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# Time and the river: approaching a socio-hydrological history of the Sabie catchment

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Does the history of this catchment still matter very much today?

## Outline

- The idea of a social-hydrological history and the framework
- Aspects of the history:
  - The resource and the resource units in the Sabie
  - Institutions
- Conclusion

# The Social-Hydrological System: Elinor Ostrom's Framework

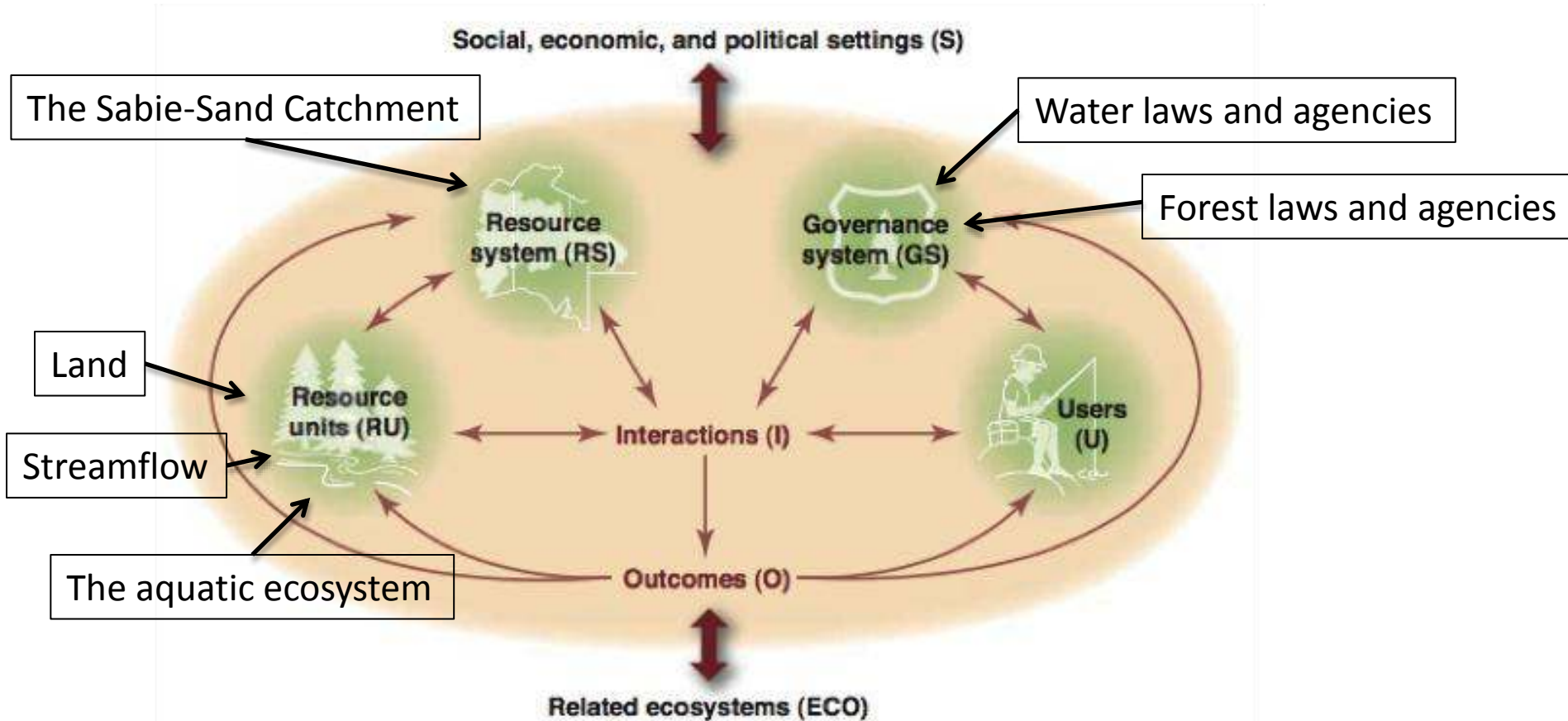


Fig. 1. The core subsystems in a framework for analyzing social-ecological systems.

