School of Geography
FACULTY OF ENVIRONMENT

Different people, different lands:
20 years experience in using participatory GIS to capture local knowledge and feeling

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Outline

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- Developments in participatory GIS
- Capturing spatial aspects of cultural diversity
- Wildfire and fuel treatments
- Case study: Mission Mountains, Montana
- Challenges

A long time ago….

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"...a PC or workstation based GIS-MCE system and an experienced operator in a committee room could create significant improvements in the way decisions for siting are made. In addition... SDSS may also have an important role to play in providing more efficient means of public participation and consultation throughout the site-search process by allowing... feedback to decision-makers regarding public sentiment."

(Carver, 1991, 337-8)

PPGIS timeline

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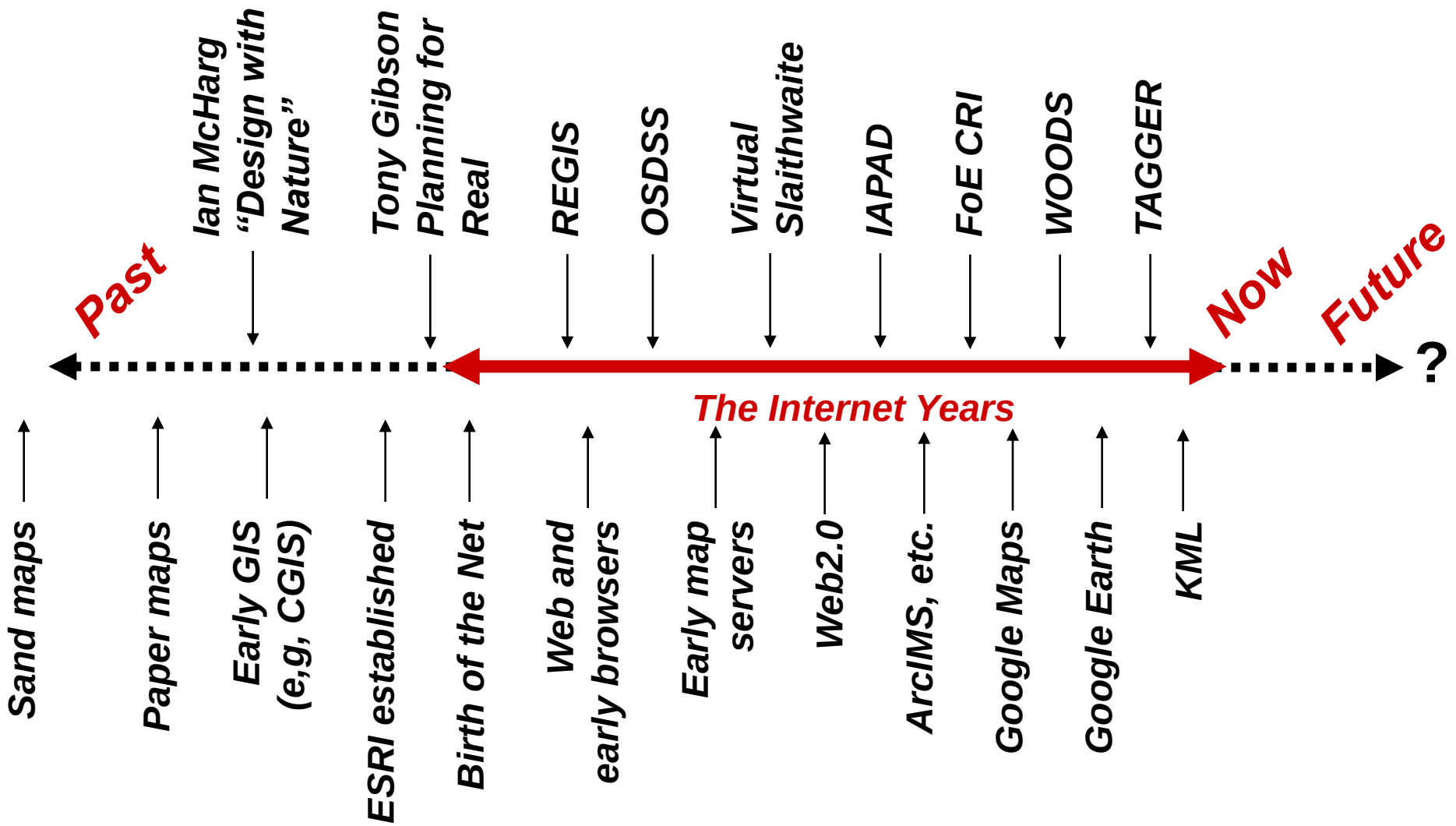

Universal inclusivity

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Great promise… or straw man?

- UK: 100% accessibility but <100% access
- Inequalities of:
  - Access to information and knowledge
  - Decision tools and their use
  - Governance and democracy
- Amplified by differences in education, welfare, culture and society (esp. first nation peoples)

Early days

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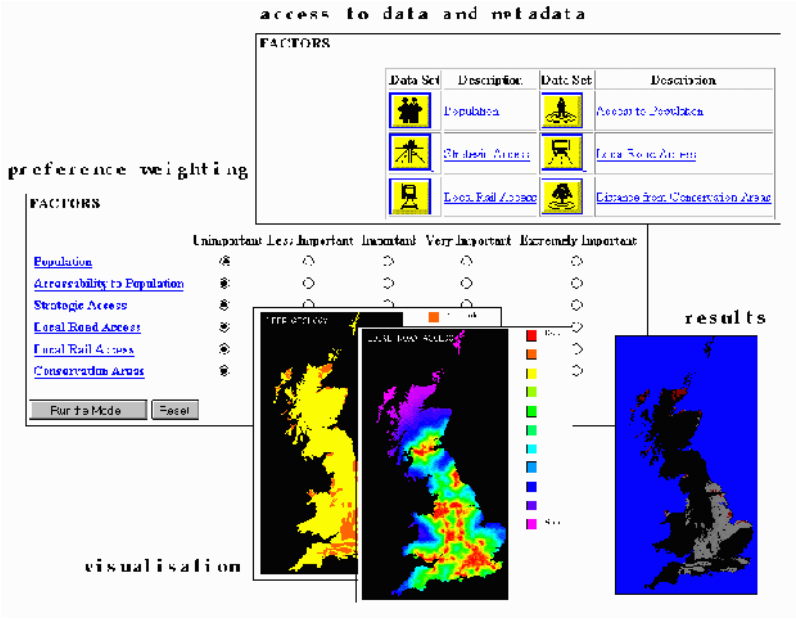
- First online GIS
  - One way (server-client)
  - Two way (server-client-server)
  - e.g. Nuclear waste online spatial decision support
  - Generated interest but failed to deliver… why?



Reasons for failure

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- Too much, too soon?
- Failure of authorities to engage
- Lack of foresight in realising potential
- Political hot potato
- Scale
  - Disconnect between scale and public concern
  - Not a local problem
- Too technical… expecting too much?

