BEST MANAGEMENT PRACTICES: A TOOL FOR RESPONSIBLE WATER MANAGEMENT

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OBJECTIVES

- Discuss the BMP concept
- Focus on forest bioenergy
- Approach from a Life Cycle Analysis viewpoint
- Examine a case study from Tasmania

BEST MANAGEMENT PRACTICES

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BMP DEFINITIONS

- **Best Management Practices (BMPs) are effective, practical, structural or nonstructural methods which prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water.**

- **BMPs protect water quality from potential adverse effects of silvicultural or agricultural activities.**

- **BMPs are developed to achieve a balance between water quality protection and the production of woody and herbaceous crops within natural and economic limitations.**

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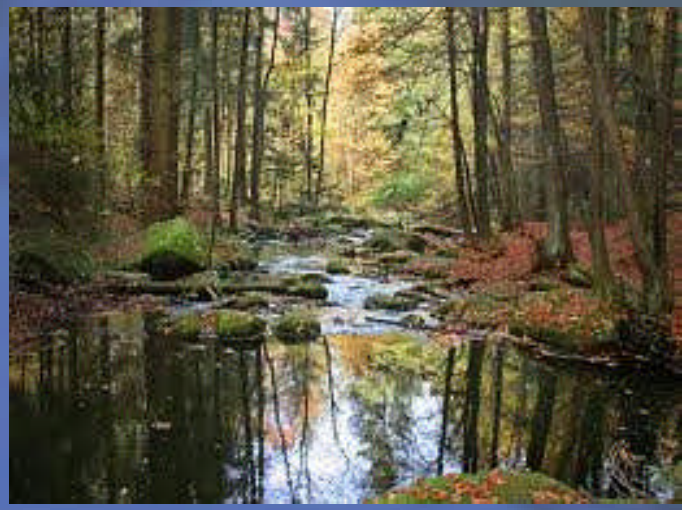
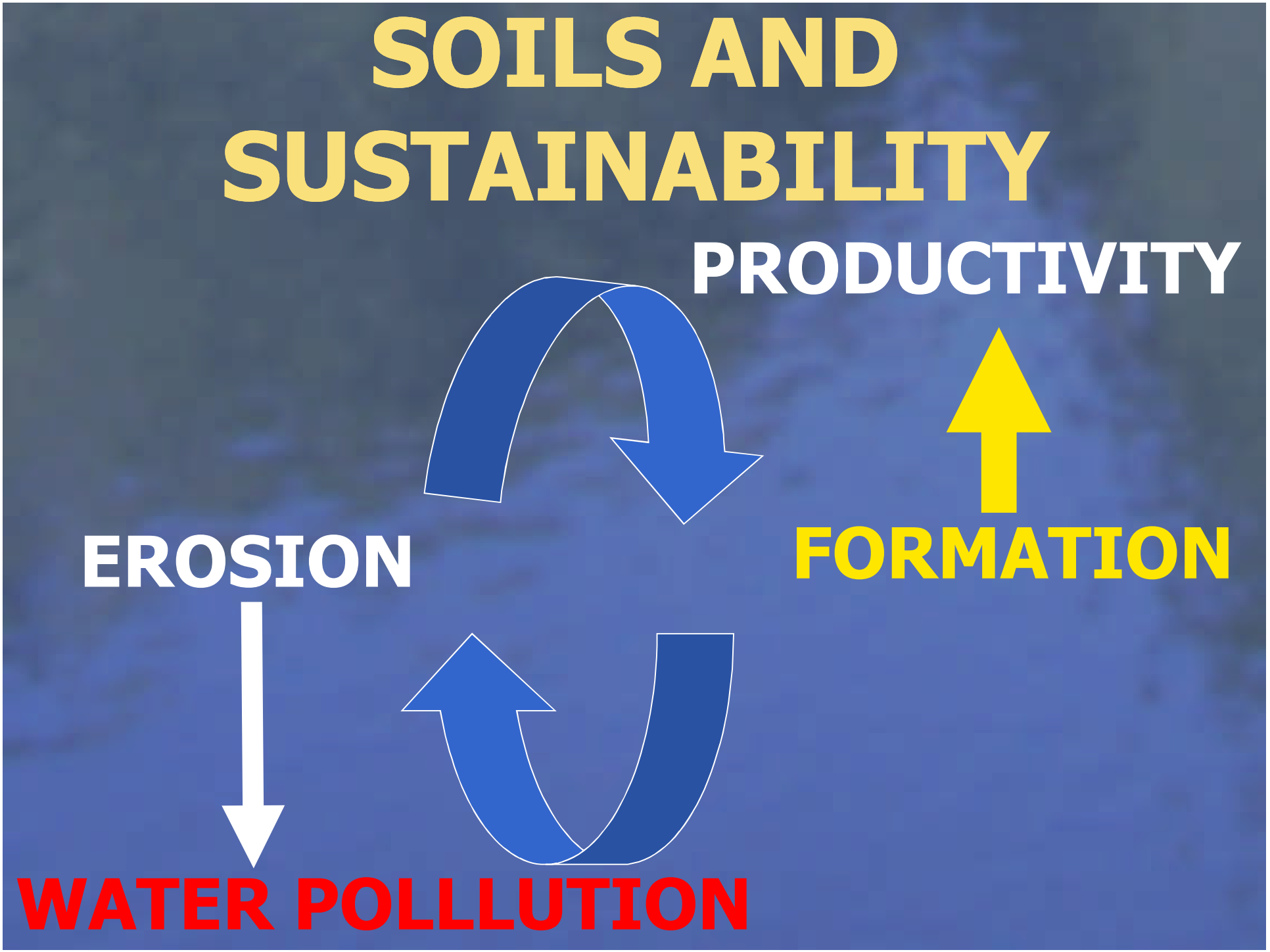
BMP HISTORY

- Originally referred to auxiliary pollution controls in industrial wastewater, city sewage, and stormwater management.
- Mentioned in USA 1977 Clean Water Act
- In 2000 the USEPA released a list of national BMPs for stormwater
- Codified in Codes of Forest Practices

