

# SWAT

Solid Waste Alaska Taskforce



## Burning

Instructor: Trisha Bower and Stephen Price, ADEC

# It's Not Just Our Health That is at Risk

- Physical Risks
- Loss of life
- Potential injuries
- Loss of infrastructure
- Loss of homes and traditional resource areas



Fire 1



Fire 2

Physical Risk







# Burning Waste

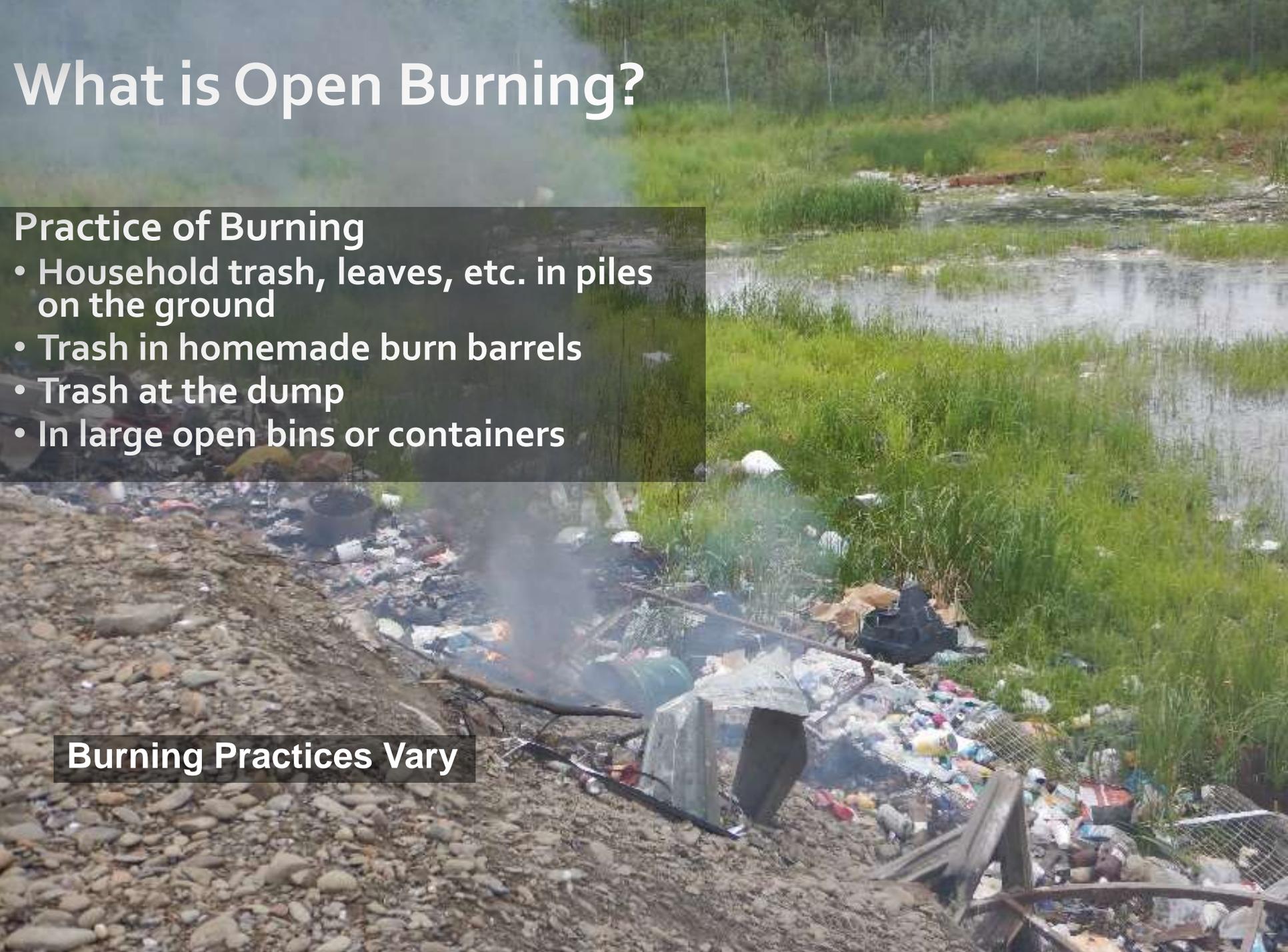
Neil Lehner, ADEC

# What is Open Burning?

## Practice of Burning

- Household trash, leaves, etc. in piles on the ground
- Trash in homemade burn barrels
- Trash at the dump
- In large open bins or containers

