	TRUE	9.49
Ponderosa pine savanna	TRUE	10.25
Bluebunch wheatgrass - Bluegrass grassland	TRUE	14.47
Live oak - Blue oak woodland	TRUE	14.84
Ponderosa pine - Two-needle pine - Juniper forest	TRUE	18.47
Black oak woodland	TRUE	26.54
Ponderosa pine - Jeffrey pine forest	TRUE	34.68
Lodgepole pine forest	TRUE	36.42
Sugar maple - Basswood forest	TRUE	37.27
Balsam fir - White spruce - Mixed Hardwoods forest	TRUE	37.95
Trembling aspen - Paper birch forest	TRUE	41.39
White oak - Northern red oak forest	TRUE	44.1
Mountain hemlock - Red fir - Lodgepole pine - White pine forest	TRUE	50.18
Grand fir - Douglas-fir forest	TRUE	52.37
Tanoak - California bay - Madrone forest	TRUE	52.6
Subalpine fir - Engelmann spruce - Douglas-fir - Lodgepole pine forest	TRUE	56.52
Pacific silver fir - Mountain hemlock forest	TRUE	59.06
Black cottonwood - Douglas-fir - Quaking aspen	TRUE	62.57
Western hemlock - Western redcedar - Douglas-fir forest	TRUE	73.44
Red fir forest	TRUE	73.53
Western hemlock - Douglas-fir - Western redcedar / Vine maple forest	TRUE	121.21
Western hemlock - Douglas-fir - Sitka spruce forest	TRUE	131.87

FRCC C3 Fuel Models (ANTH)

FRCC	C3

Sum of Fuel Load		
fuelbed.name	inwrap	Total
Sagebrush shrubland	TRUE	0.71
Mesquite savanna	TRUE	1.71
Western juniper / Sagebrush savanna	TRUE	7.48
Gambel oak / Sagebrush shrubland	TRUE	13.95
Interior ponderosa pine forest	TRUE	15.03
Jeffrey pine - Ponderosa pine - Douglas-fir - Black oak forest	TRUE	26.78
Douglas-fir - ponderosa pine forest	TRUE	29.24
Pacific ponderosa pine forest	TRUE	39.78
Douglas-fir - White fir - Interior ponderosa pine forest	TRUE	64.55

FRCC C2 Fuel Models (mixed)

CLASS	NATANTH	Fuel Load	Duff Tons	Notes
Douglas-fir - White fir forest	ANTH	41	8.64	Any categories with Douglas-fir are similar to G and H in NFDRS. They have been categorized as NAT or ANTH based on the amount of Fuel Loading and the Thickness of Duff
Oregon white oak - Douglas-fir forest	NAT	43	1.92	
Douglas-fir - Sugar pine - Tanoak forest	ANTH	50	9.6	
Douglas-fir / Oceanspray forest	ANTH	13	5.76	
Western juniper / Huckleberry oak forest	ANTH	46	7.68	The loading is higher than other juniper and hardwood classes.
Pacific ponderosa pine - Douglas-fir forest	NAT	10	4.8	Similar to Model U, but, because of the low amount of duff and fuel loading, it seems more like a natural.
Interior Douglas-fir - Ponderosa pine / Gambel oak forest	ANTH	45	7.68	A combination of Pine and Fir with high fuel loading.
Douglas-fir - Madrone / Tanoak forest	ANTH	39	5.76	
Sugar pine - Douglas-fir - Ponderosa pine - Oak forest	ANTH	42	5.76	
Idaho fescue - Bluebunch wheatgrass grassland	NAT	47	0	Based on the NFDRS classification, all grasses and loadings less than 5 tons are considered NAT
Trembling aspen / Engelmann spruce forest	ANTH	21	9.6	Spruce also applies to classes G and H.
Pine - Oak forest	ANTH	57	7.68	Similar to Model U
Redwood - Tanoak forest	ANTH	30	35.52	Very high fuel loading. Including lots of duff
Creosote bush shrubland	NAT	3	0	
Coastal sage shrubland	NAT	27	0	
Wheatgrass - Cheatgrass grassland	NAT	7	0	
Whitebark pine / Subalpine fir forest	ANTH	59	9.6	High loading/high duff.
Red fescue - Oatgrass grassland	NAT	44	0.96	
Western Juniper / Sagebrush - Bitterbrush shrubland	NAT	48	0	

FRCC C2 Fuel Models (mixed)