BMP GOAL: PROTECT SOIL & WATER RESOURCES

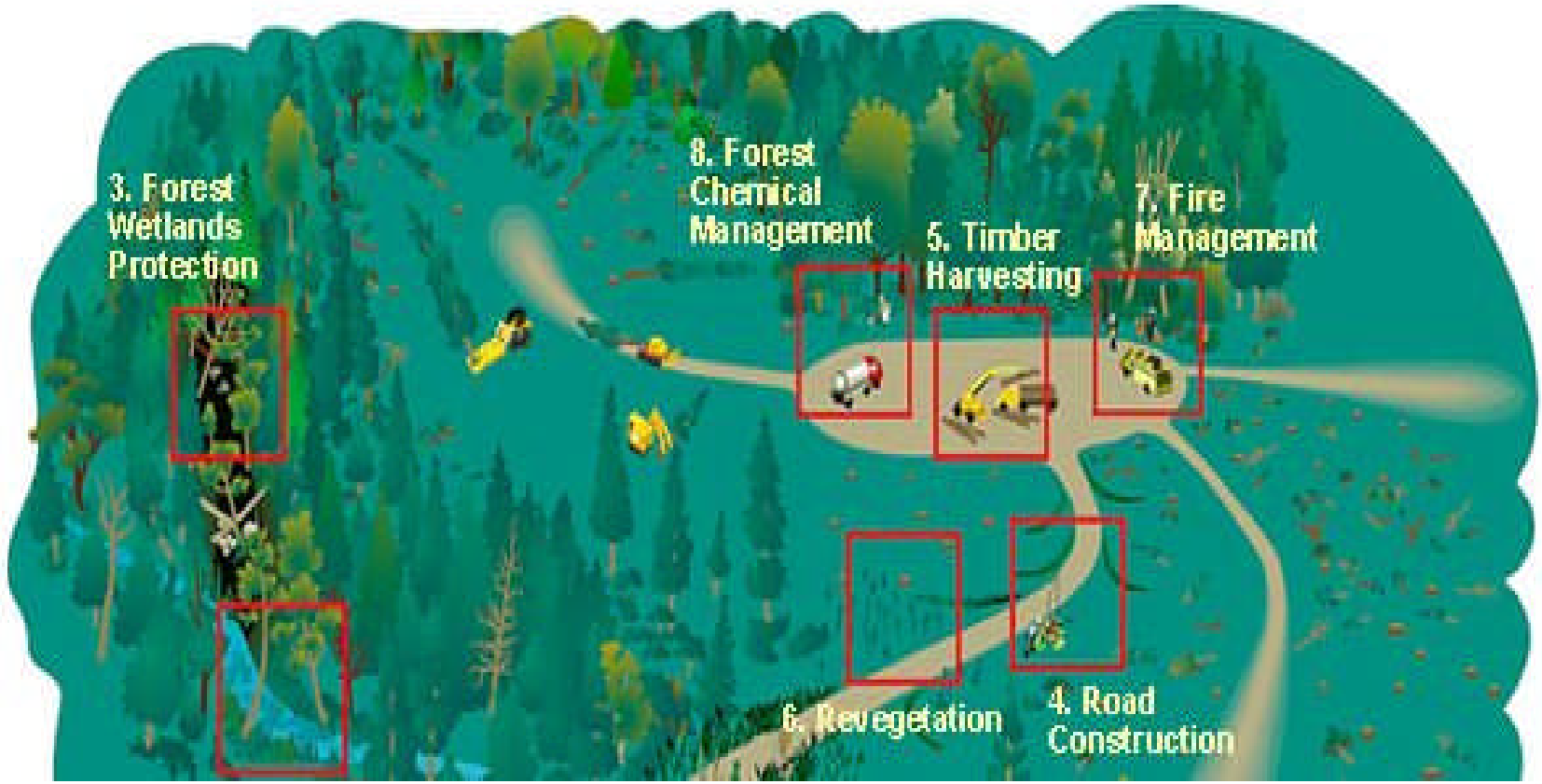


SOILS AND SUSTAINABILITY



BMP DEVELOPMENT

MULTIPLE COMPONENTS



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CORE CONCEPT:
THE USE OF SMZs

- **Water Quality, Biodiversity and Codes of Practice in Relation to Harvesting Forest Plantations in Streamside Management Zones**
-
- **Daniel G. Neary[1], Philip J. Smethurst[2], Brenda Baillie[3], and Kevin C. Petrone[4]**
-
- **July 2011**
-
- **CSIRO**
- **REPORT**
-

TASMANIA SMZ

ESK RIVER

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AGRICULTURE SMZs

IOWA, USA

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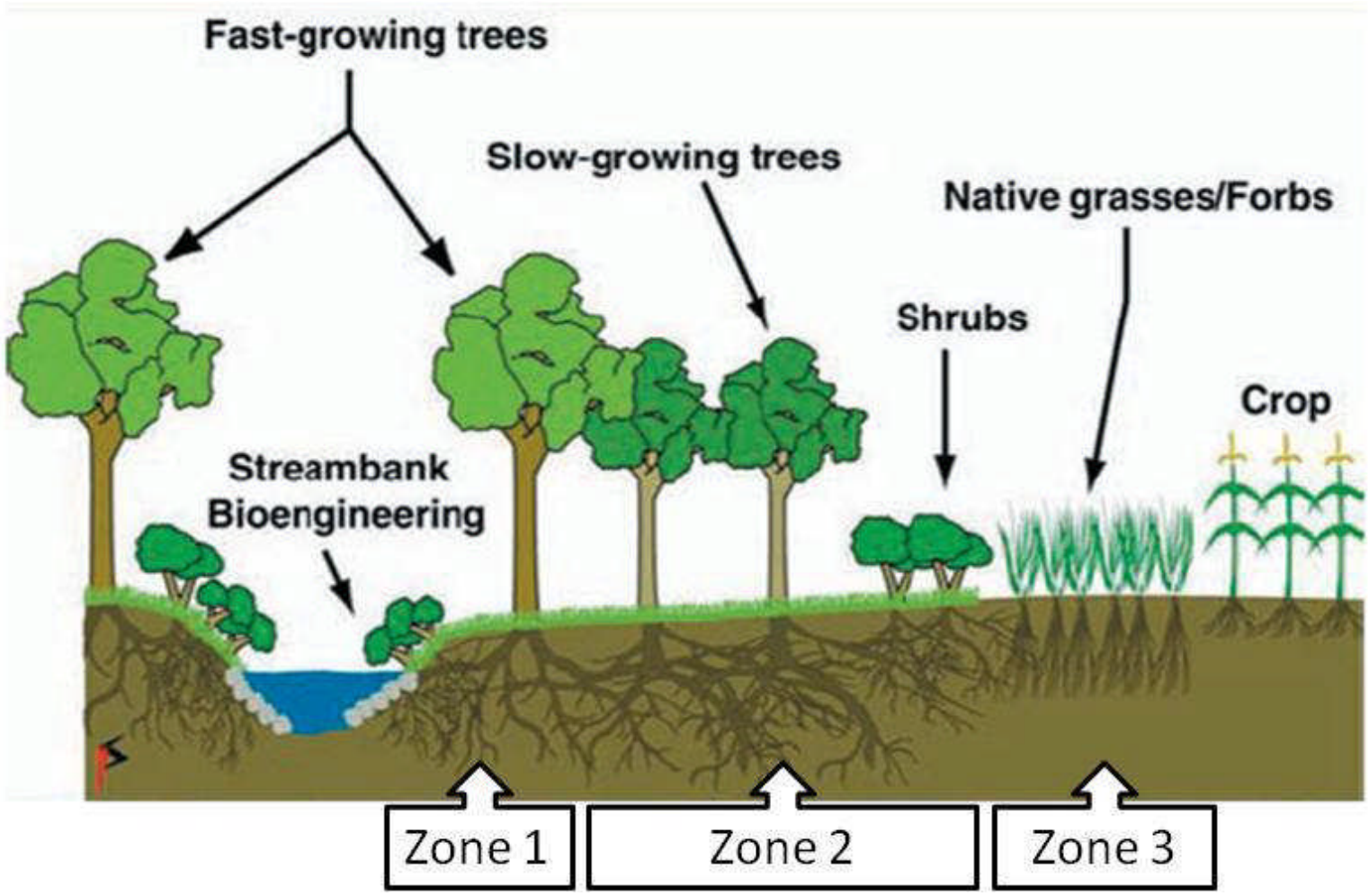
AGROFORESTRY SMZ DESIGN



