Fire in the Landscape

University of Sydney – Tina Bell

University of Melbourne – Chris Weston

Fire in The Landscape

- **1. Carbon**
- **2. Water**

What is the impact from planned fire???

Overview of Fire in the Landscape Project

Four key research areas of research:

1. Above ground Carbon- Atmospheric carbon emissions
2. Below ground Carbon - Soil carbon formation
3. Water quality
4. Water quantity

1. Carbon above ground

“Greenhouse gas emissions from fire and their environmental effects”

University of Sydney

Tina Bell – Malcolm Possell

Research aims

- GHG emissions and the carbon balance of forests.
- GHG emissions affect on growth of native forests and surrounding agriculture
- Develop predictive tools especially for planned burning

PHD STUDENT PROJECTS

EFFECT OF SMOKE FROM BUSHFIRES ON PLANT PHYSIOLOGY

- Student: Vicky Aerts
- Commenced: October 2010
- End User: Forests NSW
- Aim: To analyse the effect of smoke from prescribed burning and bushfires on agricultural and native plant physiology

2. Carbon below ground

“The impact of fuel reduction burning on forest carbon storage”

Chris Weston & Luba Volkova, University of Melbourne

Research Questions?

- **Impacts of prescribed fire on the C balance in soil, litter and vegetation in forests?**

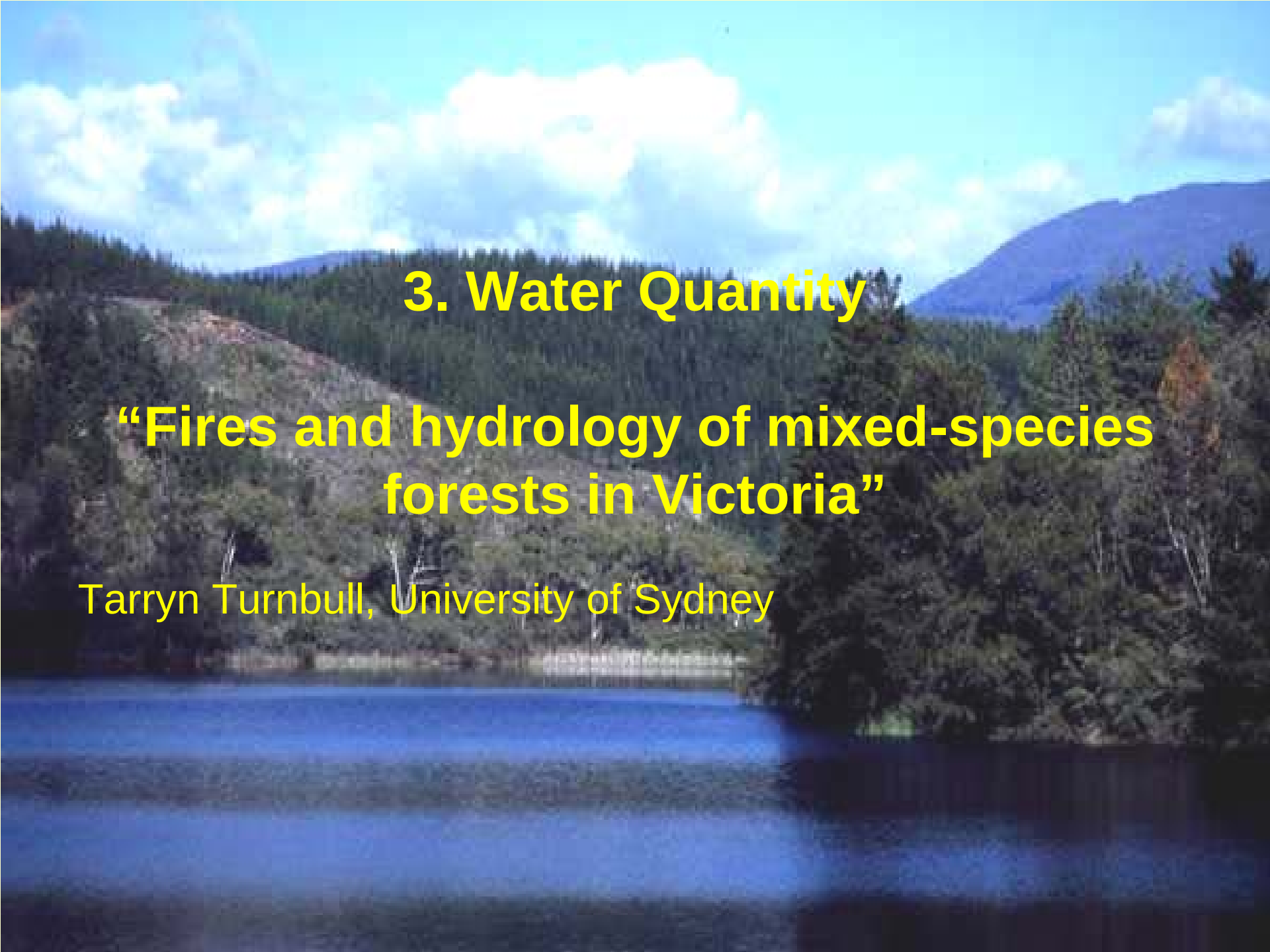
- **How are rates of carbon turnover affected by prescribed fire?**

- **How can we predict the likely net CO_2 release from a planned fire? What is the C "cost " of planned fire?**

Panel session

End of session on Carbon

Questions for Malcolm, Vicki and Chris



3. Water Quantity

“Fires and hydrology of mixed-species forests in Victoria”

Tarryn Turnbull, University of Sydney

Research Questions?

