Smoke Management

STRATEGIES
TECHNIQUES

STRATEGIES

- Avoidance
- Dilution
- Emission Reduction

AVOIDANCE STRATEGY

- Keep all smoke/emissions away from smoke sensitive areas.

AVOIDANCE

TO BURN OR NOT TO BURN?

- Is prescribed burning necessary, or are there other alternatives such as:
  - Mechanical
  - Bury/Landfill
  - Chemical
  - Increase Biomass Utilization
  - Grazing

AVOIDANCE

Strategies to avoid smoke impacts

- When wind is blowing away from sensitive areas
- Avoid burning into late afternoon or nighttime
- Burn on “strengthening” not “calming” winds
- Burn units above stable air layer in mountains
- Avoid weekend/holiday burning
- Look for burn chances outside normal season

AVOIDANCE

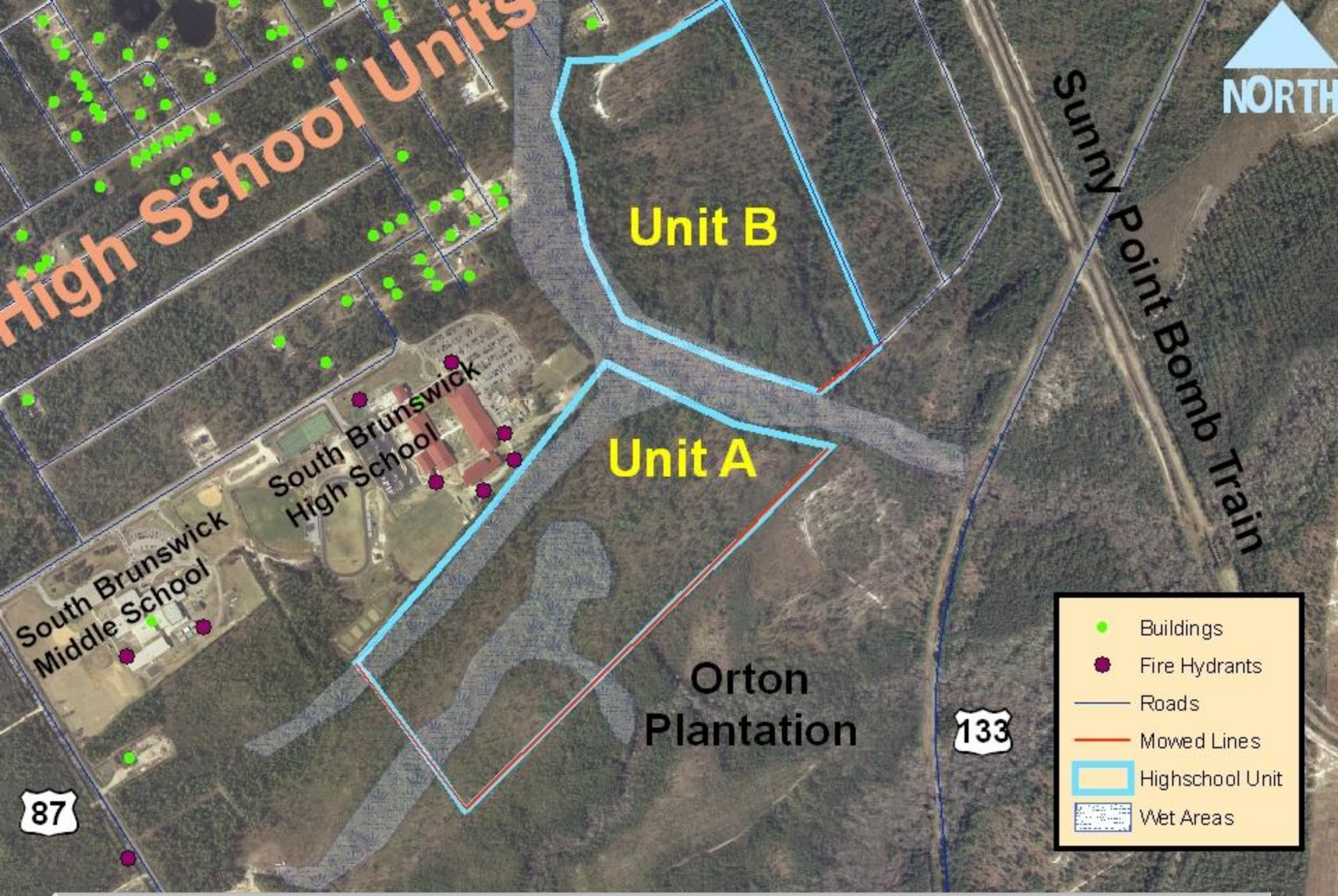
SMOKE HAPPENS, CAN I SHUT IT OFF?