Back to basics

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- Keep it simple, keep it local
- Use models that match our understanding of the world
  - Ontological approaches
  - Natural language
  - Fuzzy rather than discrete
- Importance of developing partnerships with indigenous groups
- Examples:
  - IAPAD, PfR, Community Truthing, TAGGER

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“Landscape is the work of the mind …it’s scenery is built up as much from the strata of memory as from layers of rock.”

(Simon Schama)

Knowledge systems

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- The “whole knowledge system” is not just spatial data (GIS, remote sensing, etc)
  - Most knowledge resides within community
  - Need to re-engage stakeholders
  - Devolve responsibility (bottom up)
  - Provide widest evidence base for policy
  - Build more resilient landscape/communities
  - Recognise/incorporate cultural differences and beliefs through better partnerships

Essential differences

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- Different relationships with the land:
  - "White/western" view of the world
    - Land as resource
    - Land as property (i.e. land belongs to people)
    - Mechanistic relationship
  - Indigenous/aboriginal communities
    - Land as 'Mother' (i.e. benevolent organism)
    - Land as home (i.e. people belong to the land)
    - Spiritual relationship

Wildfire

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- Increasingly widespread
  - Local and continental scales
  - e.g. 2009 Victoria fires
- Exacerbated by:
  - Land use change
    - Fire suppression & fuel build-up
    - Residential expansion
  - Climate change
  - Different people, different lands
    - Culturally based differences
    - Values, meanings & beliefs

Mission Mountains

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- Flathead Indian Reservation, Montana
- Wildfire management in Mission Mountains Tribal Buffer Zone
- Decisions on what treatment (if any) and where taking local views into account

Aims/objectives

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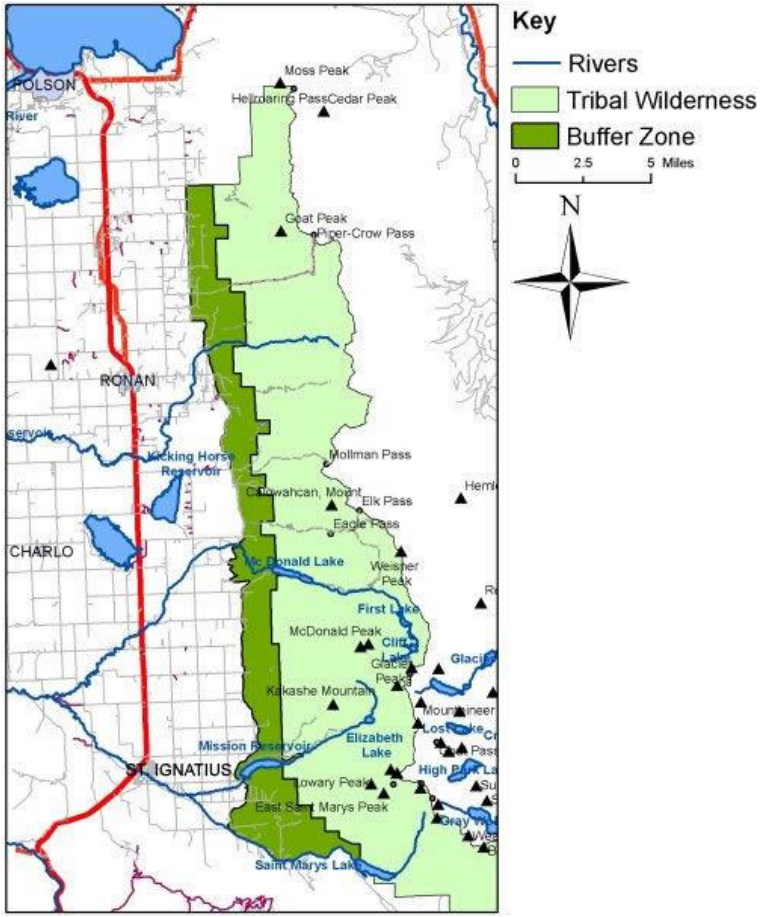
- Contrast the values/meanings tribal and non-tribal residents
- Use to better inform forest fuel reduction strategies
- Map these to understand intensity and spatial distribution
- Describe how potential application of fuel treatments interface may affect values/meanings



Wildland fire

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Mission Mountains 1910 (above) and 1940s (below)

Smokey Bear and tribal elder

Unhealthy/clean forest

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BEMRP

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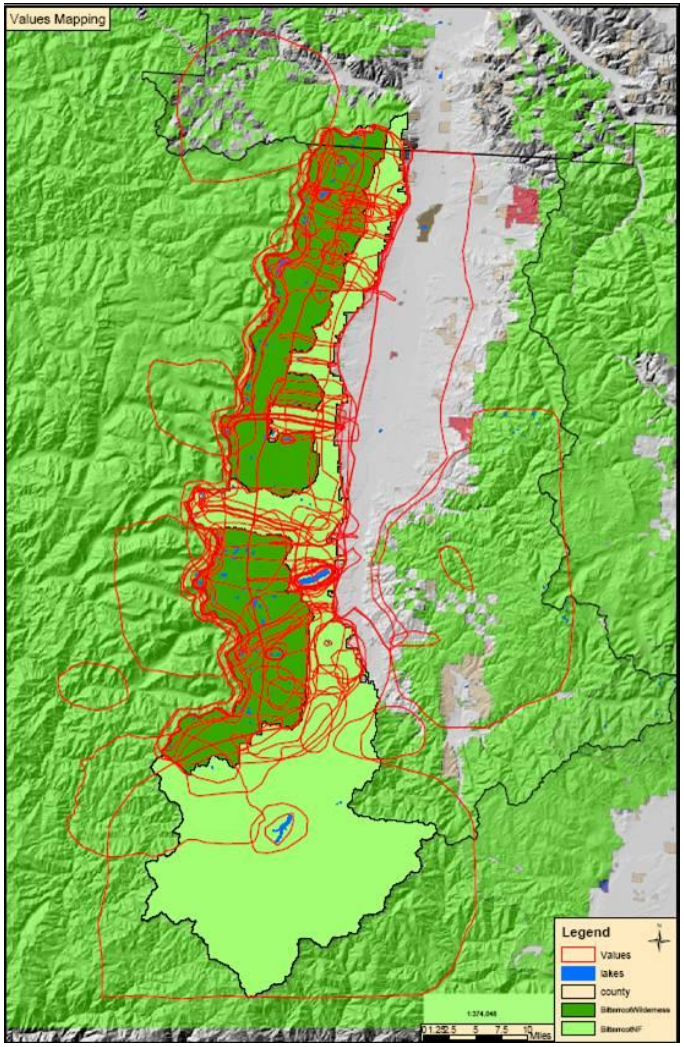