**Burning Practices Vary**



# Burning at Class III Landfills

- Burning garbage is a reality
- At least 131 Alaskan communities
- Communities burn waste for volume reduction
- Burning at Class III Landfills is allowed, under a special exemption from the EPA
- ADEC Solid Waste promotes controlled and contained burning to protect human health and the environment



# ADEC Involvement

- 
- Permit Conditions on Open Burning
  - Policy has evolved over time/ SW Program has increased compliance assistance (Helping get burn units, burning rules, plans, more efficient methods)
  - Permitting Process

Other Agencies/Entities Involved

-Liability

09.09.2013

# Why Do People Burn Trash?

- A way to keep their business private
- A way to minimize the amount of waste they have to haul to the dump
- Reduction in disposal costs
- Pyromaniac
- Old habit



# Why Burn

- Volume Reduction (less going to landfill)
- Ash -Less attractive to animals compared to raw garbage
- Ash -Covered less frequently compared to raw garbage
  - Less Litter, Odor, Leachate Formation
- Ash- Less Reactive
  - Easier to Dispose

Done Properly- Effective Management of Waste

Done Improperly-

- Unburned waste in ash
- Wildfires
- Smolder-more smoke and air pollution
  - Environmental Health, Human Health
- Disadvantages of Improper Burning



# Things to keep in mind regardless of burn method



## Management Practices

- Waste Reduction
- Recycling
- Treatment
- And then Disposal



# Reduction/Recycling

## Some of the challenges:

- Life Style Changes-more waste products
  - Different type of waste
- Outreach and Education
- Lack infrastructure
- Remote/Isolated-coordination challenges
- Staff turn over also create obstacles
- Expensive and Logistical Considerations

**But some options are still available, even if very limited**

- Still help to make a difference



# Treatment Before Disposal

## -The main objectives

- Reduce volume of waste going to disposal
- Placement of waste to maximize disposal space



- Salvaging/Reuse (what can be used)
- Composting
- Recycling/backhauling
- Compacting
- Compiling
- Covering
- Burning/incineration



# Improper Open Burning



- It is a fire hazard
- It is an environmental health hazard
- It is a human health hazard

# Fire Hazard

- Unmanned open burning is very dangerous in any location
  - Weather Conditions, Drought, etc.
- Kids are attracted to open flame
- Burning waste has caused forest fires!!!
- Liability





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# Environmental Health Hazard

When complete burning occurs all waste is burned

- Completeness of Combustion  
(How much waste is fully burned to ash)

But not always done properly

- Most all of the waste is burned at temperatures between 250 to 500 degrees Fahrenheit -Smokey (Indicator of incomplete combustion)
- When a trash fire smolders the waste does not burn and more contaminants enter the environment - Air, Soil and Water -



# Health Hazards

- Current research- improper burning
  - Far more harmful to health than previously thought
- Increased risk of heart disease
- Aggravate respiratory ailments such as asthma and emphysema
- Rashes, Nausea, Headaches
- Coughing
- Depressed Immune System
- Especially people at risk



# Pollutants from Burning

- Hazardous Air Pollutants
- Particle Pollution
- Volatile Organic Compounds (VOC)

- Particulate matter
- Nitrogen Oxide
- Carbon Monoxide
- Sulfur Dioxide
- Furans
- VOCs
- Hydrochloric Acid
- Benzo(a)pyrene
- Dioxins
- Hexachlorobenzene
- Halogenated hydrocarbons
- Heavy Metals
- Arsenic
- Mercury
- Barium
- Chromium
- Lead
- Cadmium