Have a contingency plan for shutting down operations safely and quickly if the unexpected happens

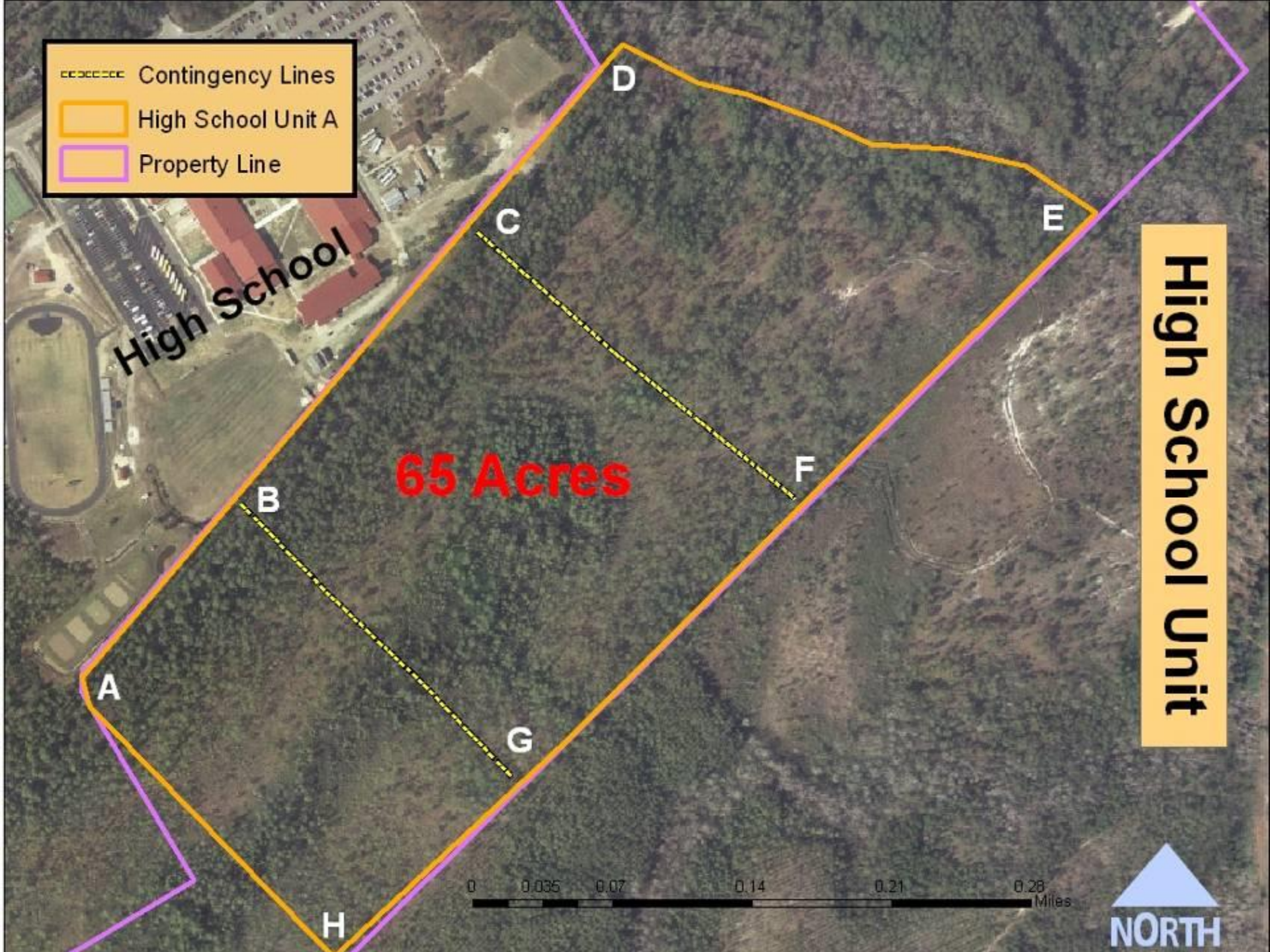
- Identify existing log roads, trails, etc. useful in shutting burn off
- Construct some additional internal lines
- Burn in small blocks
- Provide for engines to standby with water/foam
- Provide for dozer unit to standby
- Identify & notify available extra personnel
- Totally finish one burn block before moving to another block