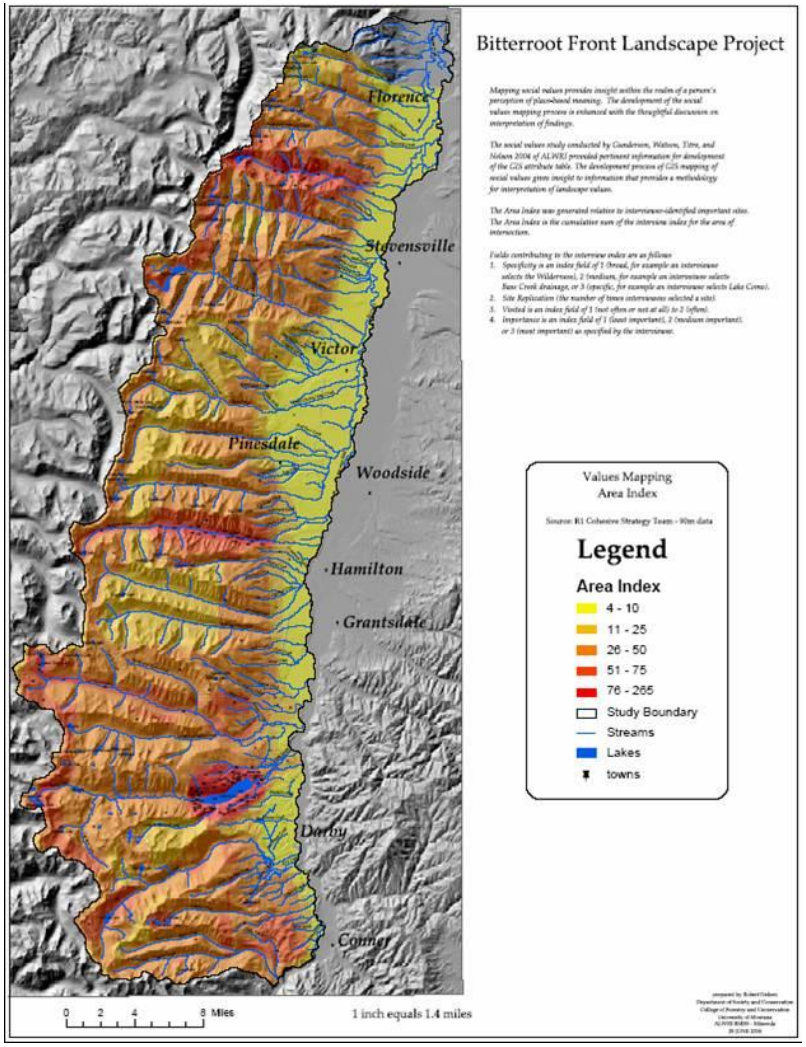

Values mapping

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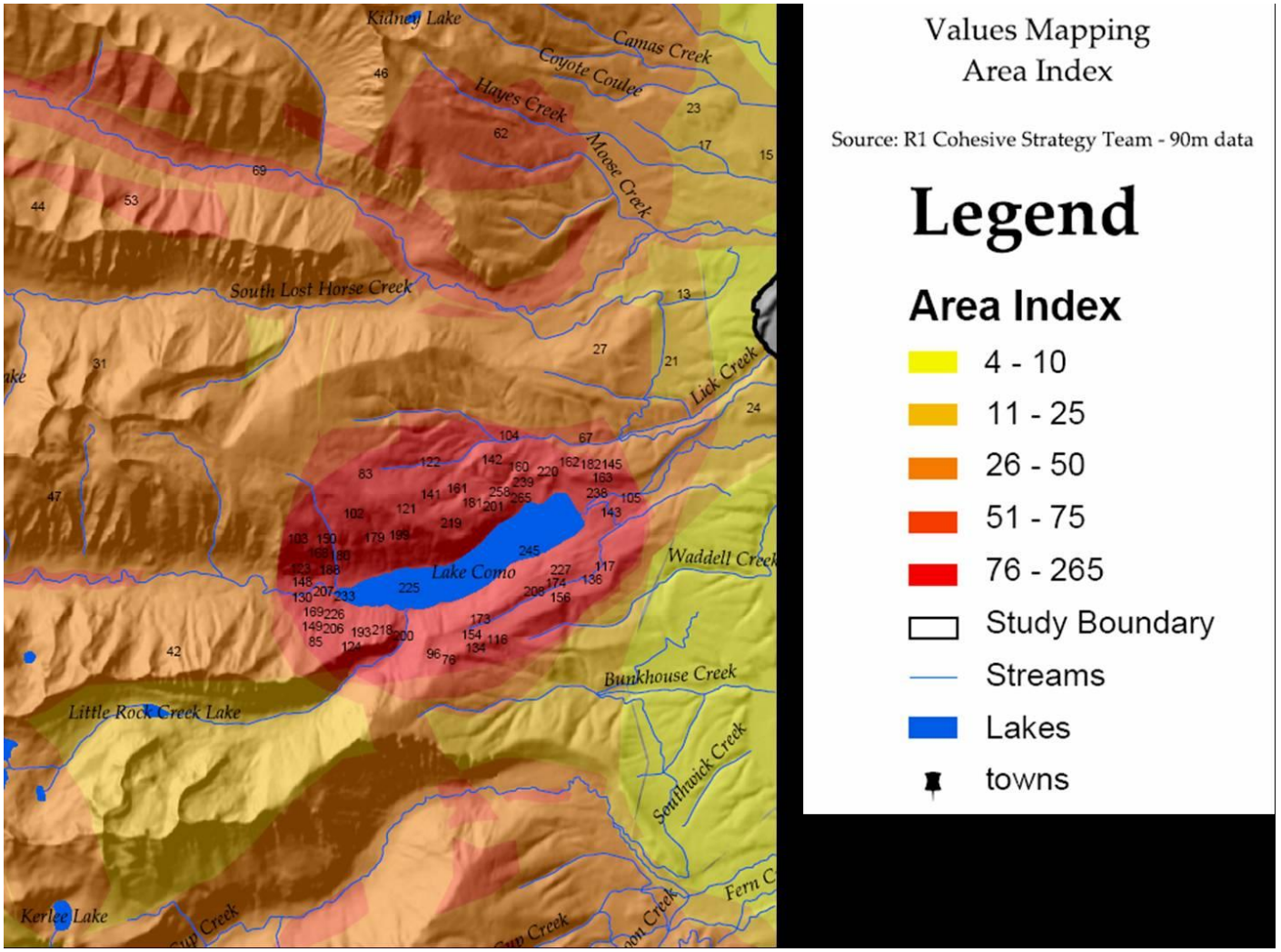

Method

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- Expanded rapid appraisal technique
- 3 phase approach:
  - Key informant interviews (identify issues)
  - Landscape mapping (participatory mapping)
  - Focus group interviews (feedback)
- Informing decisions about where and when to apply different fuel treatments