Long List of Potential Pollutants

# Particulate Matter

Microscopic particles released by open burning

- Small particles
  - Lodge deep in the lungs
  - Even the bloodstream
- Numerous Health Problems
  - Aggravate Respiratory Conditions
    - Asthma, Bronchitis
  - Heartbeat Irregularities
  - Heart Attacks
  - Decreased Lung Function
  - Increased Respiratory Symptoms
    - Irritation of the airways
    - Coughing
    - Difficulty Breathing

Particle size is directly linked to their potential for causing health problems

- Small particles (less than 10 micrometers) pose the greatest threat



# Particulate Matter (PM) Size

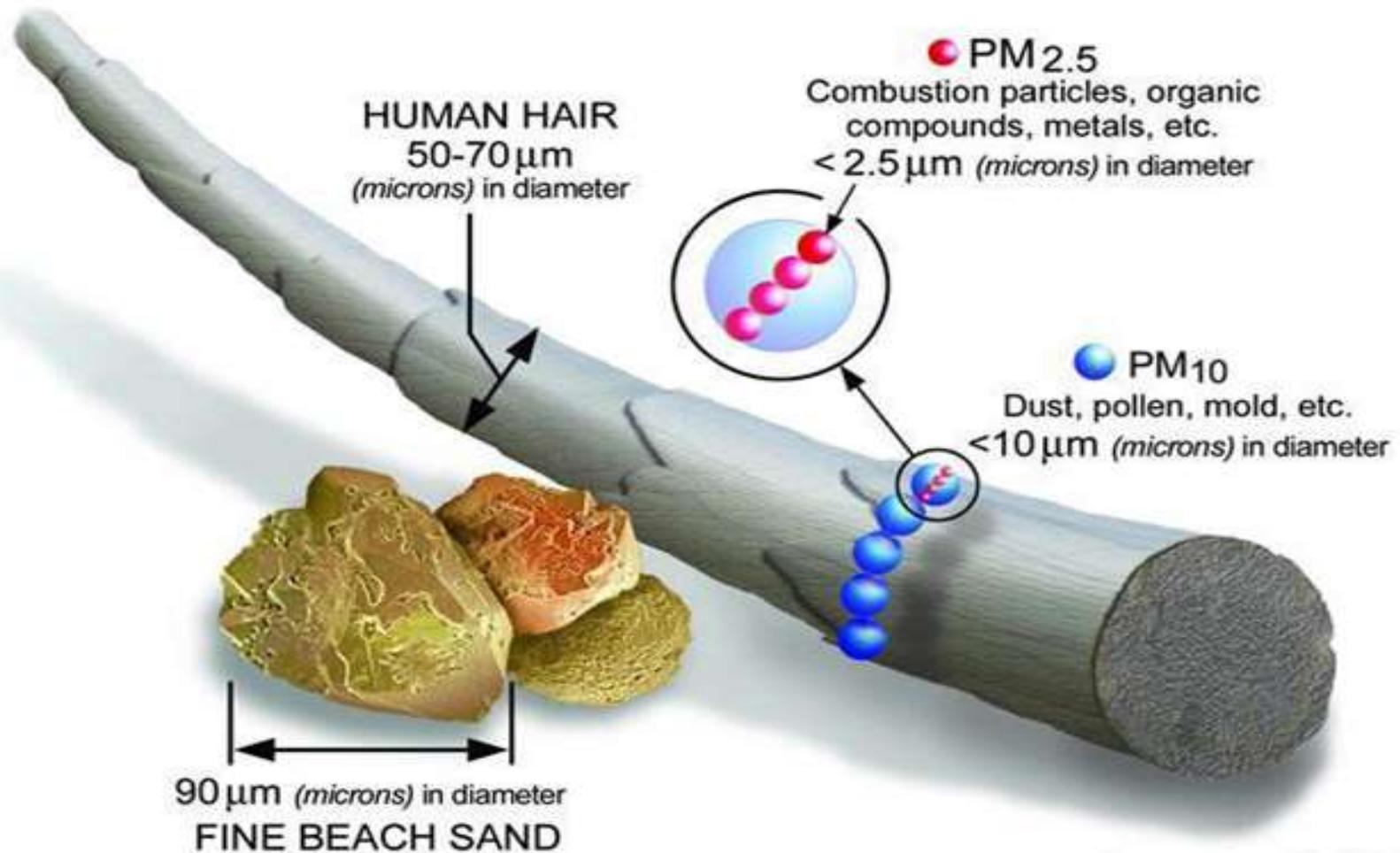


Image courtesy of the U.S. EPA

# Vulnerable Population



- Children
- Elders
- People who have pre-existing heart, respiratory diseases or allergies
- Healthy people exposed to smoke or contaminants/residue from open burning

