



Natural Capital Accounting and Valuation of Ecosystem Services (NCA&VES) in South Africa

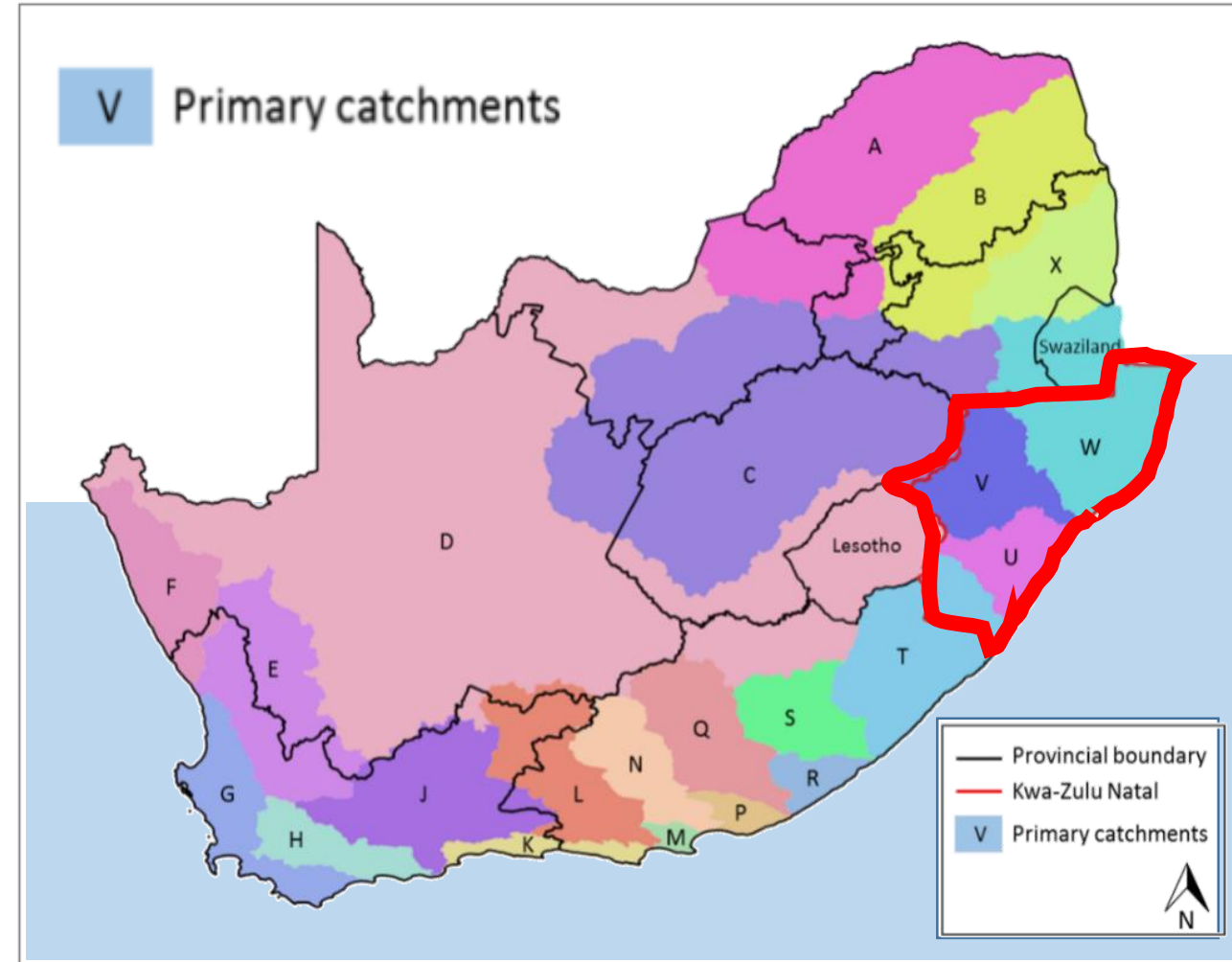
Development of pilot monetary ecosystem accounts for KwaZulu-Natal

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Scope of the study

- Provincial scale
 - KwaZulu-Natal, inland
 - 92,000 km²
 - Builds on earlier work
- 1990-2005-2011-2014
- Valuation of multiple ecosystem services
 - Annual flows, asset values
 - Summarise in accounting tables, show changes over time
- Scenario analysis