TAGGER

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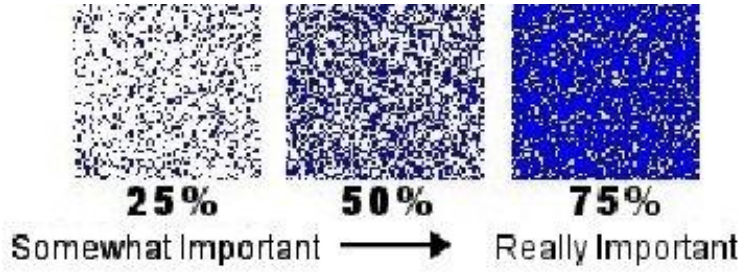
- Fuzzy PPGIS “TAGGER”
  - Spray can tool for capturing fuzzy areas
    - Vary size/shape of area of interest
    - Vary intensity of value/meaning/feeling
    - Tag spray pattern with explanatory text



  - Java aplet (www.ccg.leeds.ac.uk)
  - Free for use with acknowledgement

TAGGER aps

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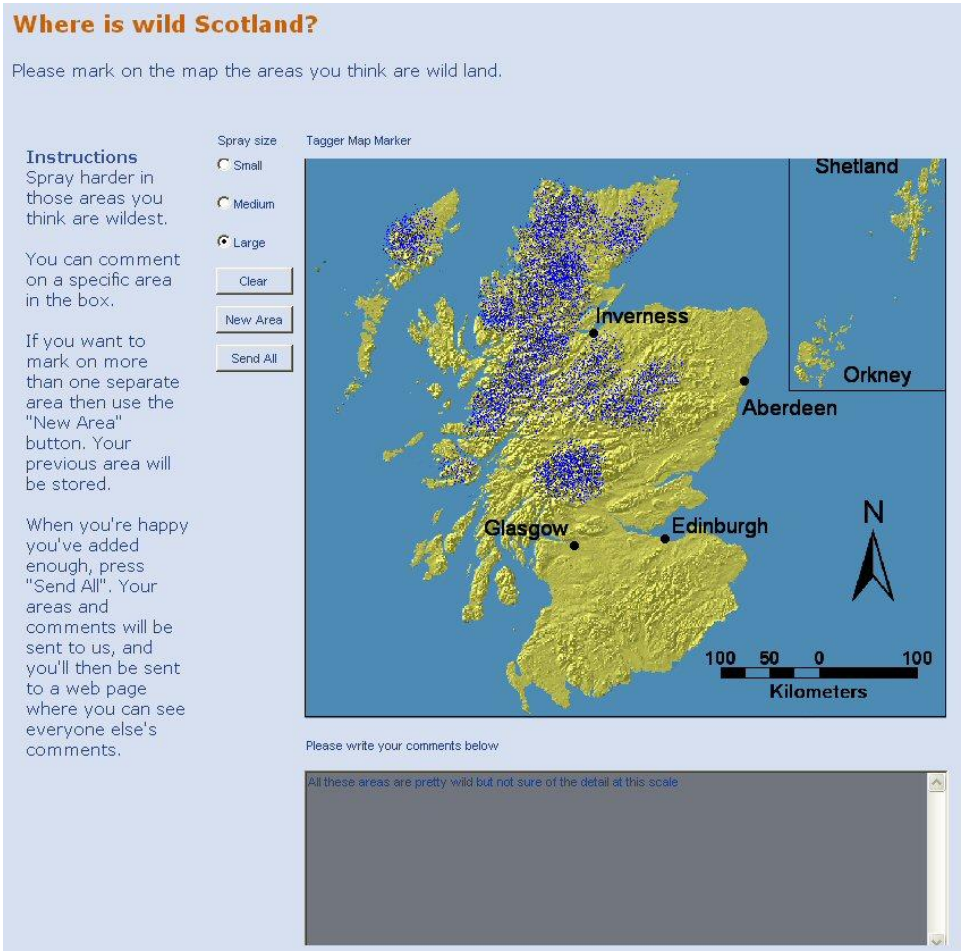

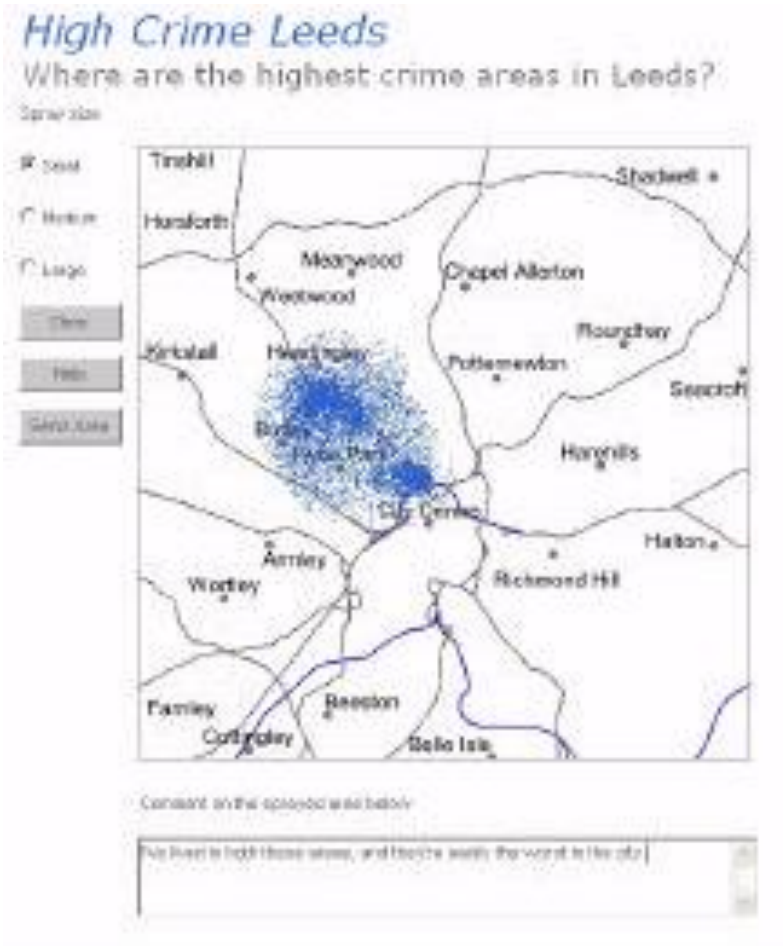

Phase 1 interviews

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- Semi-structured interviews with tribal members and non-tribal residents to solicit range and types of meanings (*n=22*)
- Informants were selected according to:
  - knowledge, understanding and appreciation of values/meanings;
  - roles in the community that require wide exposure to range of perspectives; and
  - ability to communicate and discuss relevant research issues in detail