UNIVERSITY OF MISSOURI 2006

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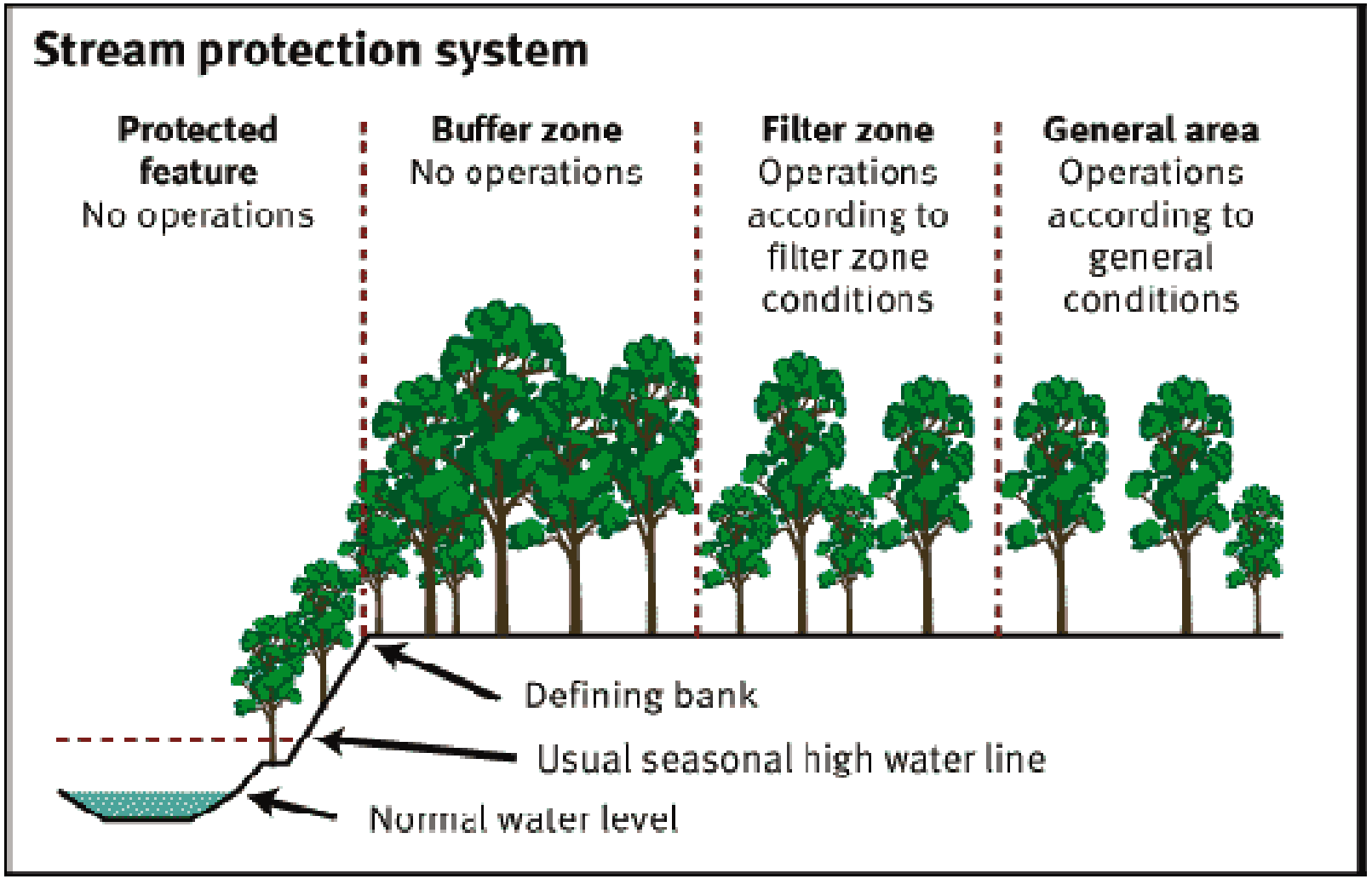
QUEENSLAND FOREST SMZs



QUEENSLAND DNRW 2007

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SMZ ECOSYSTEMS SERVICES

- Water Quality Protection
- Streamflow Enhancement
- Geomorphic Stability
- Flora & Fauna Benefits
- Air Quality Improvements
- Social & Economic Benefits

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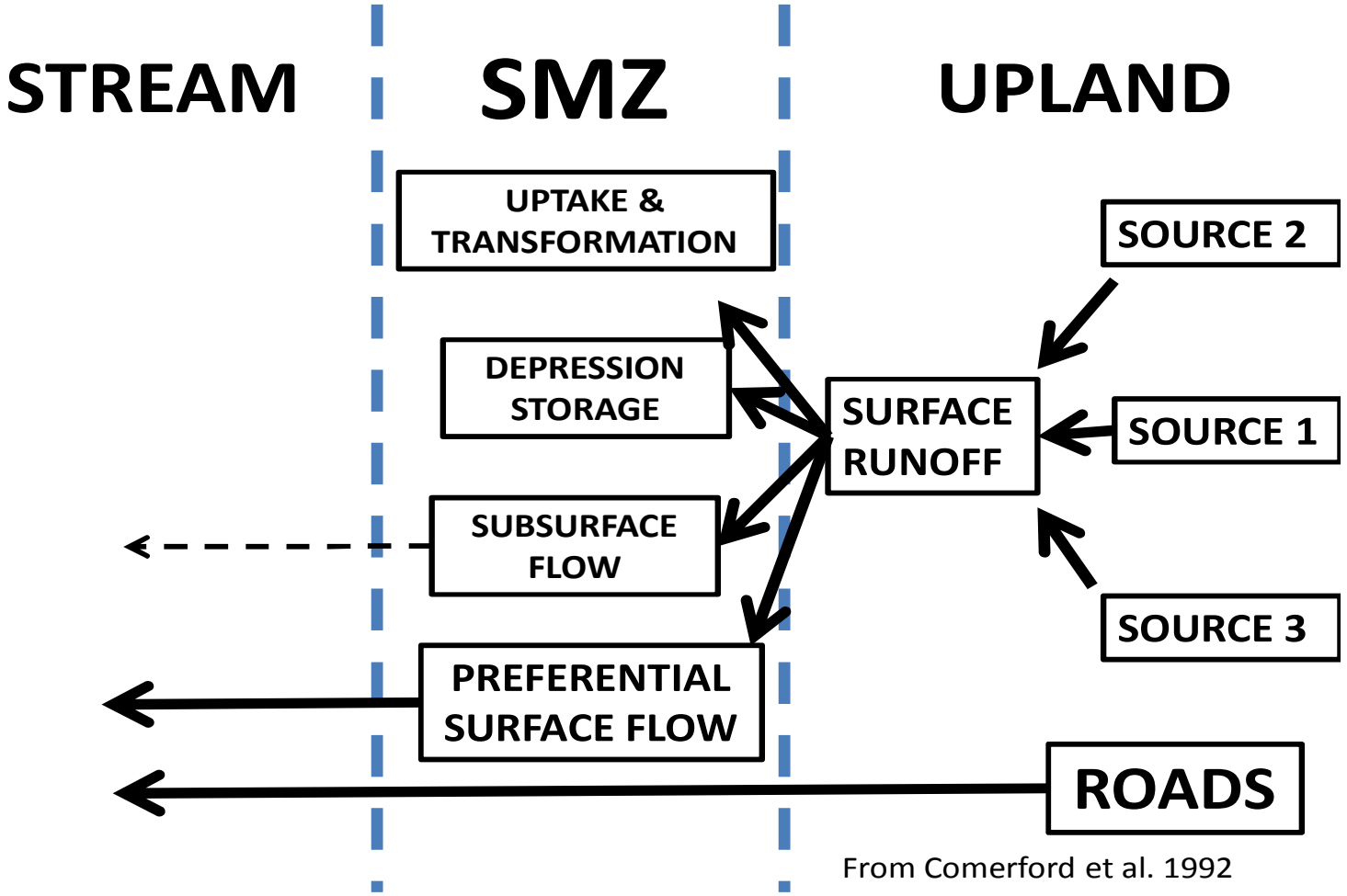
SMZ FUNCTION



From Comerford et al. 1992

BMP PLANNING

- **SMZ SIZES – VARIABLE**
- **W = 8 - 9 m + 0.6 m (s)** ***Trimble and Sartz (1957)***
- **W = 13 m + 0.42 m (s)** ***Swift (1986)***
- **W = 9 m + 0.46 m (s)** ***USDA Forest Service 1989***
- **W = k($s^{1/2}$)** ***Nieswand et al. (1990)***
  - Where: W = width of SMZ (buffer) in meters
  - k = constant size (e.g. 5, 7, 10, 15 etc. m)
  - s = percent slope expressed as a whole number (e.g. 5, 10, 15 etc.)