# Susceptible Situations

- Trash burning in burn barrel near residential homes
- Downwind from open burning at the landfill/dump
- Trash burning during winter months
- Residential home fires
- Forest fires





# Dioxins

- Catch all term for three chemical groups
  - 2378-TCDD-has been called the most lethal human made poison
    - toxicity is second only to radioactive waste
- Highly toxic, long-lasting organic compounds
  - Break down very slowly
    - Low Levels Dangerous
    - Formed when products containing carbon and chlorine are burned
    - Even small amounts of chlorine can produce dioxins
    - Separating out items high in chlorine content really not effective
      - Low levels of chlorine are present in MOST HOUSEHOLD TRASH
- One Burn Barrel
  - Can produce as much or more than a full-scale municipal waste combustor burning 200 tons a day (EPA)



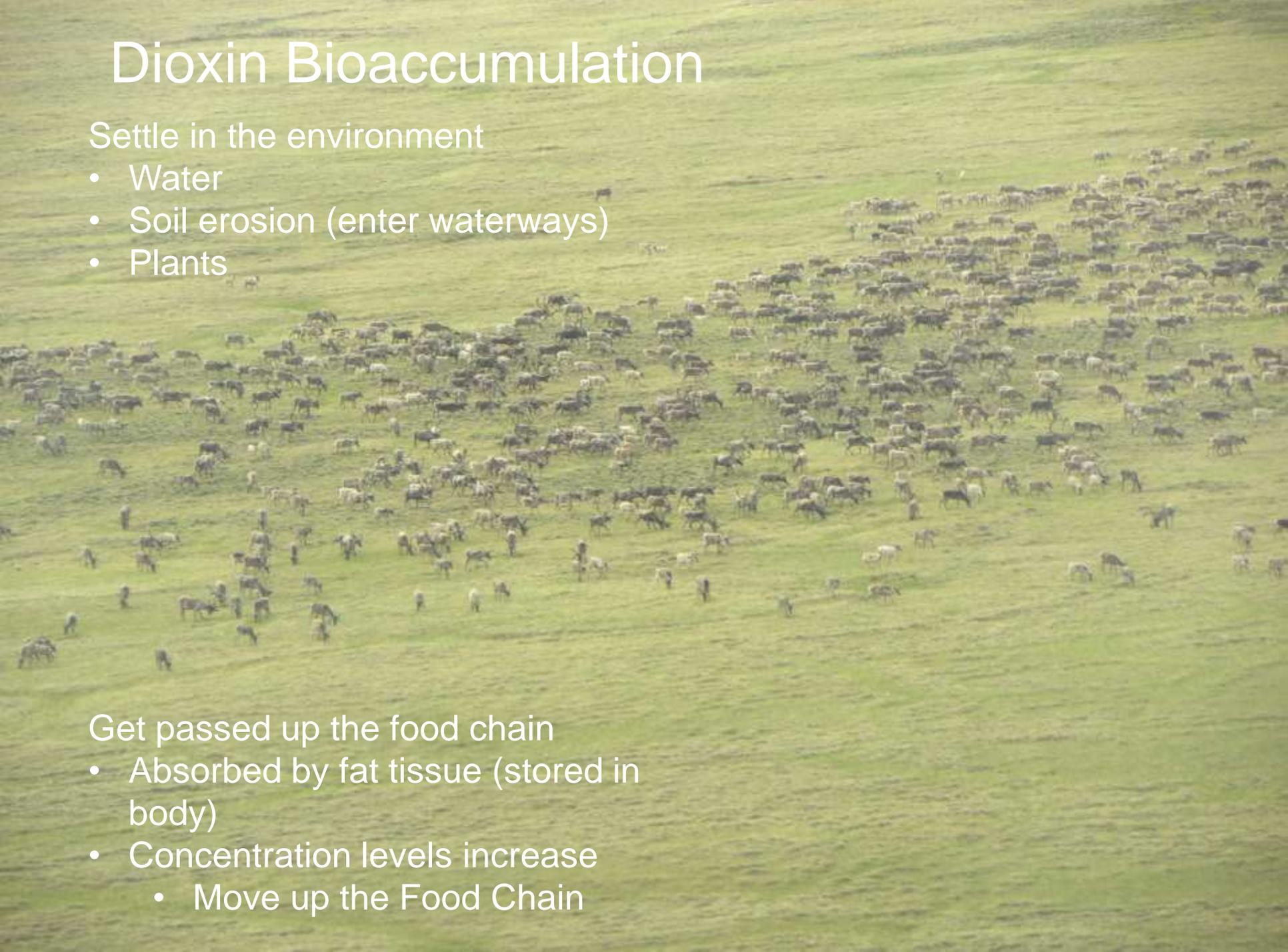
# Dioxin Bioaccumulation

Settle in the environment

- Water
- Soil erosion (enter waterways)
- Plants

Get passed up the food chain

- Absorbed by fat tissue (stored in body)
- Concentration levels increase
  - Move up the Food Chain



# Adverse Health Effects



- Exposure to dioxins at high enough levels may cause a number of adverse health effects including cancer
- Chronic respiratory illness
- Allergies
- Asthma
- Skin Disease & rashes
- Breakdown in the immune system
- Liver damage
- Heart disease
- Hormonal systems
- Reproductive disorders
- Developmental disorders
- Lower birth weight in babies
- Sudden infant death syndrome (SIDS)
- Birth defects
- Several types of cancer



# The health effects associated with Dioxins depend on these factors

- Level of exposure
- When exposed
- How long
- How often

So why increase the risk!!!



# Where do Dioxins come from?

- Burning any product treated with chlorine
- Burning treated lumber
- Burning plastics
- Burning fuels – exhaust
- Burning chemicals or chemically treated products
- Chemicals such as herbicide or pesticides