Focus today:

- Aspects of the history of resource units
- Governance history of the Upper Catchment

# History and institutions

- Douglass North: “institutions are the rules of the game in a society or, more formally, ... the humanly devised constraints that shape human interaction”
  - the diverse, characteristic aggregates of law, regulations, customs that govern actions by agents (the players; organisations)
- The path-dependence theory of institutional change: how past behaviours influence the present character of the institution and future behaviours
- Given, that the present state of the catchment is the outcome of past behaviours as determined by the (changing) institutions
  - What were these past behaviours, and how does their legacy define our options?

North, D. (1991). Institutions. *Journal of Economic Perspectives*, 5, 97–112.

North, D. (2005). *Understanding the process of economic change*. Princeton and Oxford: Princeton University Press.

# Path dependence and history

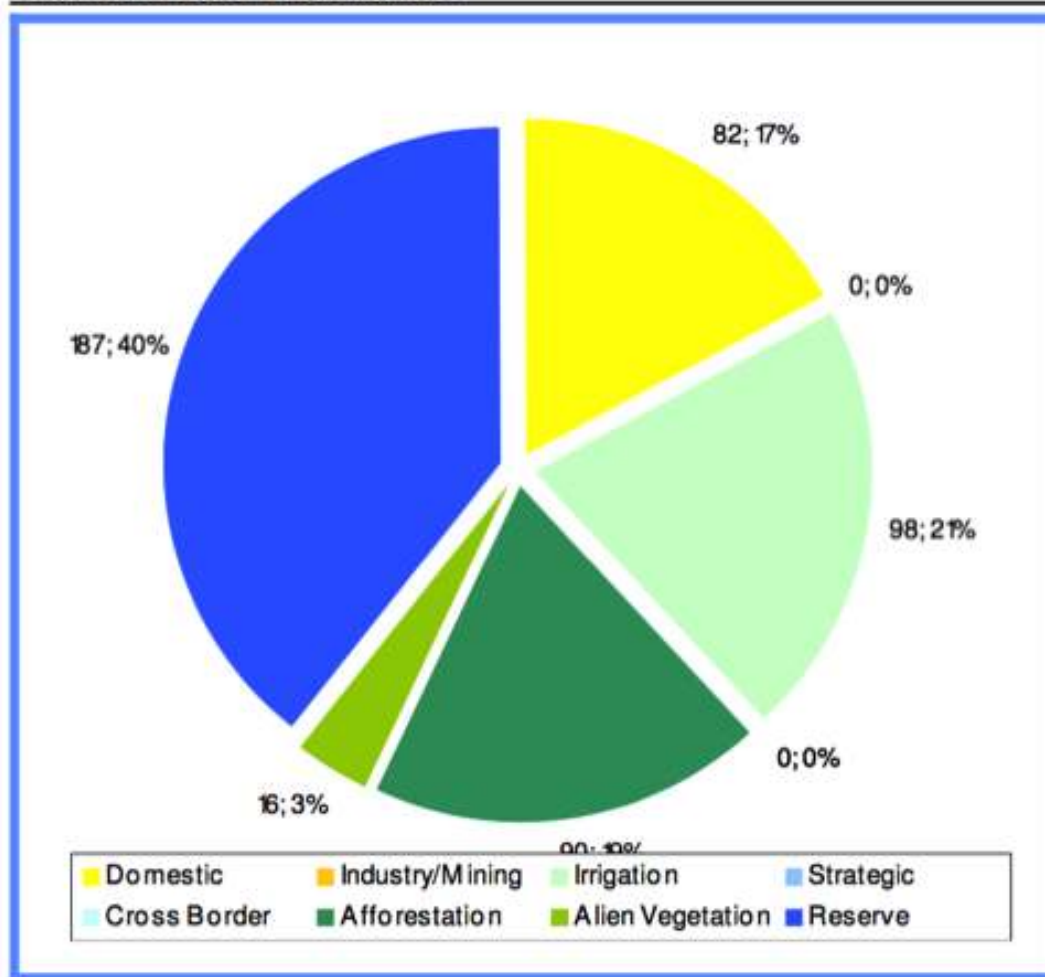
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# A good social history exists for the region, e.g.