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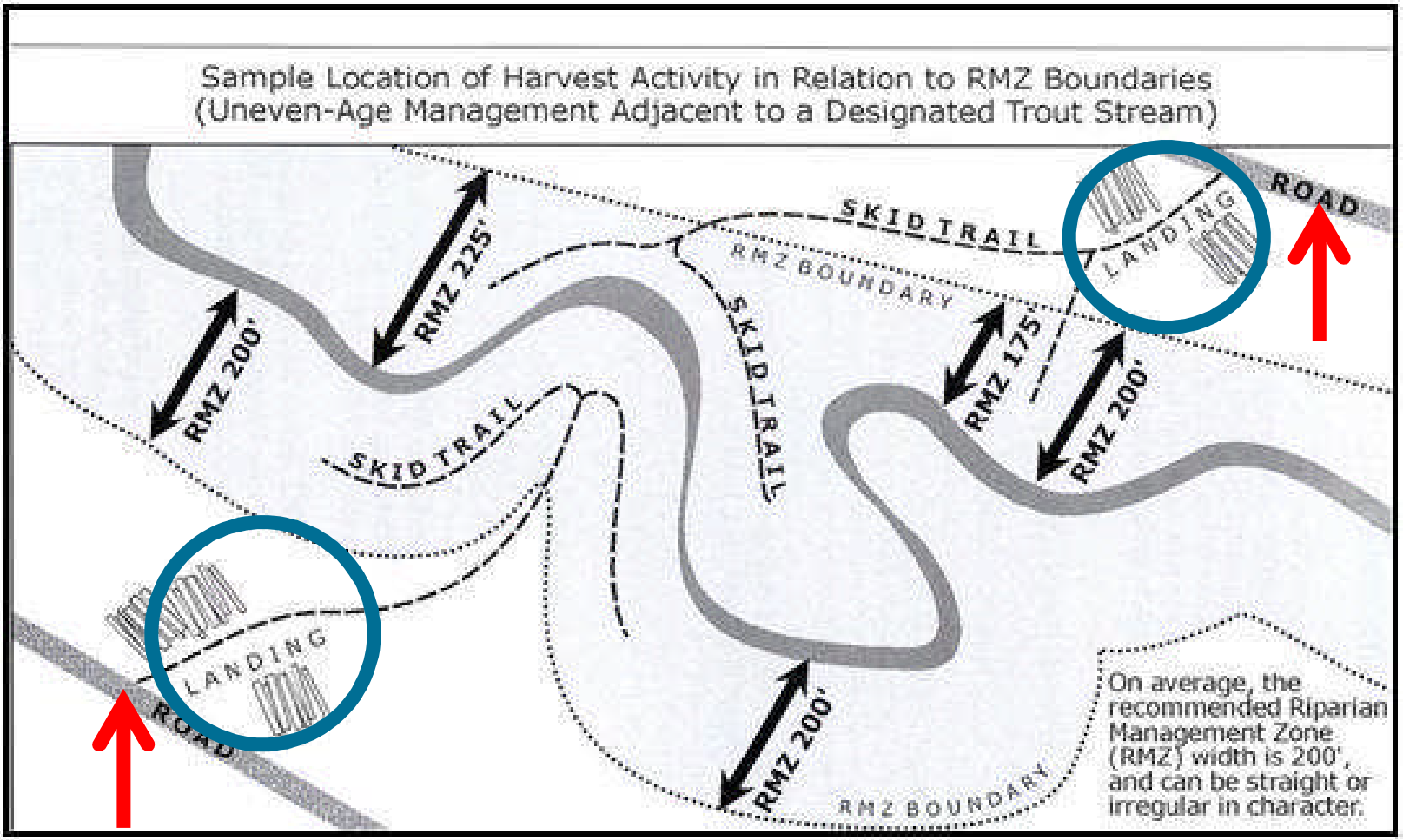
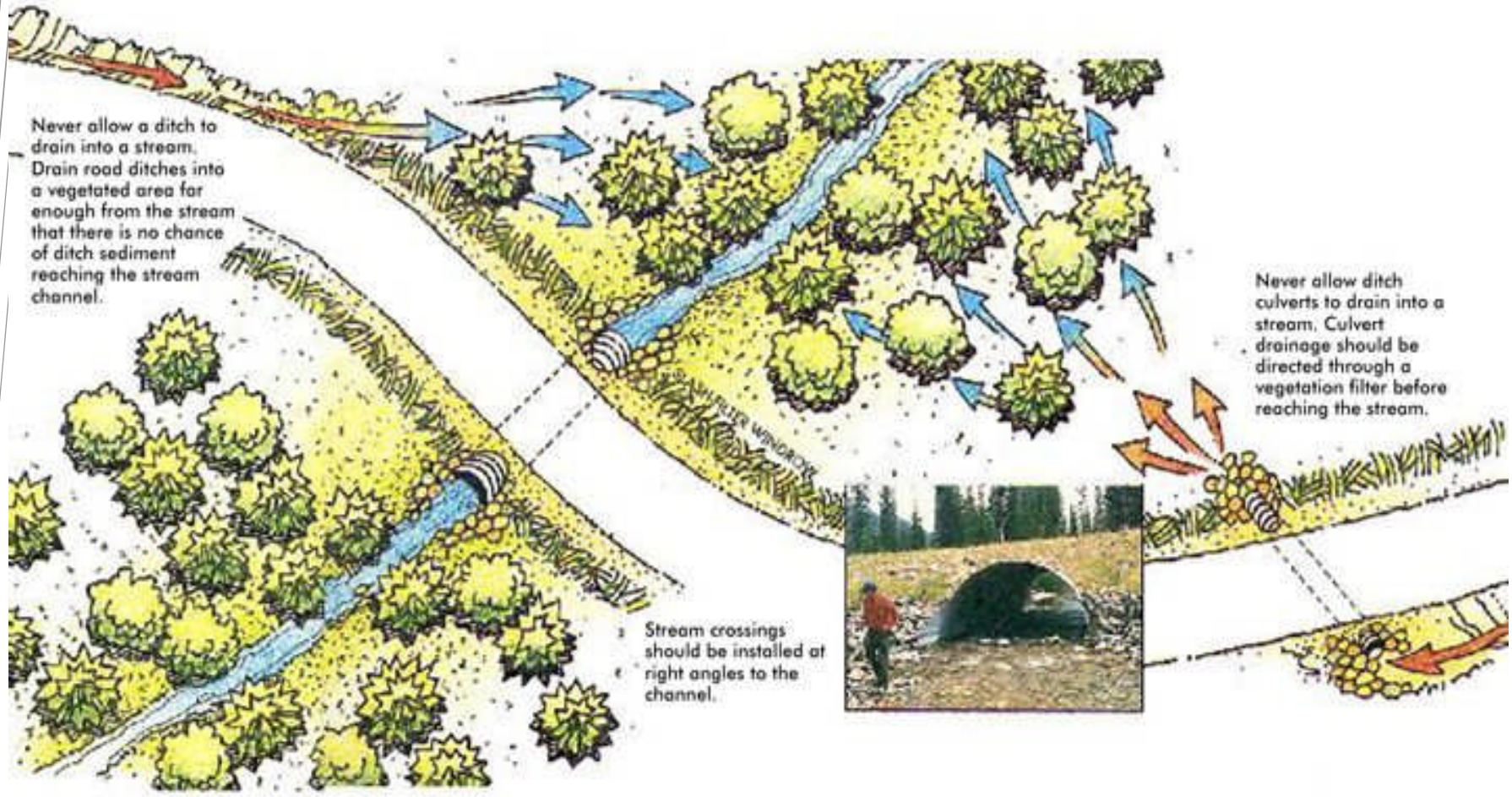
PLANNING
ROAD & LANDING LOCATIONS