Phase 2 system design

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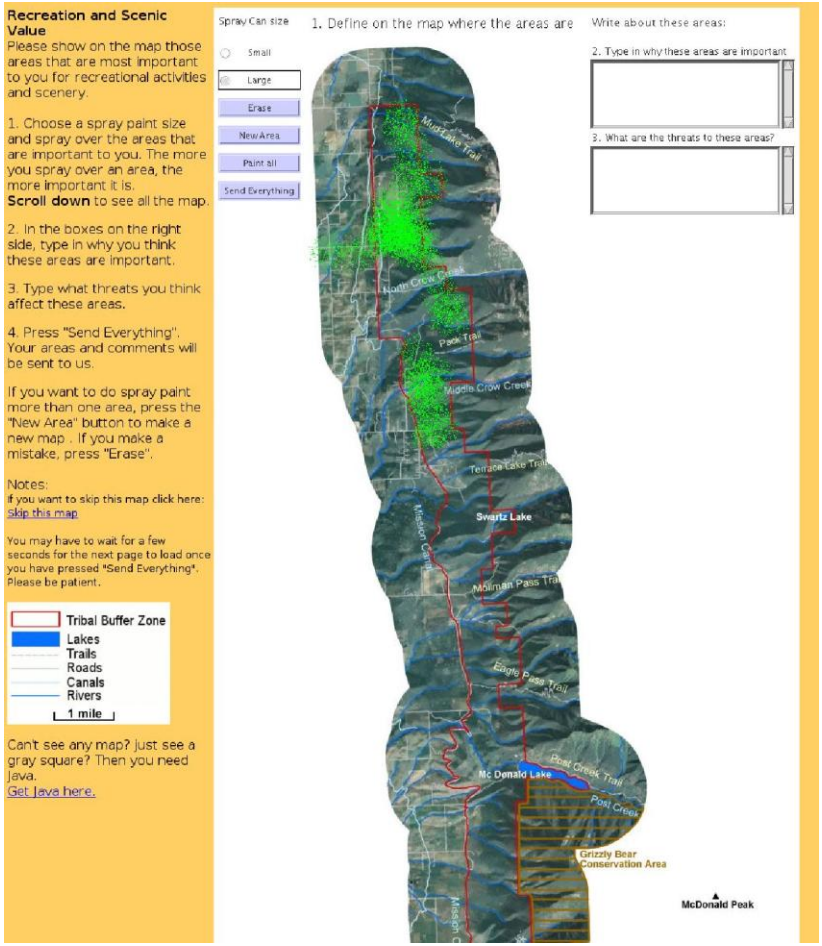
- Phase 1 identified 5 key issues:
  - wilderness protection, wildlife and water values, recreation, access, and personal and cultural meanings
  - Designed as “layers” in TAGGER interface
  - Run on and off-line (*n=154*)



Example inputs

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- Meanings: *Keep the wilderness!!! Keep a sanctuary for animals and fish because there are fewer and fewer areas that are left.*
- Threats: *fire is so close to the residence; fire is a prominent threat; opening the buffer zone; vegetation-wise; will allow fire control and management*
- Meanings: *I live and breathe here*
- Meanings: *No Comment*
- Meanings: *These areas are important to me because I visit them periodically and/or because grizzly bears use them and I don't want to see grizzly bears disturbed unnecessarily*
- Threats: *Logging; off-road vehicle use; over use by recreationists; residential development.*

Phase 2 results

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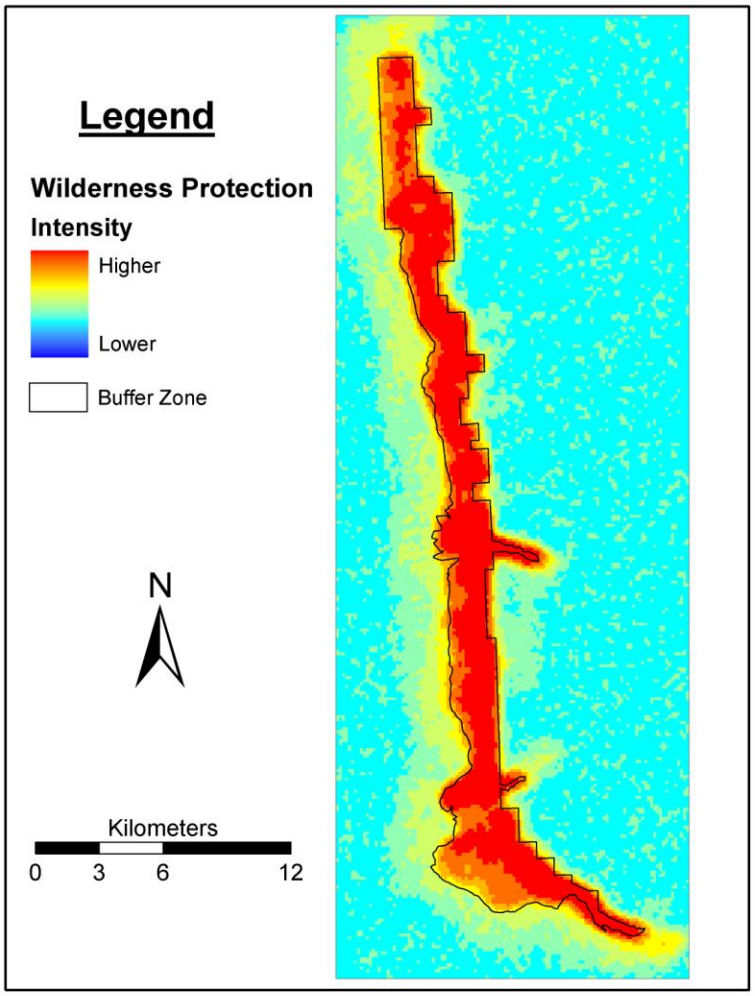