Ecosystem services included in KZN pilot

- **Provisioning (Largely in SNA)**
 - Harvested natural resources
 - Livestock production
 - Crops & plantation forestry
- **Cultural (Partly in SNA boundary)**
 - Experiential fulfilment associated with active or passive use
 - Tourism value
 - Property value
- **Regulating (Outside SNA boundary)**
 - Carbon sequestration
 - Flow regulation
 - Sediment retention
 - Water quality amelioration
 - Pollination (*intermediate*)
 - Nursery value (*intermediate*)

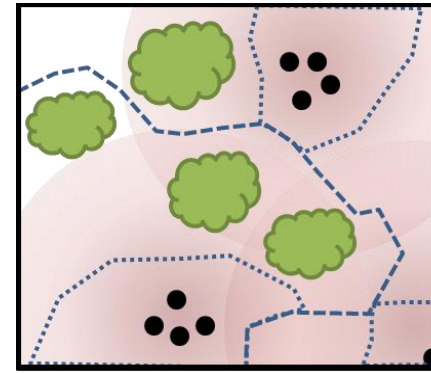
Provisioning services: overview

- Harvested natural resources
 - 10 groups of foods, raw materials, fuelwood
- Livestock production
 - Domestic livestock
 - Wildlife ranching
- Agriculture
 - Plantation forestry
 - Sugar
 - Orchards & vineyards
 - Irrigated crops
 - Dryland crops
- Estimate production from statistics, survey data
 - More challenging than expected!
- Map based on
 - land cover, condition,
 - land tenure, wildlife ranch map
- Value
 - Gross output – production costs
- 2011, then 2005

Provisioning services: Wild living resources

- **HH demand** for 10 groups of resources estimated for 4196 census sub-places, mapped to settlements
 - surveys 2009-12 (n=1600)
 - 2011 census data.
- For each group, **supply** (stocks and MSY) mapped to **13 natural land cover** types based on literature
- Estimated **use** mapped to **vegetation** taking supply and distance into account
- **Value** based on prices and proportional input costs from local area literature