Reduce Area Burned

Burn small units



Reduce Area Burned


Contingency Lines
High School Unit A
Property Line
High School
65 Acres
High School Unit
A
B
C
D
E
F
G
H
0
0.035
0.07
0.14
0.21
0.28
Miles
NORTH

Choose appropriate wind direction

DILUTION STRATEGY

- Mix a fixed amount of smoke/emissions throughout a larger volume of air.

Prescribe for nighttime dispersion

- overnight low 5^{o} > dew point
- <80% RH

DILUTION

IF YOU MUST POLLUTE, PLEASE DILUTE

- Good Ventilation = Good Dispersal
  - Burn during mid-day when ventilation typically improves and avoid burning late when ventilation deteriorates.
  - Stable atmosphere vs. unstable atmosphere
  - Pay attention to Mixing Heights and Transport Winds

DILUTION

SMALLER ACRES/SLOWER MATCHES

- Burn fewer and/or narrower strips at any one time.
  - Too slow a pace to ignition can cause operations to extend into poor dispersal period
- Burn smaller area during each burning period.
  - Subdividing larger burn units into several smaller ones to accommodate smoke management needs costs more.

DILUTION

TURN IF OFF, COME BACK LATER IF SMOKE HAPPENS

- Have a contingency plan to suspend operations early and come back another time to put up the rest of your smoke.

EMISSION REDUCTION STRATEGY

- Reduce the quantity of smoke or emissions produced/unit area (e.g. reduce the tons/acre of PM2.5 produced).

EMISSION REDUCTION

TONNAGE AND TIMELAGS

- Focus on larger/heavier fuels and duff classes.
  - Reduce total fuel loading present on the site.
  - Reduce actual fuel load consumed during burn.

REDUCE FUEL LOADINGS

- Improve biomass utilization (e.g. low stumps, chipping)
- Isolate heavy fuel concentrations from ignition source
  - Interior control lines
  - Pre-treat with foam/water/retardant
- Is your duff burning?