# Ash and Heavy Metal

## Ash Residue from Burn Barrels

- Can contain toxic metals
- Harmful if Ingested
  - Spread out in yard or around garden
  - Absorbed and accumulated by vegetation
  - Groundwater, Surface Water
  - Children playing in areas where ash was spread



## Many potential health effects!!!

Kidney, Liver Disease  
Nervous System  
Gastrointestinal Problems  
Respiratory System  
Some types of Cancer



# Harmful Long Term Effects

The pollutants don't just disappear after the burn is over

- Smoke does not have to be inhaled
- Some of these toxins from the smoke remain in the immediate vicinity and area downwind of the burn area for decades
- Other toxins and heavy metals gradually work their way into the groundwater
- While in the groundwater the contaminant enters the small species and up the food chain where they eventually enter our bodies



Everyone in the Community is  
responsible for waste  
management

YOU can significantly  
reduce the human health  
and environmental risks by  
burning properly



# What Can You Do?

- Educate the public of the harmful effects
- Separate the burnables / non-burnables before burning
  - Starts at the home
- Keep waste dry
  - Typical Household Waste 20-30% water
  - Storage/Burn Frequency
- Burn your waste in well ventilated burn units
  - Use the most efficient unit available
- Burn when weather is favorable
- Oversee your burn once it is on fire
  - Properly Dispose of Cooled Ash
  - Don't let Fire Smolder
- Create ordinances to help manage burning
  - Landfill and Community
- Have a written out procedure that everyone can follow



# EDUCATE!

- Word of mouth
- Posters & signs around town
- Signs at the landfill

Teach the importance of proper waste management to Community members!

Reduce health risks for future generations!!!

ADEC Posters!!!

## BURN BOX USE

This burn box has been placed at the landfill to aid in waste minimization to reduce the volume of trash necessary for burial.