RMZ = SMZ

MINNESOTA FRC 2005

ROAD CONSTRUCTION



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HARVESTING GUIDES

TIMING
WEATHER
EQUIPMENT
SLASH HANDLING
EXCLUSION ZONES

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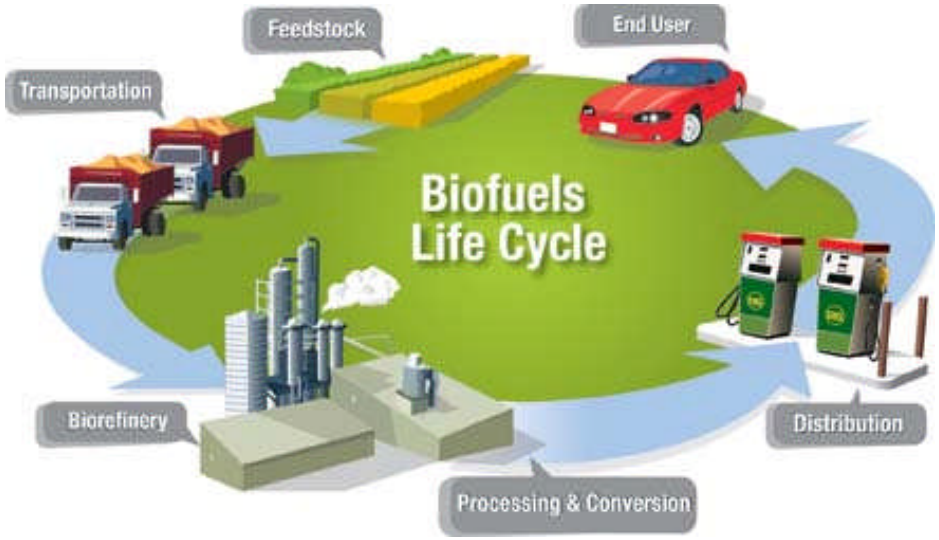
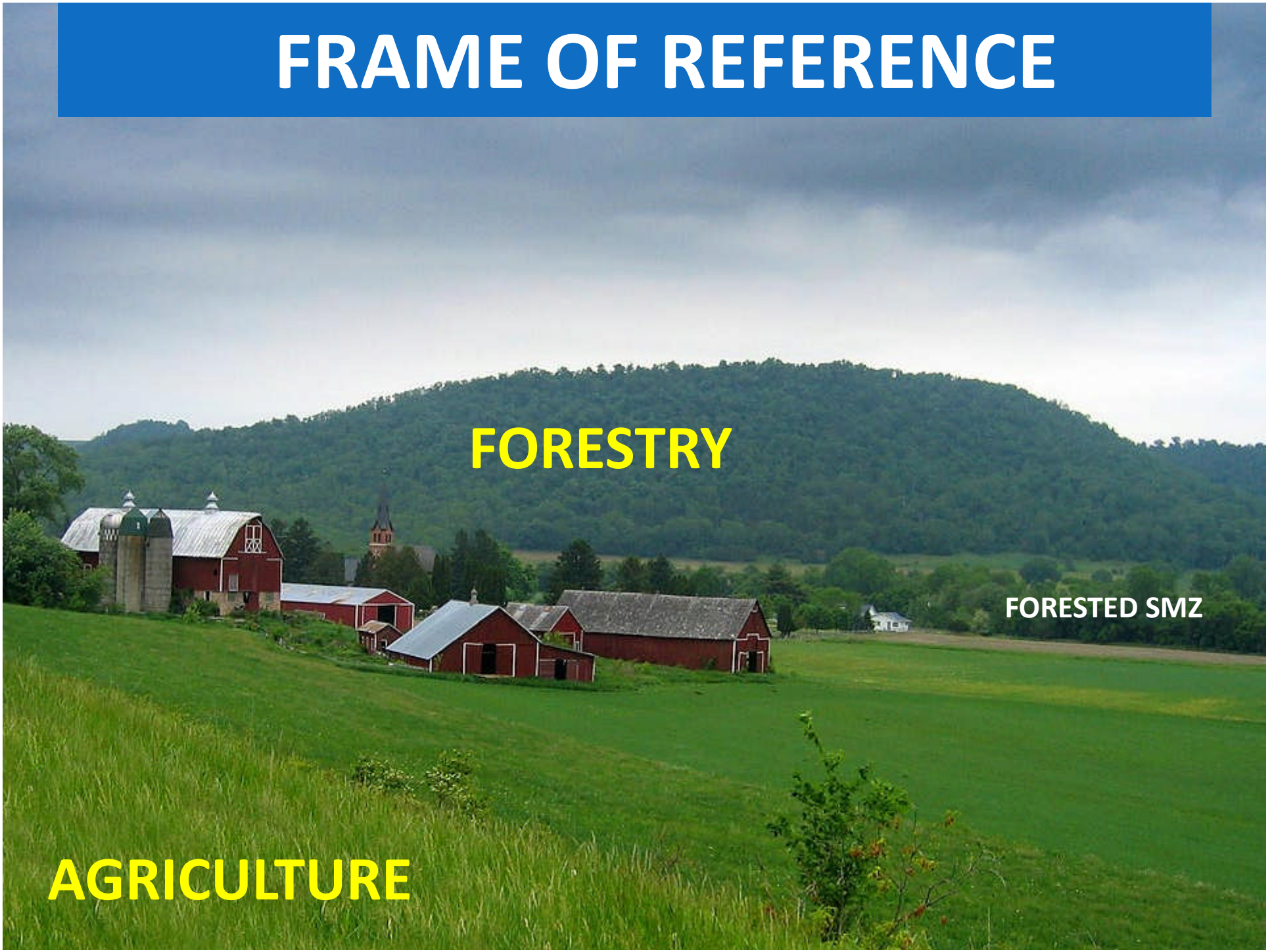
BIOENERGY LIFE CYCLE BMPs



- Crop establishment
- Intermediate Treatments
- Harvesting
- Transportation
- Processing & Generation
- Energy Dispersal
- Waste Handling
- Crop Establishment
- etc

FRAME OF REFERENCE



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Sustainable Forestry in Australian Agroforestry Landscapes for Water Quality and a Source of Biomass for Bioenergy

DAN NEARY

PHILIP SMETHURST

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TASMANIA WATER QUALITY RESULTS

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Naraglen Farm

NORTHWEST TASMANIA SOUTH OF BURNIE

Pet River Water Supply Dam

Forestry

LANDSCAPE LOGIC

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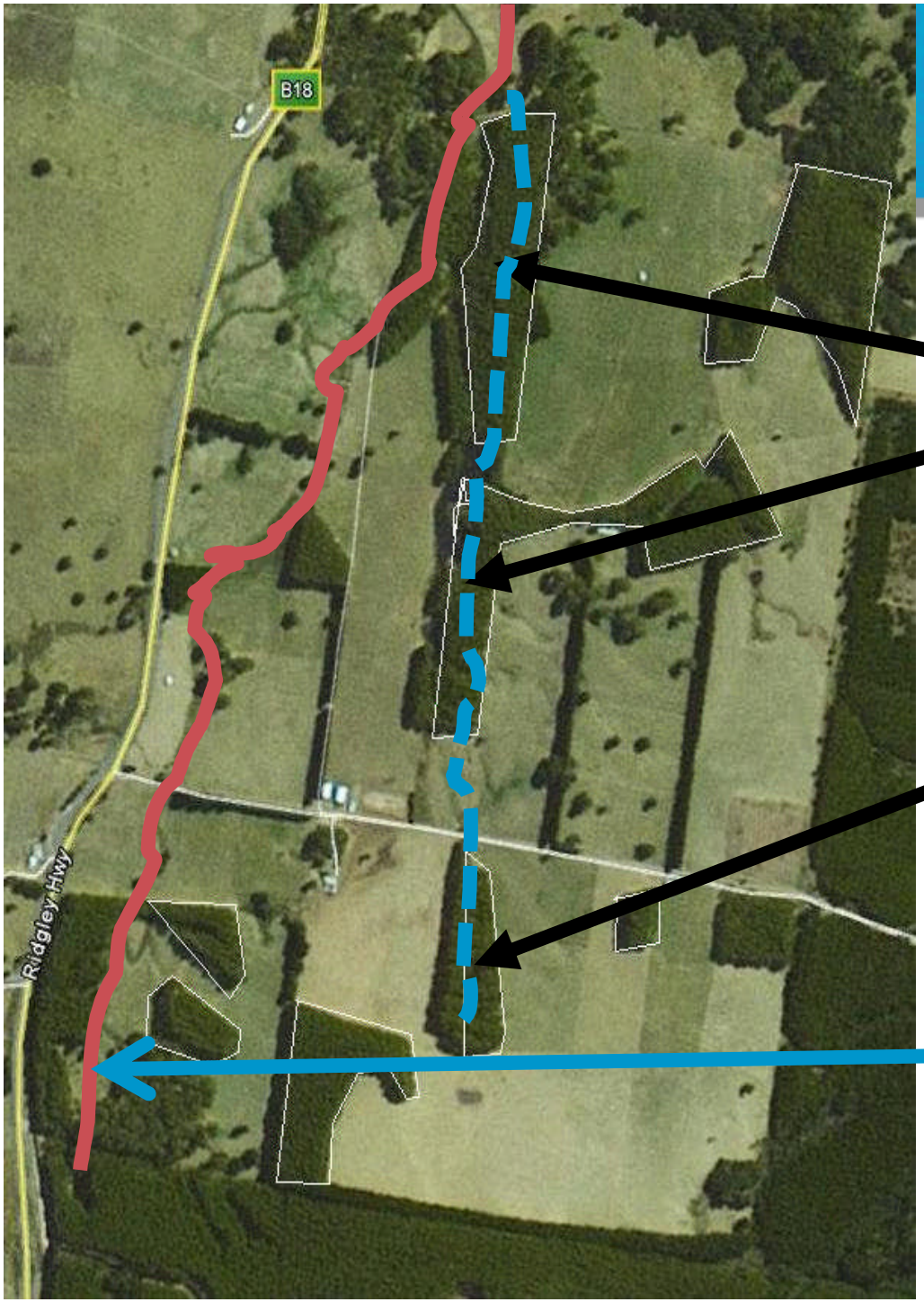
NARAGLEN FARM