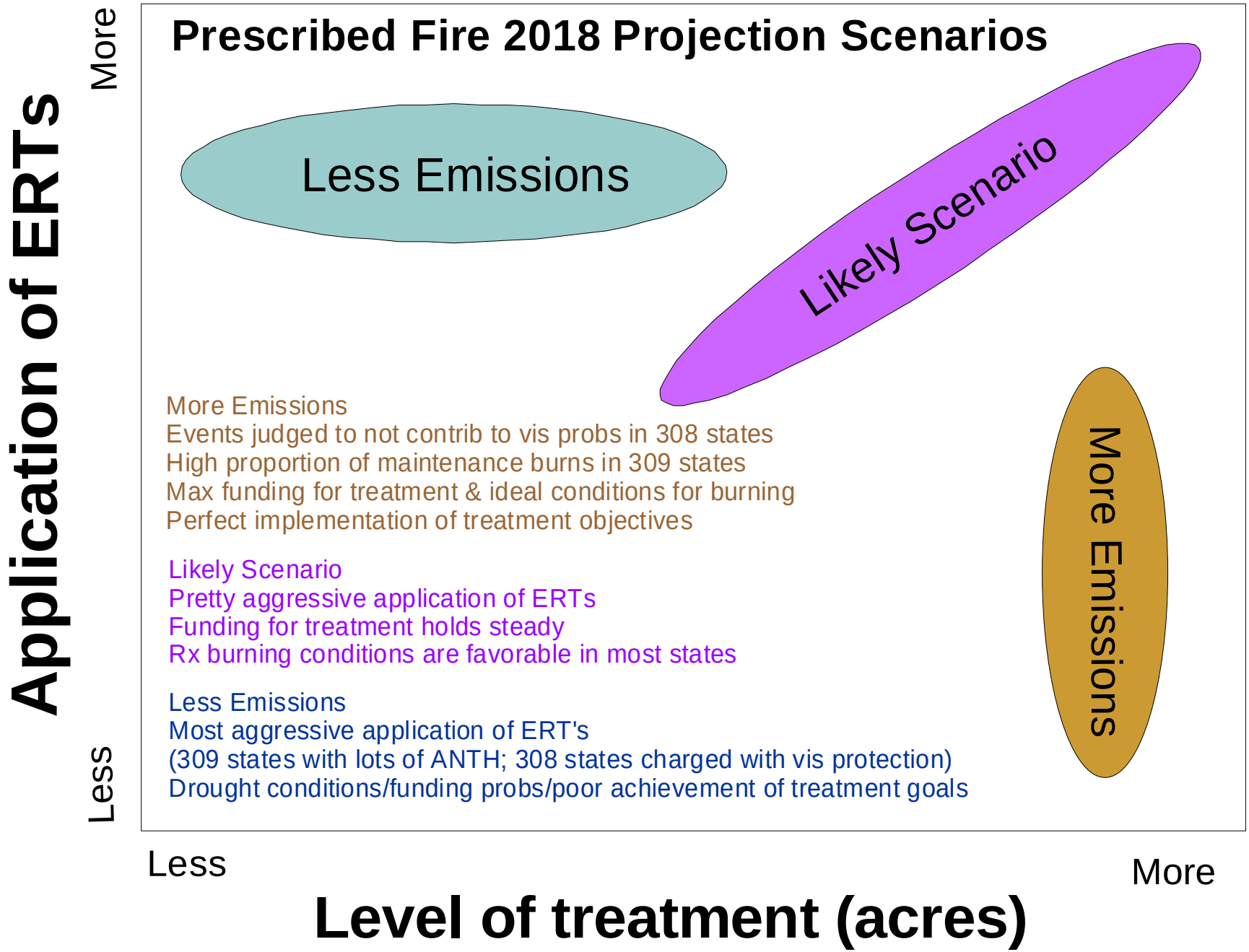
Subalpine fir - Lodgepole pine - Whitebark pine - Engelmann spruce forest	ANTH	36	9.6	Relatively high loading/high duff
Pitch pine / Scrub oak forest	NA	-	4.8	
Eastern white pine - Northern red oak - Red maple forest	NA	-	7.68	
American beech - Yellow birch - Sugar maple forest	NA	-	7.68	
Bluestem - Indian grass - Switchgrass grassland	NAT	38	0	
Red pine - White pine forest	ANTH	60	13.44	High loading/high duff.
Jack pine savanna	NA	-	2.88	
Bur oak savanna	NAT	55	2.88	Low duff and hardwood
Red spruce - Balsam fir forest	NA	-	24	
Little gallberry - Fetterbush shrubland	NA	-	363.84	
Red maple - Oak - Hickory - Sweetgum forest	NA	-	15.36	
Turkey oak - Bluejack oak forest	NA	-	5.76	
Longleaf pine / Yaupon forest	NA	-	9.6	
Pinyon - Juniper forest	NAT	4	0.96	
Trembling aspen forest	ANTH	37	6.72	high fuel loading for aspen.
Saw palmetto / Three-awned grass shrubland	NA	-	15.36	
Post oak - Blackjack oak forest	NA	-	2.88	
Engelmann spruce - Douglas-fir - White fir - Interior ponderosa pine forest	ANTH	15	12.48	ANTH because of the high duff content
Chestnut oak - White oak - Red oak forest	NA	-	6.72	
Oak - Pine - Magnolia forest	NA	-	5.76	
Bluestem - Gulf cordgrass grassland	NA	-	0	
Shortleaf pine - Post oak - Black oak forest	NA	-	7.68	
Loblolly pine forest	NA	-	15.36	
Green ash - American elm - Silver maple - Cottonwood forest	ANTH	52	7.68	High loading for hardwoods.