### PLEASE FOLLOW THESE GUIDELINES FOR USE:

#### ACCEPTABLE Burnable Items:

Newspaper Office paper Cardboard  
Paperboard Natural fiber rope Non-glossy magazines  
Food and vegetable wastes  
Paper packaging products & packaging material  
Bare wood in small quantities - no treated or painted wood

#### PROHIBITED Non-Burnable Items:

Plastics Aerosol cans Tires  
Diapers Sorbent pads Oily rags  
Batteries Electronics Carpet  
Shrink wrap Appliances Hazardous materials  
Synthetic construction materials [insulation, wiring, drywall, plumbing]

Call the KPB Solid Waste Department at 262-9667 with any questions

This project was financed by the Denali Commission  
and Kenai Peninsula Borough



## The Best Burn Units:

- Enclosed
- Efficient draft  
(open holes to bring in and circulate air)
- Smoke stack
- Easy to empty ash



## Operator:

- Light and tend the burn
- Training-Operation, Maint.
- Remove non-burnables
- Burn in the right conditions
- Attend the burn
- Ash removal as necessary



# Sorting your waste

Provide information on what CAN  
& **Cannot** be burned

- |               |   |              |   |                           |
|---------------|---|--------------|---|---------------------------|
| ✓ Food Scraps | x | Hard Plastic | x | Oil                       |
| ✓ Clean wood  | x | Styrofoam    | x | HHW                       |
| ✓ Paper       | x | Rubber       | x | E-Waste                   |
| ✓ Cardboard   | x | Metal        | x | Treated wood              |
|               | x | Glass        | x | Anything else             |
|               | x | Batteries    |   | you are not<br>sure about |



# Teach people to sort at home

Sorting burnables and non-burnables at home makes trash day easier

- Two trash cans
- Each labeled
- Burnables
  - taken to the burn box
- Non-burnables
  - placed in landfill
- Direction at the landfill



# Enforce the Rules

The Community must enforce the rules to protect their health and the environment.

- Ordinance and Resolutions - with consequences (fines, etc.) if they are violated
- Individual follow-up when you can identify who disposed improperly



# Best Management Practices for Open Burning Summary

- Proper Burn Unit
- Waste Separation
  - Non-burnables
  - Wastes that should not be burned
- Clean Dry Materials
  - Storage/Burn Frequency
- Clear Procedures
- Do not allow fire to smolder
  - ADEC Air Quality Regulations

## Results

### A Healthier Community

Fewer animals at the landfill

Fewer chemicals and particulates

Safer Subsistence areas

A cleaner Landfill

A cleaner Community



If burning is going to occur, what should be burned?



# GOOD SMOKE BAD SMOKE



Let's Play the Game 😊

# What can be safely burned in the Burn Box?

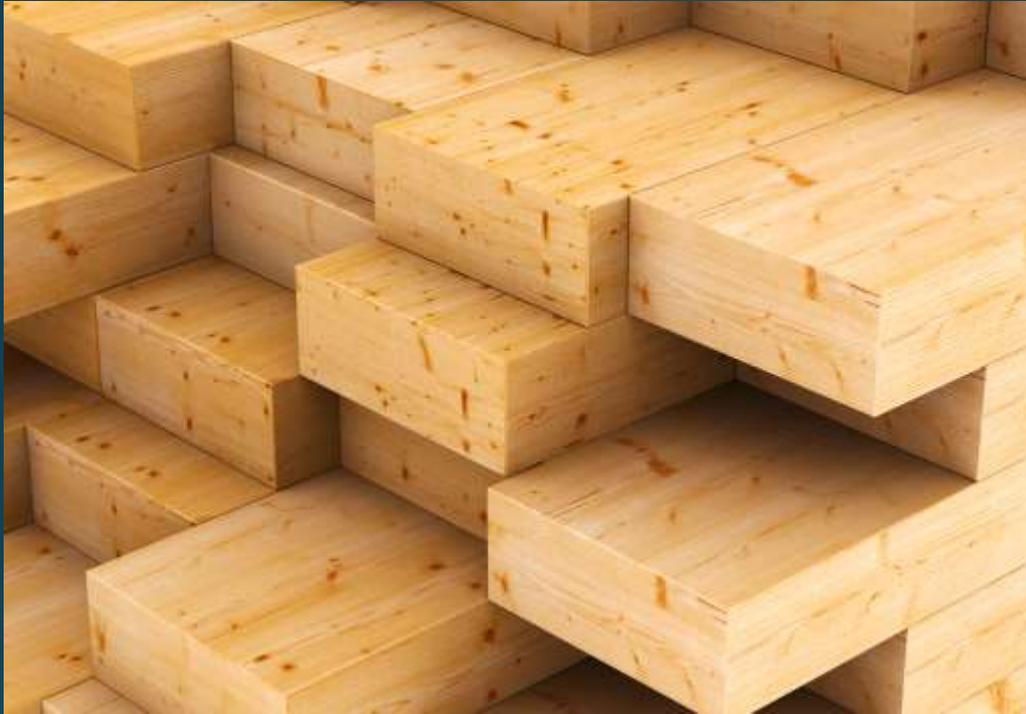
- Hit the buzzer if you think you have the correct answer