CUT

CONTROL

PET RIVER

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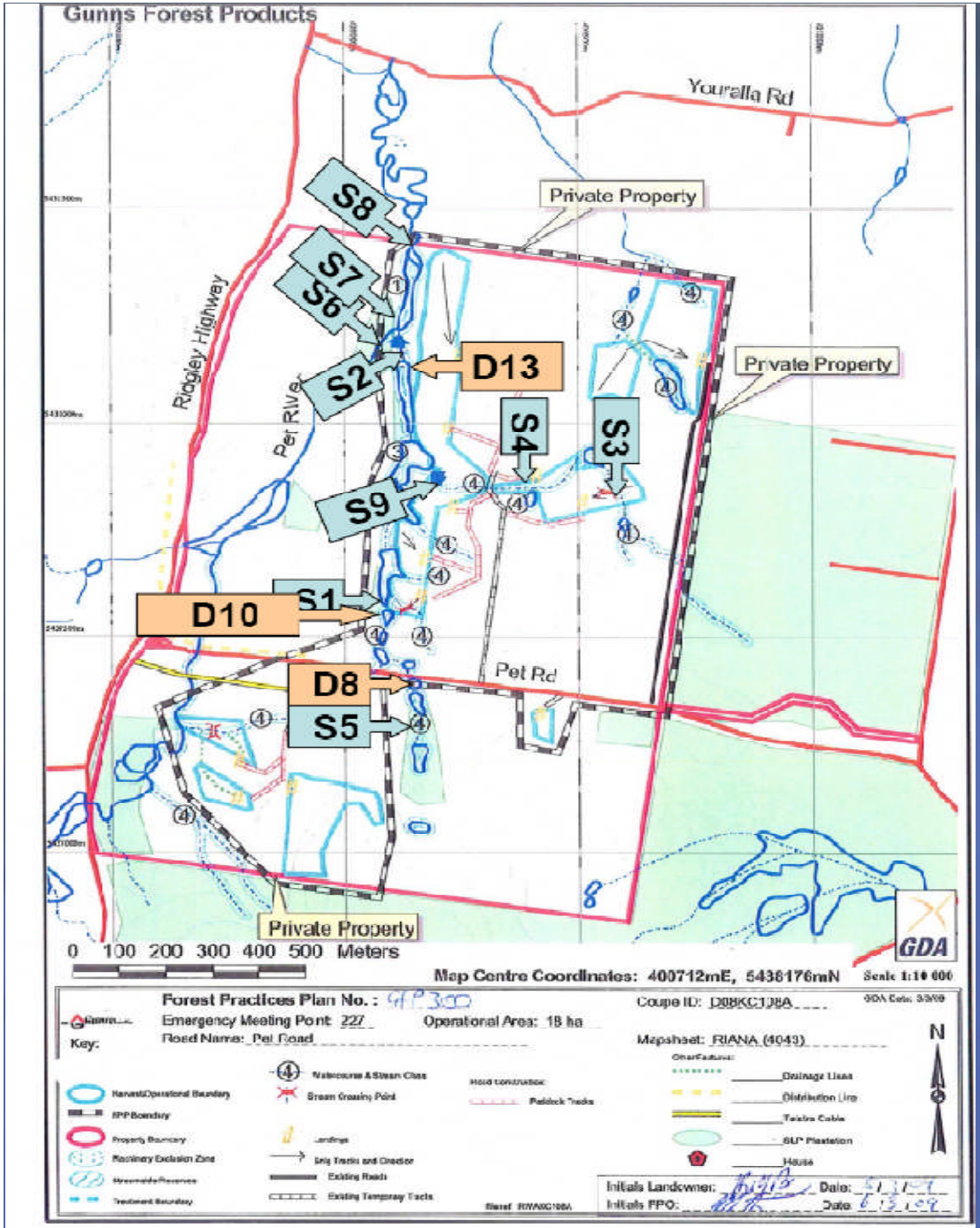


NARAGLEN FARM SAMPLING SITES

NARAGLEN BMPs

- USE OF EXISTING ROADS
- WIDE-TRACKED FELLER BUNCHERS
- NO MACHINERY WITHIN 10 m OF WATERWAYS
- SLASH LEFT IN PLACE
- HARVEST DURING DRY WEATHER
- PRE-PLANNED LANDINGS
- SERIES OF FARM STOCK PONDS
- SMZ FENCING