Still busy with mapping use



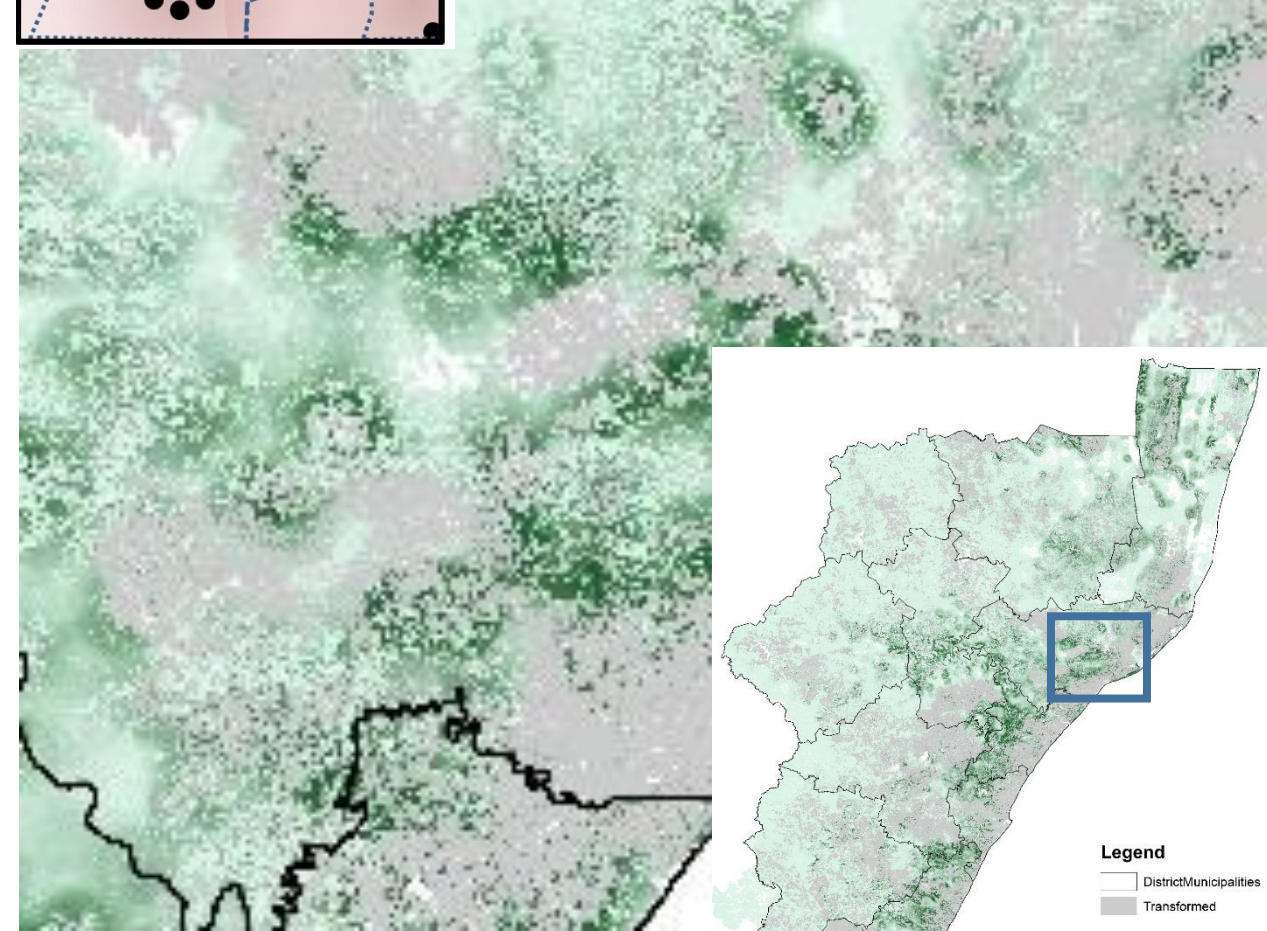
Fuelwood Use

$\text{m}^3/20\text{m}^2$ pixel

High : 0.5



Low : 0



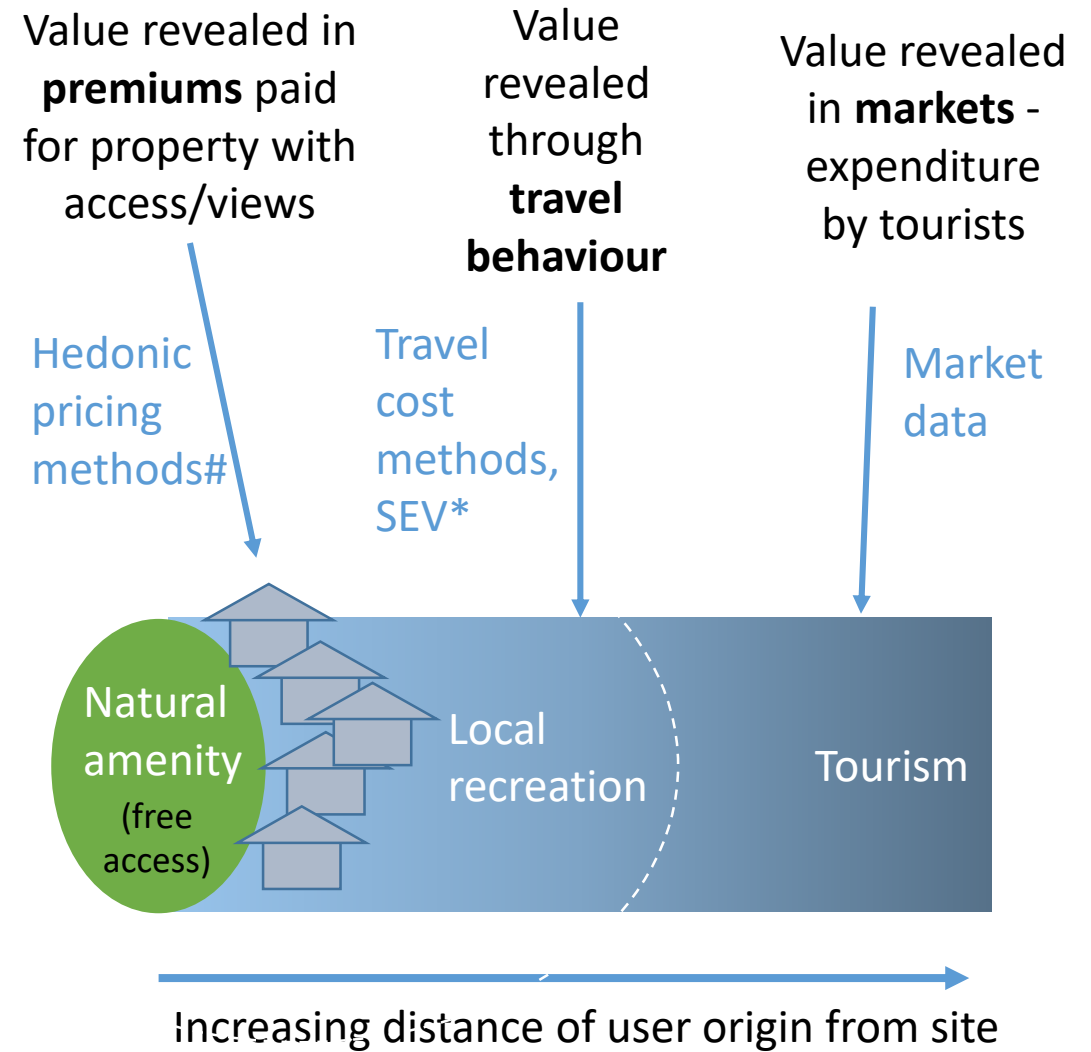
Legend

- District/Municipalities
- Transformed

Cultural services: overview

- Use values only
- Passive or active use value revealed in 3 main ways
 - different valuation methods
 - additive (need to value all 3)