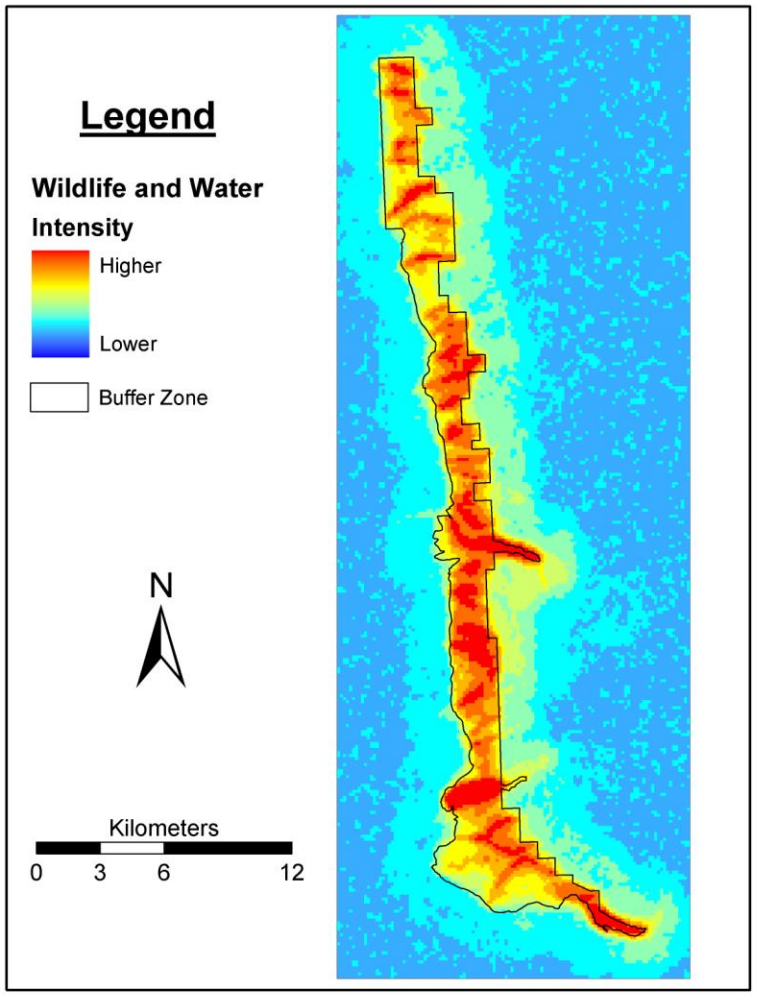

Phase 2 results

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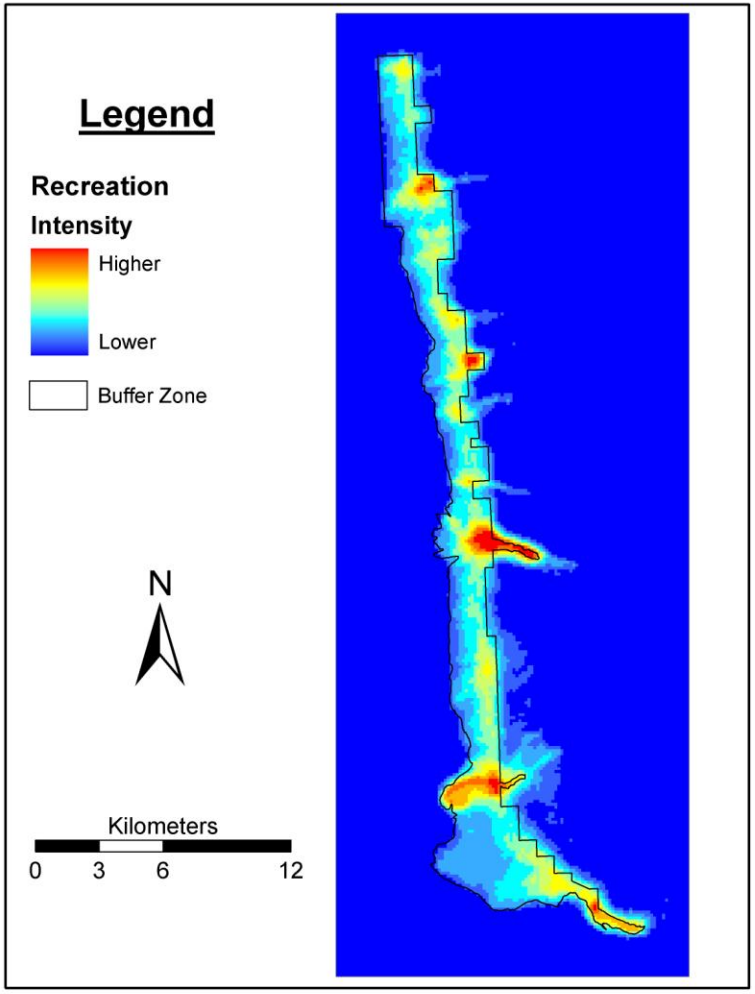