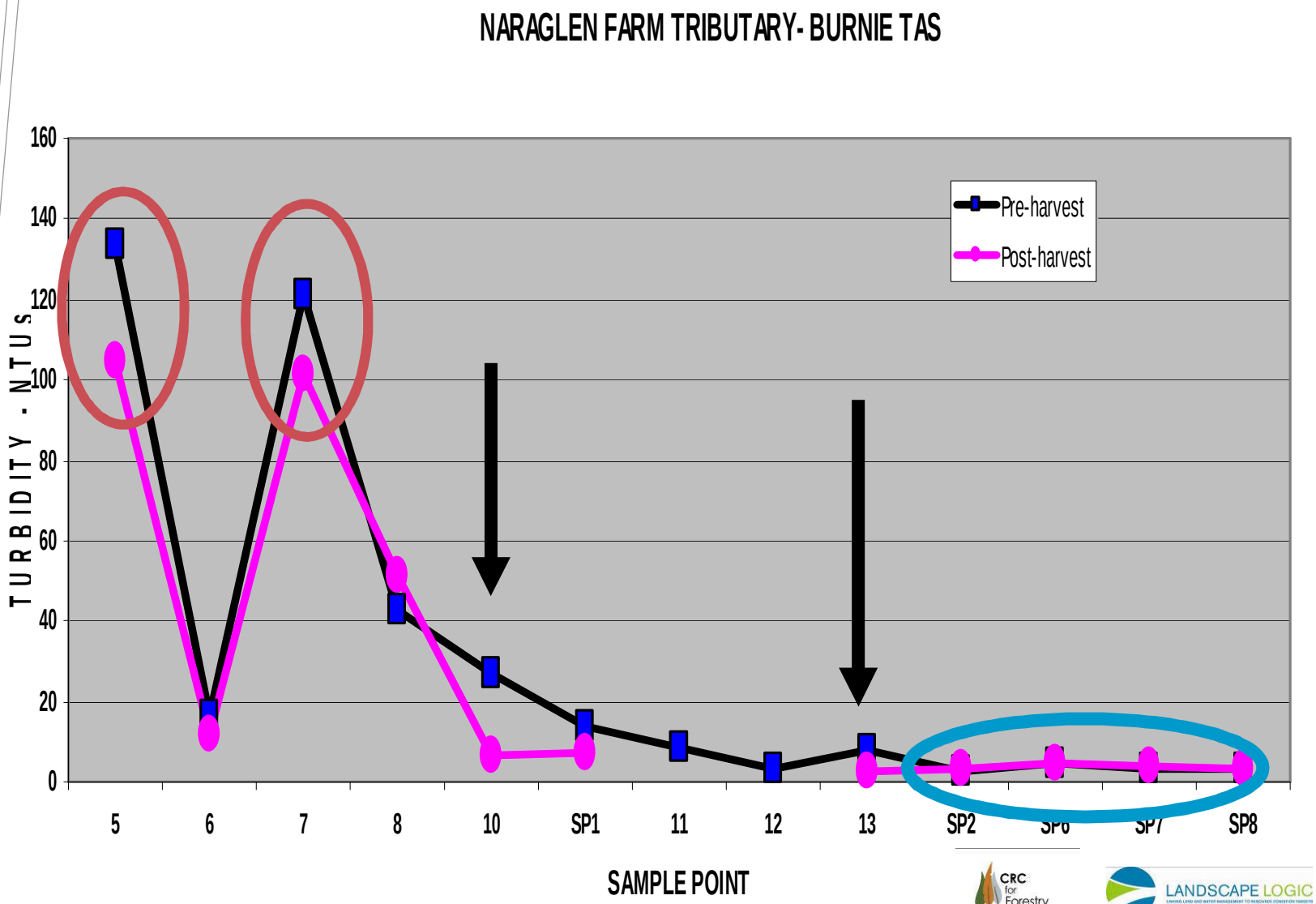
NARAGLEN FARM
COVER – AFTER HARVEST

NARAGLEN FARM
COVER – AFTER HARVEST

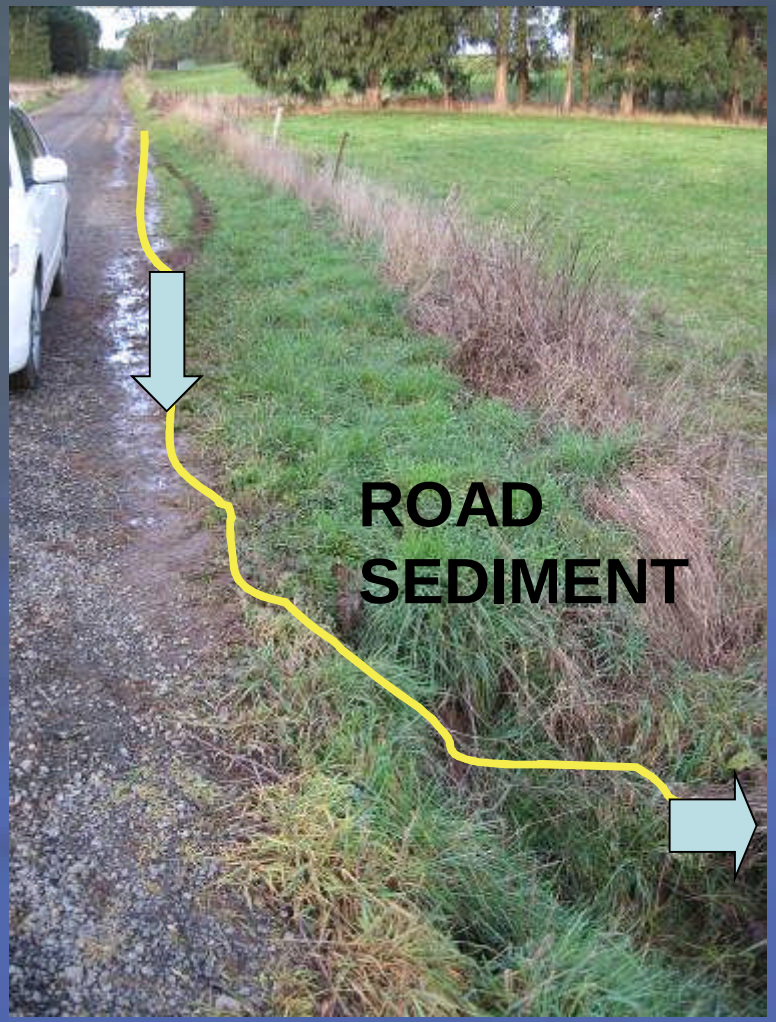
<2% BARE SOIL

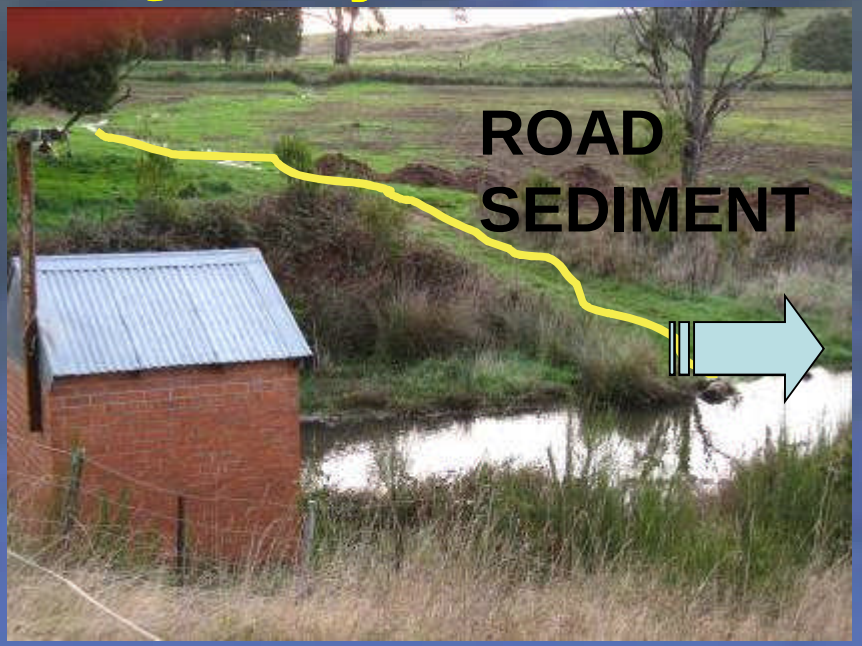
NARAGLEN FARM
COVER – AFTER HARVEST

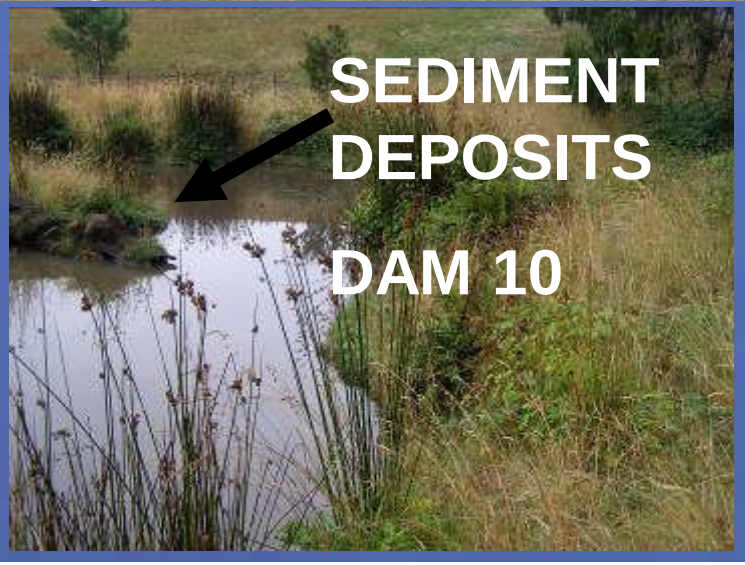
NARAGLEN FARM TRIBUTARY – GRAB SAMPLES



Naraglen Farm and Pet River Water Quality