- What is the water use in re-sprouting mixed-species forests following planned and unplanned fire?

- Can we predict future tree water-use and hence catchment interception for a range of species, soils and topographical microclimates?

PHD STUDENT PROJECTS

IS ALIEN PLANT INVASION A THREAT TO BURNING OF AUSTRALIAN FORESTS?

Student: Felipe Aires

Commenced: March 2011

End User: ACT Parks and Conservation Service

Aim: To predict and test changes in fuel accumulation and fire behaviour in forests of eastern Australia caused by <u>invasion by woody weeds</u>

4. Water Quality

“Quantifying water quality risks following wildfire”

Gary Sheridan, Petter Nyman & Patrick Lane, University of Melbourne

Research Questions?

- What is the likelihood of extreme erosion events following planned and unplanned fires?
- What is the relationship with burn severity?
- Can we predict the likelihood of extreme erosion <u>before</u> implementing a planned fire?

Panel session

End of session on Water (and woody weeds)

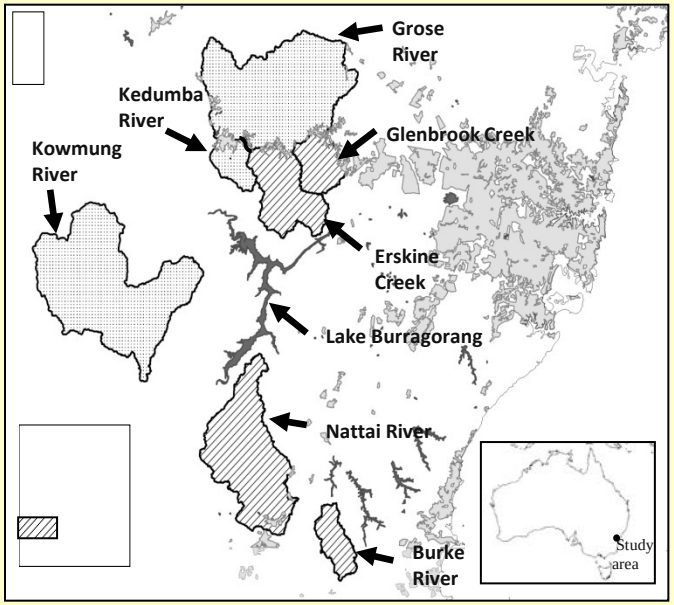
Questions for Tarryn, Felipe and Chris

PhD Students

- Critically important to the Industry
- Add value to the projects and develop our future researchers
- We have 4 other PhD’s who are not here today

PHD STUDENT PROJECTS

WILDFIRE IMPACTS ON HYDROLOGY WITHIN SYDNEY'S DRINKING WATER SUPPLY CATCHMENTS



Student: Jessica Heath

Commenced: March 2010

End User: NSW Parks and Wildlife Service

Aim: To determine if summer wildfires in 2001-2002 have had an impact on the <u>post-wildfire water yield</u>

Sub-catchment delineation

Digital elevation model > watershed above each hydrometric station

→

Data processing

Rainfall, flow and temperature
Data collected 1st January 1991 – 31st January 2010

→

Statistical analysis

Generalized Additive Models (GAM) > Gamma family

PHD STUDENT PROJECTS

DO WOODY LEGUMES USE FLAMMABILITY TO PROMOTE THEIR PERSISTENCE?

Student: Valerie Densmore

Commenced: March 2011

End User: Forests NSW

Aim: To investigate the interaction of fire, soil nutrient status and <u>occurrence of woody legumes</u>

PHD STUDENT PROJECTS

RECOVERY OF SOIL CARBON AND NITROGEN IN *EUCALYPTUS DELEGATENSIS* FOREST FOLLOWING WILDFIRE

Student: Hari Ram Shrestha

Commenced: late-2011

End User: ACT Parks and Conservation Service

Aim: To understand processes involved in recovery of soil nitrogen and carbon after landscape-scale wildfire

PHD STUDENT PROJECTS

QUANTIFYING WATER QUALITY RISKS FOLLOWING WILDFIRE

Student: Rene Van Der Sant

Commenced: mid 2011

Aim: To determine the sensitivity of landscapes to extreme erosion events