- Answer  **good smoke** for things **acceptable** to burn

- Answer  **bad smoke** for things that **should not be burned**



# Plastic Bottles



Untreated Lumber



Aerosol Cans



# Batteries



Newspapers





Used Diapers



# Magazines



# Treated Wood



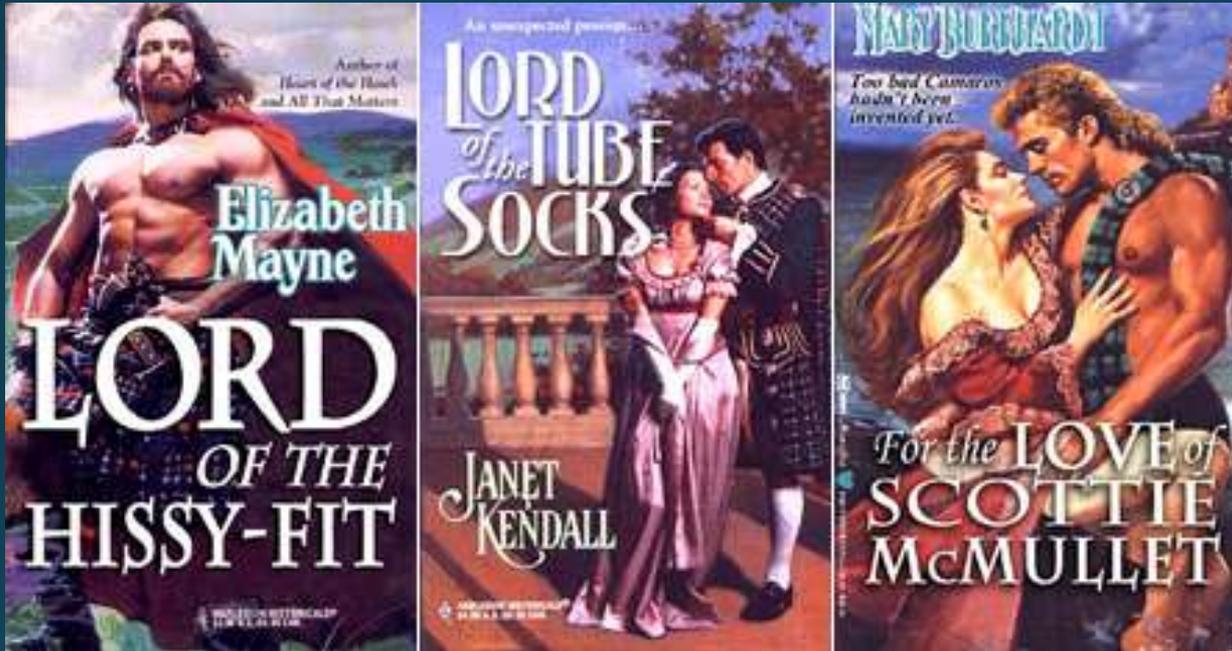
Electronics



Food Waste



Cardboard



# Old Paperback Books



# Aluminum Cans



# Steel or Tin Cans



Animal Carcasses (including heads and hides)



Waste Oil



Honey Bucket Waste



# Paper Products



Styrofoam or blue board



# Household Hazardous Waste



Couches or Old  
Furniture



Glass



Toys



# Creosote Coated Lumber



Woody Debris



Medical  
Waste



# Fluorescent Tubes



Unusable  
Clothing



# Spray Foam