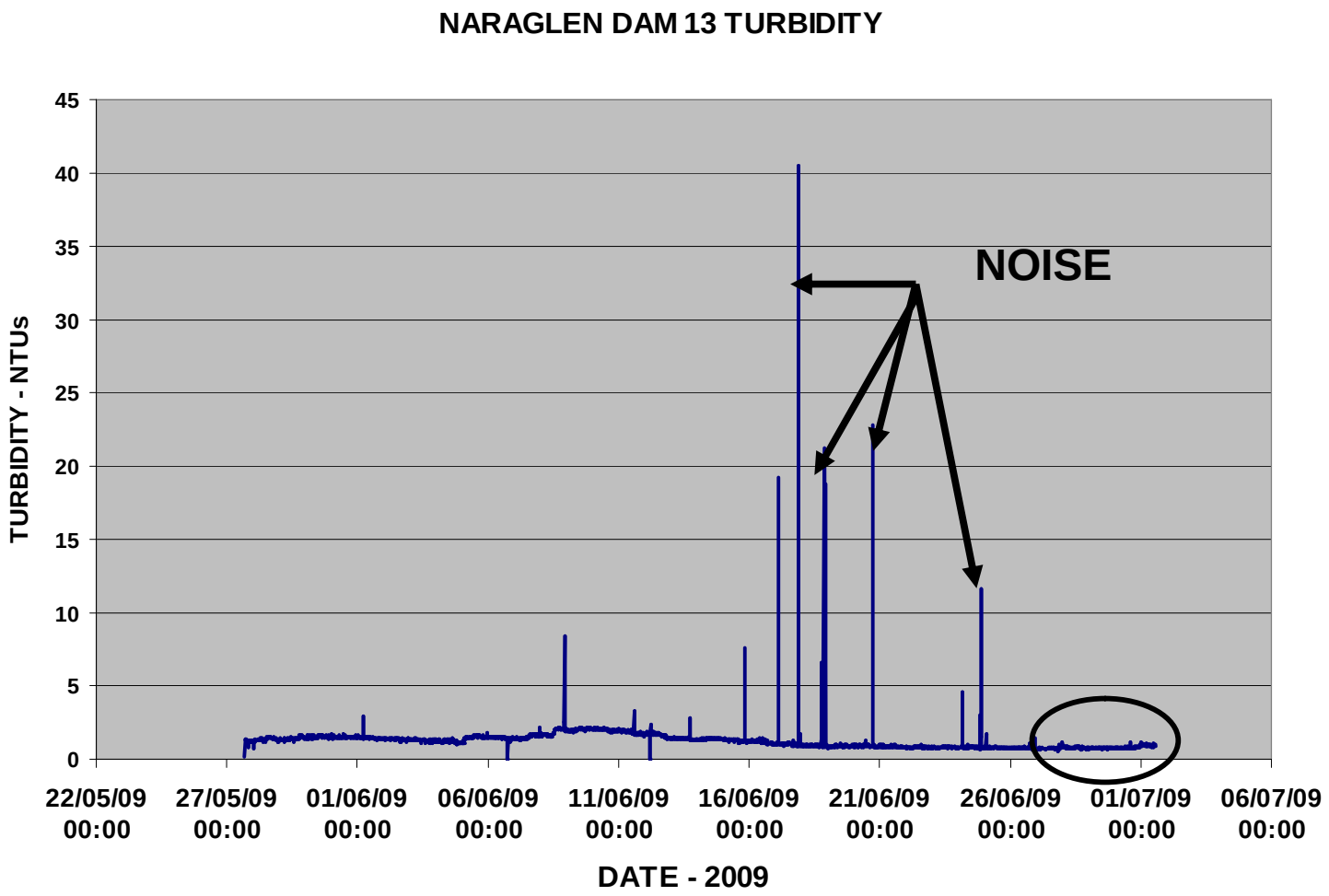






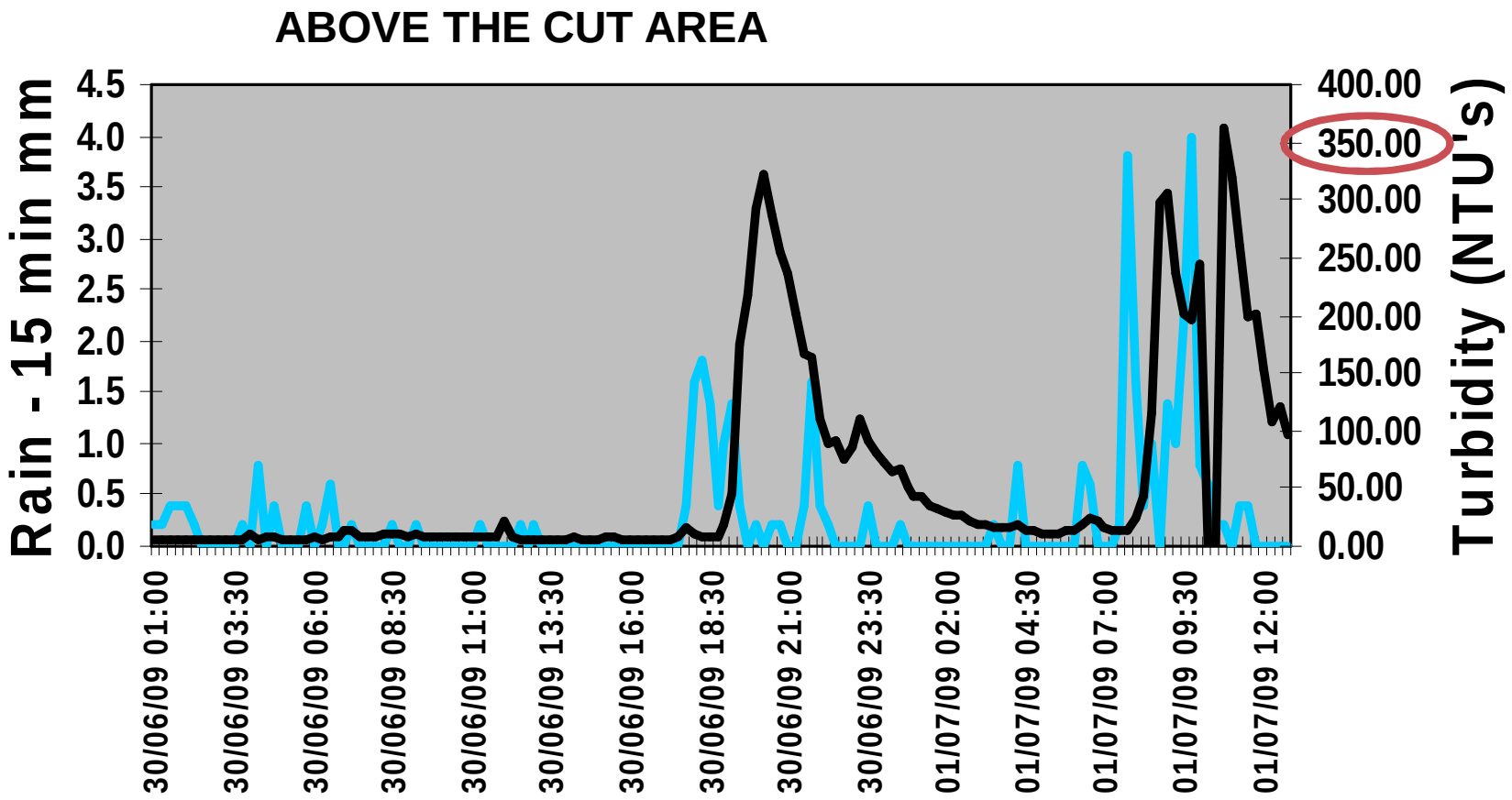
SMZ HARVESTING

NARAGLEN DAM 13 TURBIDITY



POST-CUT TURBIDITY & RAINFALL

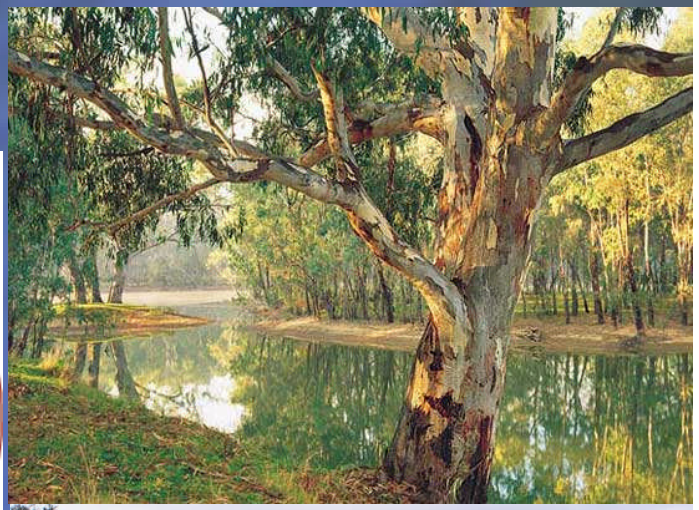
Naraglen Dam 10 - Rainfall & Turbidity



ABOVE CUT

SUMMARY & CONCLUSIONS

BMP GOAL: PROTECT SOIL & WATER RESOURCES



BIOENERGY PASSION

HELSINKI AIRPORT 28 AUGUST 2007

ANY QUESTIONS?