Nat/Anth Assignment

- QC info:
  - Total acres (WRAP-wide) of FCCS fuel models assigned ANTH: 225M
    - 88M acres > 7 tons/acre
    - 1 fuel model "sagebrush shrubland" (C3) is 137M acres 0.71 tons/acre
  - Total acres (WRAP-wide) of FCCS fuel models assigned NAT: 432M
    - 325M acres < 15 tons/acre total fuel loading
    - 85M acres (all C1) greater 25 tons/acre
- Statistics (tons/acre including duff):
  - for FCCS fuel models assigned ANTH:
    - min = 0.71
    - max=106
    - avg=37
  - for FCCS fuel models assigned NAT:
    - min = 0.07
    - max=132
    - avg=29.5

Projection Scenarios

- Strawman Projection Scenario Matrix
  - 3 scenarios for the projection inventories for prescribed fire.
  - Product of a brain storming session between Mark Fitch and Dave Randall and review by the Ph III/IV Task Team.
  - Main ideas:
    - Capture a range of possibilities in order for the emission budgets and modeling analysis to bracket the possibilities for 2018.
    - The scenarios are represented as OVALS (rather than a point on the matrix) in order for each scenario to accommodate some range of conditions.
    - Conditions could range based on rules we apply to the baseline EI and the way we apply those rules (e.g., state-by-state, agency-by-agency, eco-zone-by-eco-zone, 308 vs. 309).


Prescribed Fire 2018 Projection Scenarios
Less Emissions
Likely Scenario
More Emissions
More Emissions
Events judged to not contrib to vis probs in 308 states
High proportion of maintenance burns in 309 states
Max funding for treatment & ideal conditions for burning
Perfect implementation of treatment objectives
Likely Scenario
Pretty aggressive application of ERTs
Funding for treatment holds steady
Rx burning conditions are favorable in most states
Less Emissions
Most aggressive application of ERT's
(309 states with lots of ANTH; 308 states charged with vis protection)
Drought conditions/funding probs/poor achievement of treatment goals
Application of ERTs
More
Less
Less
More
Level of treatment (acres)

Next Steps

- Technical Development
  - Baseline
    - Produce baseline EI's from established baseline activity levels
    - Post summaries of baseline EI for review by interested parties
    - Revise (as necessary) and produce final baseline EIs (due by October 14)

Next Steps

- Technical Development
  - Projection
    - 2002 Ph. 2 Statistics to P. Lahm
    - P. Lahm to obtain *simple* projection data from Interagency Fuels Committee
    - Preliminary project scalars
    - QC Binders
    - Workshop #2
    - Produce final projection levels and event based EIs

Task List & Schedule (*Revised*)

Status	**Date**	**Task**
Done	June 15	**Draft Project Work Plan**
Done	June 30	Final Project Work Plan
Preliminary		**WFU and Rx Fire Baseline Strawman**
Done	*August 10*	**1 day technical session (projection scalars)**
In progress	October 14	Baseline EI's and draft documentation
draft	October 10	**White Paper on 2018 projections**
	November 15	Baseline EI final documentation
In progress	October 10	**Proposed EI scenarios draft assumptions**
	October 20	**2018 projection burning levels QC Binders**
	November 1-2	**1- ½ day technical workshop on projections: QC Binder results; ERT's; Fire Calc Tool**
	December 15	2018 projection EIs and draft documents
	January 15, 2006	2018 final documents

Red = involvement from state/tribal SMPs is critical