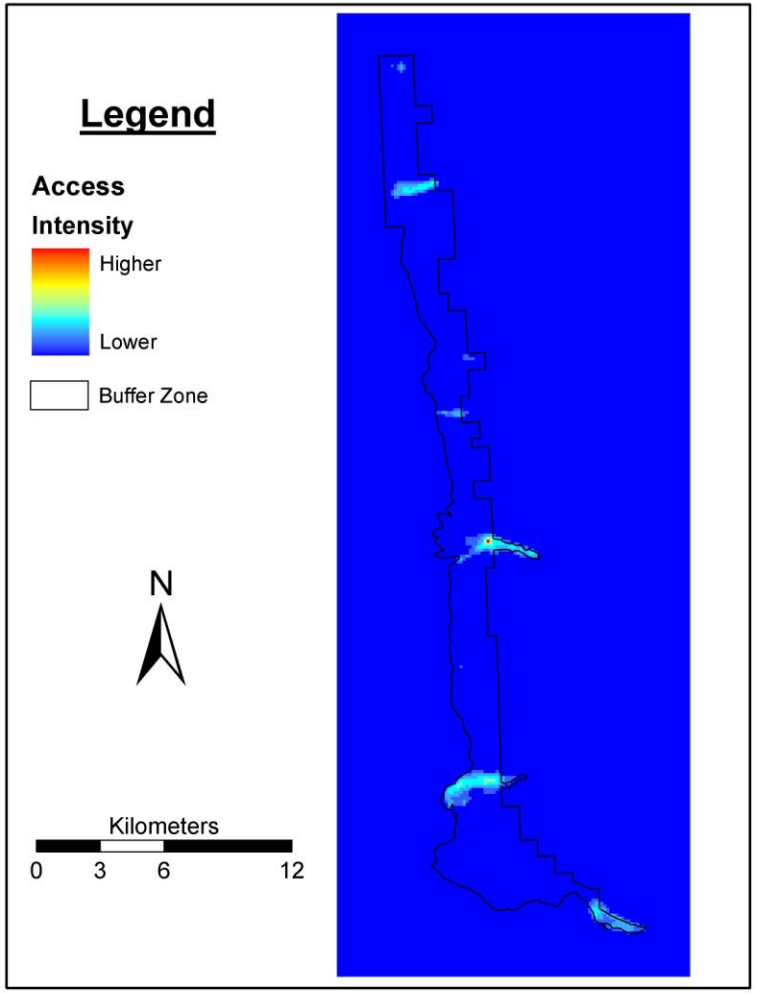

Phase 2 results

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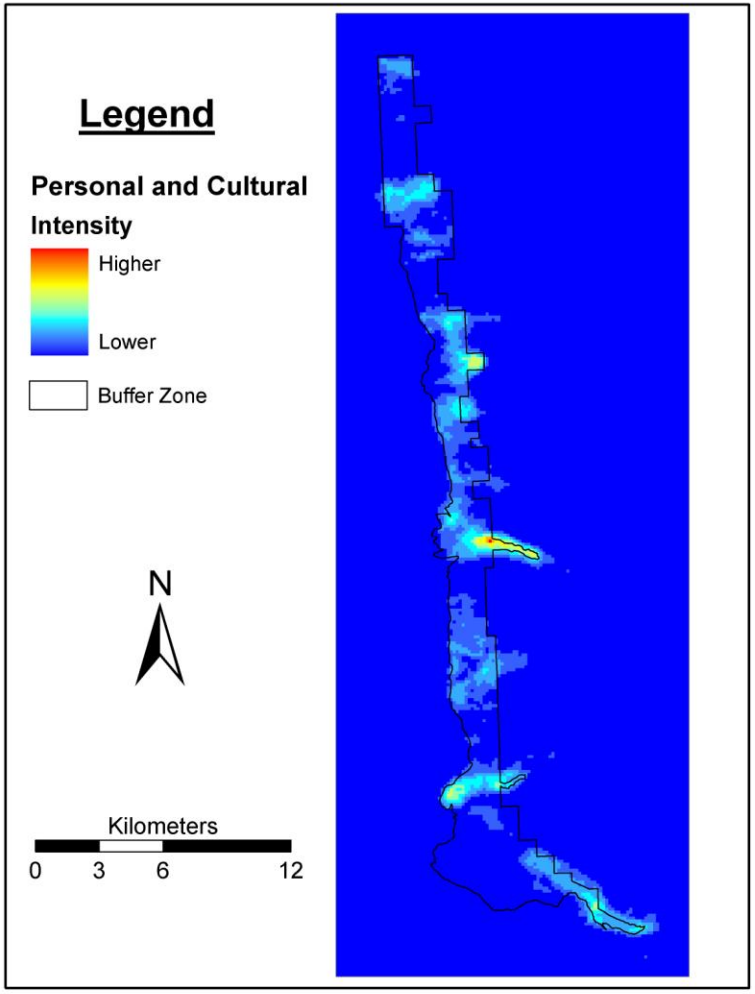

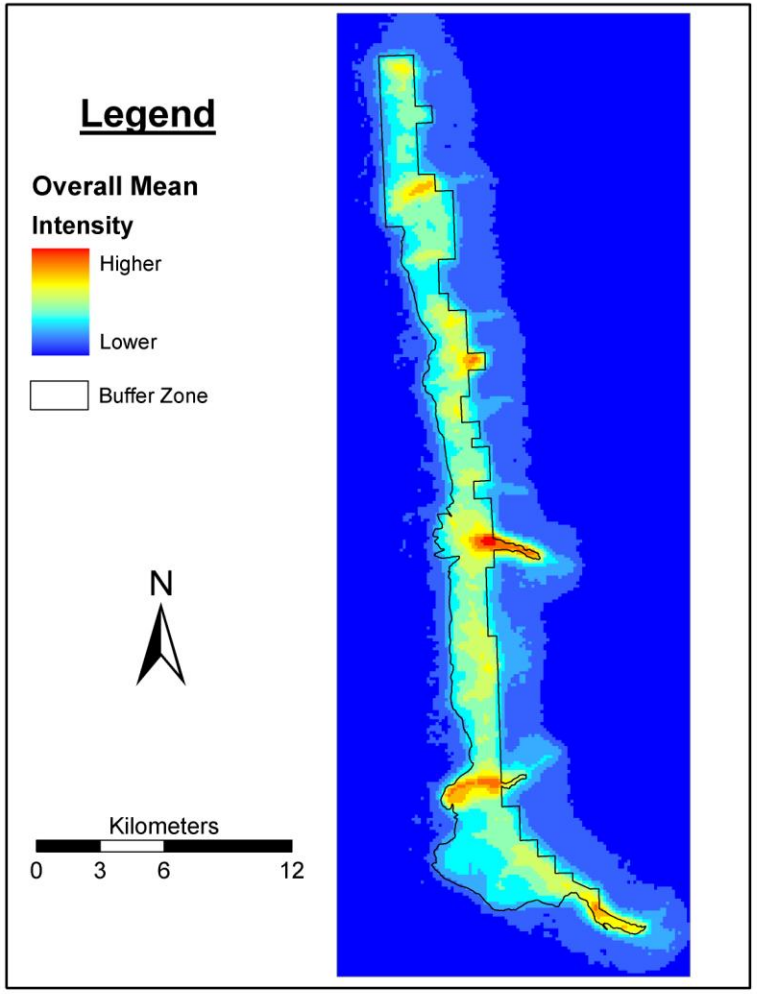

Cross comparisons

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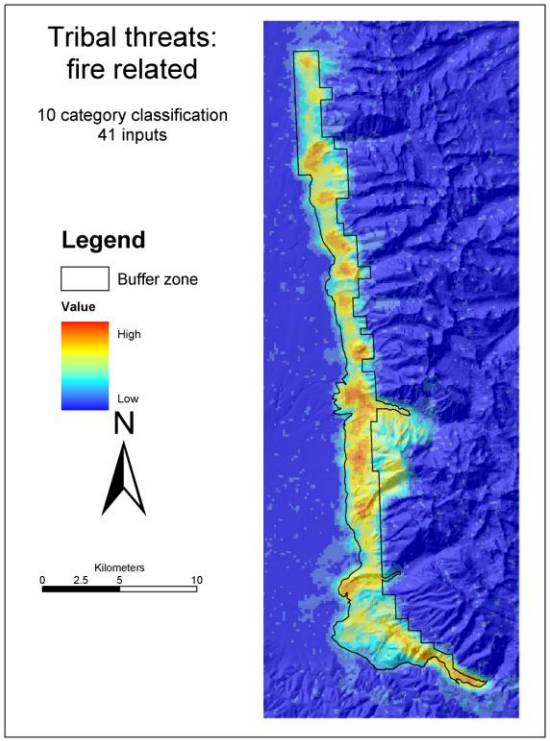