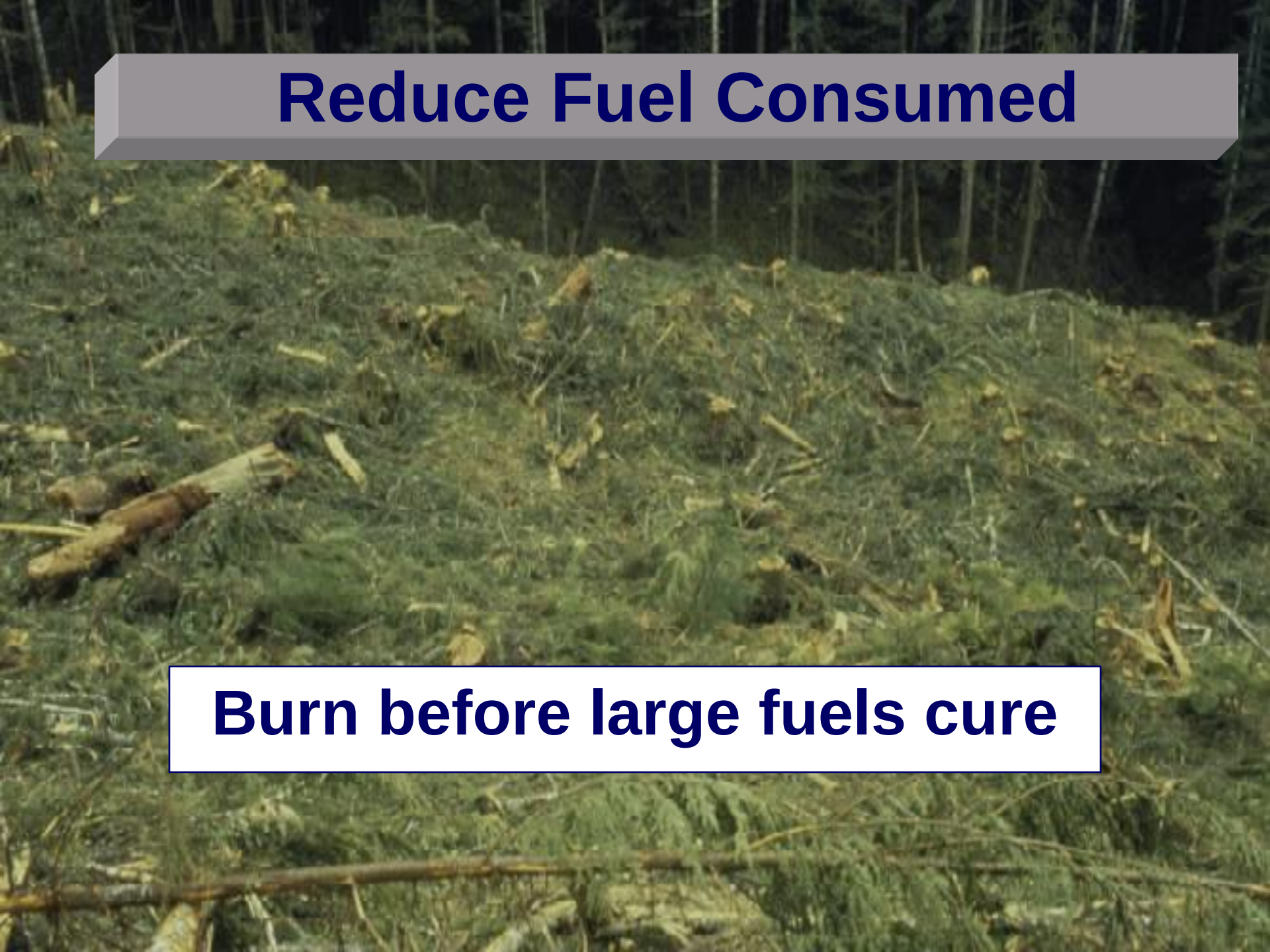

Burn frequently

Increase Combustion Efficiency

Burn under dry conditions

- Dry conditions lead to increased combustion efficiency and less emissions may be produced. However...

Reduce Fuel Consumed



Burn before large fuels cure

Reduce Fuel Consumed

Burn before precipitation

REDUCE CONSUMTION

- Schedule burns when large fuel class moistures are too high to ignite or sustain combustion, yet finer fuels will burn (e.g. a low RH day 1-3 days after long duration “soaking” rain).

- Break up/scatter heavy fuel concentrations (change horizontal arrangement/continuity of large fuels).

EMISSION REDUCTION

- Favor flaming over smoldering combustion
  - Firing technique--backing fires/mass ignition
  - Keep dirt out of piles
  - Avoid burning heavy organic soils
  - Mop-up--prompt and thorough, get inside!

MINIMIZATION TECHNIQUES

- Have clear objectives.
- Obtain/use weather forecasts.
- Don’t burn during stagnation advisories, inversions.
- Comply with regulations, including the local ones.
- Burn under good dispersion conditions.
- Notify local fire dept. dispatchers, adjacent landowners and other neighbors.
- Burn under favorable moisture conditions.

MINIMIZATION TECHNIQUES

- Use backing fire whenever you can, flanking too.
- Smaller areas.
- Mop-up.
- Have an emergency plan and implementation criteria.
- Shut it off, safe and fast.

PILE AND WINDROW POINTERS

- Allow large fuels to dry before concentrating into piles or windrows.
- Cover piles before rains start.
- Keep dirt out by using toothed (brush-rake) blades
- Round “haystack” piles burn more efficiently than windrows do. Pile it higher.

STRATEGIES

- Avoidance
- Dilution
- Emission Reduction

Questions, Comments?

Thanks!

Sam Lindblom
slindblom@tnc.org
434-91-0580