- Tourism
 - Value of attractions from stats
 - Map from geotagged photos
- Local recreation
 - No data
- Property premiums
 - Hedonic study for main metro
 - Benefit transfer

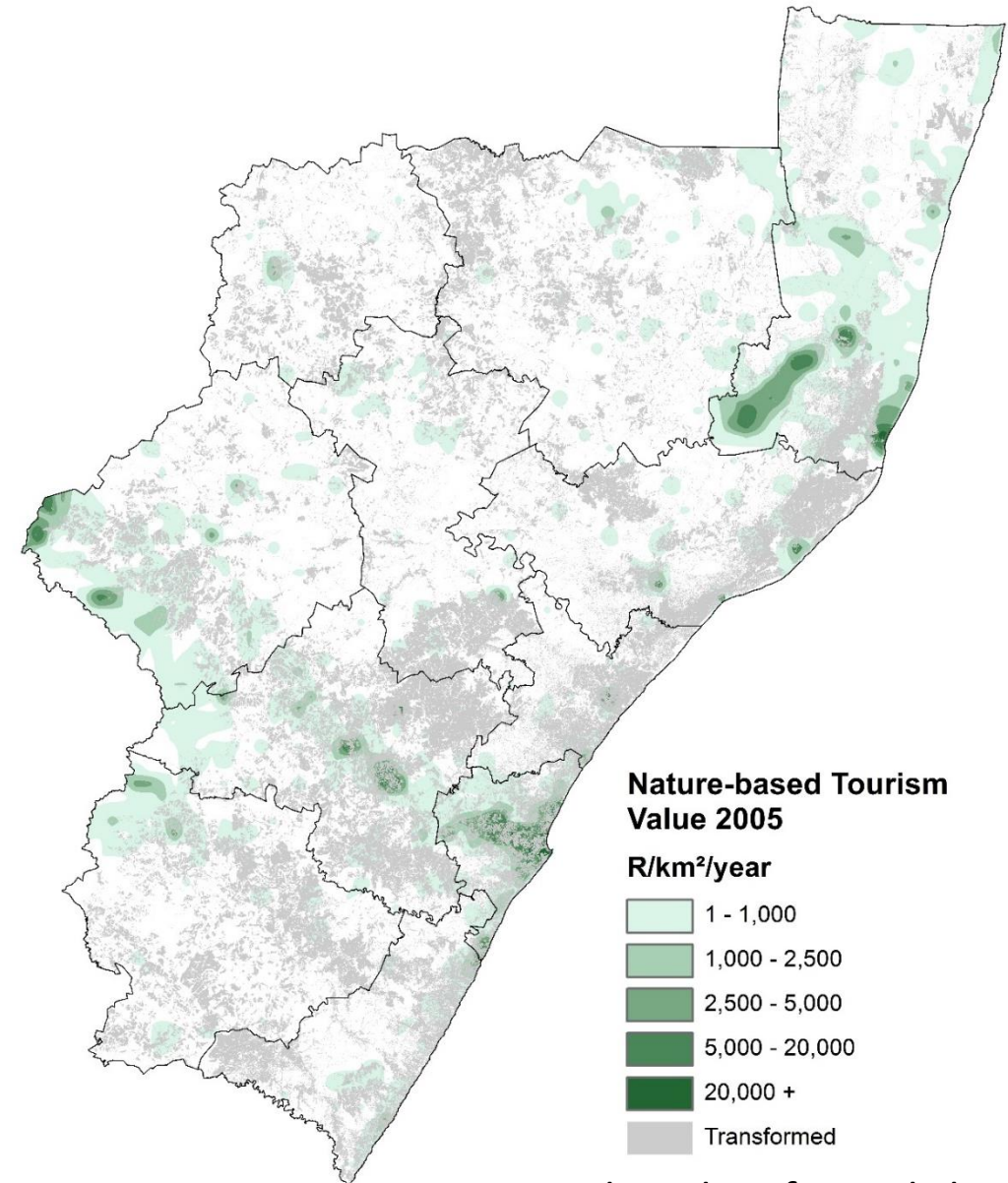


First stage for NCA

* For conversion to exchange value for NCA

Cultural services: tourism value

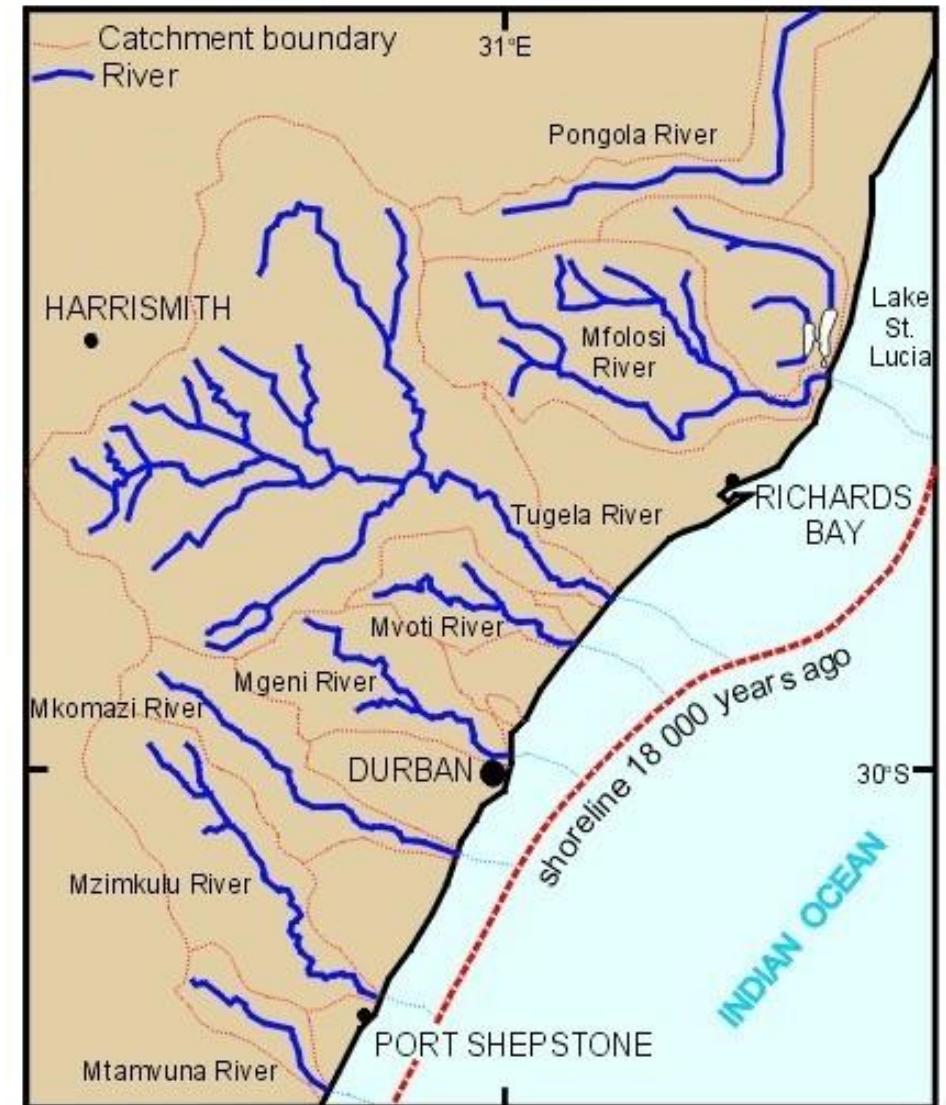
- Total tourism value from province from official statistics
 - Direct value added
- Fraction attributed to visiting attractions (as opposed to family, shopping, business, etc), estimated based on tourism reports
- Attraction value mapped based on density of geo-tagged photographs uploaded to internet sites



Based on data from Flickr

Hydro-regulating services: overview

- Flow regulation
 - Reduced need for storage for water supply
 - Reduced flood risk
 - Sediment retention
 - Reduced sedimentation
 - Water quality amelioration
 - Reduced water treatment costs
-
- Model flows, sediment using SWAT/InVEST
 - 2005, 2011 land cover
 - Replacement costs (flows, sediment reg)
 - Empirical valuation model (WQ)
 - Panel data from 25 plants, fixed effects



Scenario analysis

- Business as usual
 - Requires projection of population, land use and ecosystem condition.
- Full implementation of protected area expansion plan
 - Improvements in condition
 - reduced access to resources
- Rangeland extension programme
 - Improved land cover and productivity