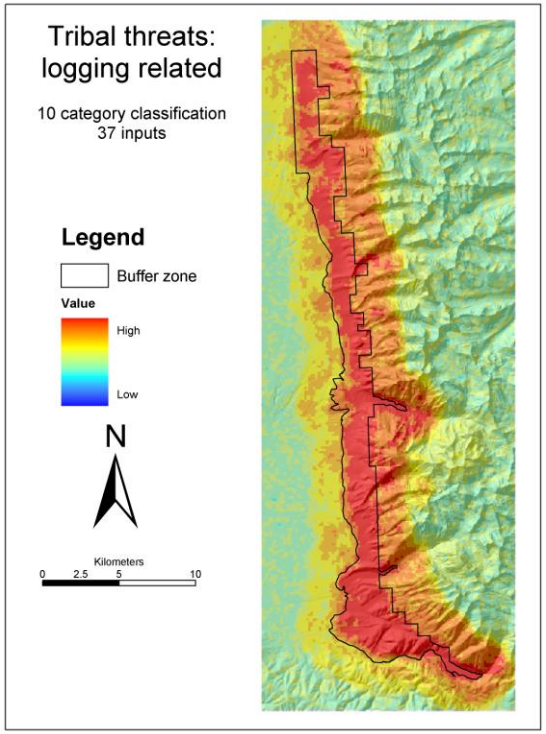

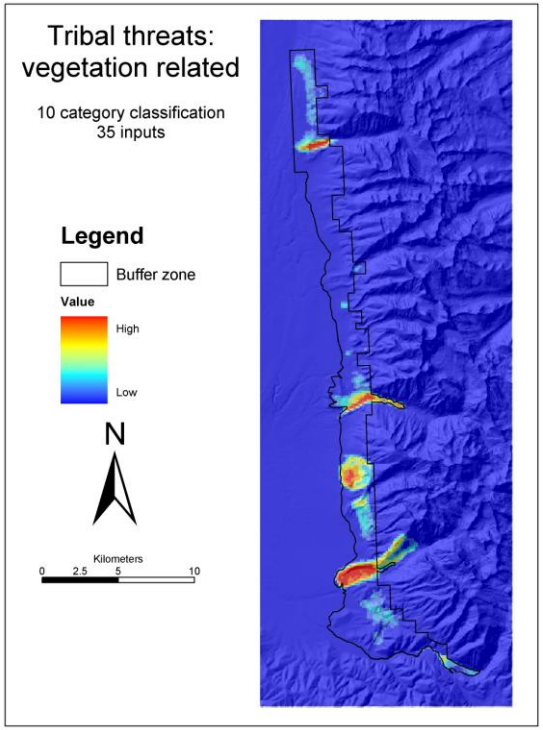

Cultural comparisons

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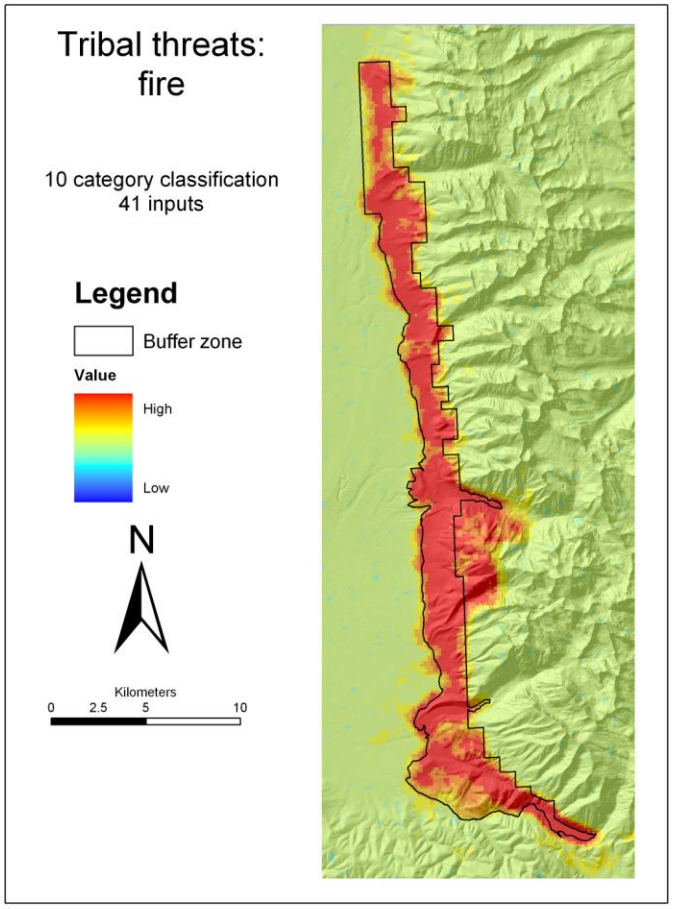

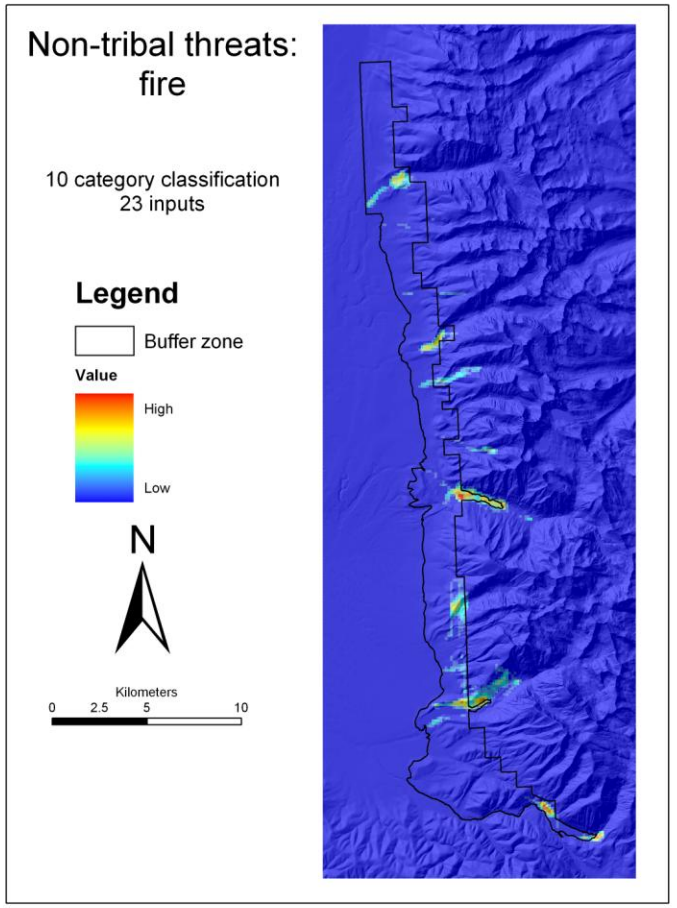

Phase 3

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- Ongoing work
  - Feedback of Phase 1 and 2 to participants
  - Check consistency (“community truthing”)
  - Cross check with tagged comments
  - Discuss possible fuel treatments
    - What, where and when
    - Collaborative spatial decision making
    - Mix traditional ecological knowledge (TEK) with modern methods/data/techniques

Pro's and con's

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Pros	Cons
•Inclusive at all stages •Accept local leadership •Address local issues •Identify solutions that are spatially delimited and widely acceptable •Fuzzy model matches our perception of landscape	•**VERY** time consuming •Reliant on selected individuals (especially 'offline' community) •Possible conflict between groups •Problems with "secretive" aspects of tribal society

Challenges

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- Respect and understanding
  - Differences in view and values (need for privacy)
  - Different cultures have different ways
- Compromise and collaboration
  - No universal solution across space/scales
- Courage and conviction
  - Admit previous mistakes and take steps to rectify
  - Listen to others' opinions (whole knowledge system)
  - Beware political intransigence and public apathy
- Address the NIMBYs
  - Where top down meets bottom up

Further work?

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- Other possible approaches:
  - Crowd sourcing
  - Data mining
  - Spatial statistics
- Integration with:
  - High resolution imagery
  - Predictive fire models
  - FIM data and interpretations
- Fuzzy targeting of fuel treatments

Take home message

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- 20 years of PPGIS development
  - Solved main technological problems
  - BUT… yet to fully appreciate level of cultural/societal differences
- The challenge is now to:
  - Address problems of political intransigence and public apathy
  - Appreciate the benefits and seize the opportunities in community partnerships
  - Realise the rewards of better governance
  - Make those **brave** decisions and act on them

Thank you

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