- Andrews, E. T. E., A. R. C. Fowler, C. B. Genis, and R. R. Uren (1954). “Minerals and Mining.” In *A Survey of the Resources and Development of the Southern Region of the Eastern Transvaal Lowveld*, 58–74. Barberton: Lowveld Regional Development Association.
- Harries, P. (1987). “A Forgotten Corner of the Transvaal”: Reconstructing the History of a Relocated Community through Oral Testimony and Song. In Bozzoli, Belinda (ed.), *Class, Community and Conflict: South African Perspectives* (pp. 93–134). Johannesburg: Ravan Press.
- Hartman, J. B. (1972). *Die politieke en judisiële organisasie van die suidelike Changana (Bosbokrand) in die lig van hulle herkoms* (M. A. Thesis, unpublished). University of Pretoria, Pretoria.
- Mabin, A. (1987). The Land Clearances at Pilgrim’s Rest. *Journal of Southern African Studies*, 13, 400–416.
- Niehaus, I. (2001). *Witchcraft, Power and Politics: Exploring the Occult in the South African Lowveld*. Cape Town, London, and Sterling, Virginia: David Philip and Pluto Press.
- Ritchken, Edwin. (1995). *Leadership and Conflict in Bushbuckridge: Struggles to Define Moral Economies Within the Context of Rapidly Transforming Political Economies (1978 -1990)*. Ph. D. Thesis, unpublished, Johannesburg: University of the Witwatersrand.

Little change in water utilisation since the 1970s  
But the water is overallocated and “underutilised”

*Sabie Water Demands.* (c. 2010)



Inkomati Catchment Management Agency. (n.d.). *The Inkomati Catchment Management Strategy: A First Generations Catchment Management Strategy for the Inkomati Water Management Area*. Nelspruit: Inkomati Catchment Management Agency.

# Sabie River aquatic ecosystem in time

- 1913: ‘A well was sunk and blasted at Sabi Bridge and a windmill erected to provide water for the Warden and his staff. It was because of the polluted state of the Sabie River, caused by the effluents of the gold mines at the upper reaches of the river’ Stevenson-Hamilton in Pienaar 1985 p. 137
- 1929: ‘The Sabie River stream is polluted by a number of Mines, and this detracts greatly from the amenities of the Park ... This matter has been the subject of negotiations by your Board ... and though the pollution is not denied, it has not been possible to end the infringement’
  - 3<sup>rd</sup> Annual Report of the National Parks Board of Trustees
- 1933: ‘startling report’ by water expert indicated that the micro-organisms in the Sabie River were *totally non-existent*
- the pollution of the River continued unhindered until the end of the Second World War
  - Pienaar 1985 p. 143
- CSIR 1963?
- Now, Class A/B in the statutory classification: pristine or nearly so

# Aspects of apparent history

- State of land and land cover in the upper Sabie
- Mining
- Afforestation and forestry

# Periods for analysis

- Last quarter of the 19<sup>th</sup> Century: conflict & migration; (British) state-formation and land surveying; exploration and mining
- 1900-1934: chaotic land administration; mining, pioneer afforestation
- 1934-1948: Ministerial inspection of catchment; rehabilitation and environmental flows; Forestry Department land acquisitions; SANT land acquisitions; afforestation accelerates; labour tenant, forestry, and Betterment removals
- 1948-1968: Apartheid government; water resource supply concerns deepen; extra-district removals to BBR intensify conflict
- 1968-1998: Interdepartmental Committee on Afforestation and Water Supplies; Water Commission; certified Sustainable Forest Management
- 1998-to present

# Land and ‘the singularly fluid conditions in the[BBR] district’ – Edwin Ritchken 1995

- The social and administrative template for the Sabie SHS begins with human settlement patterns that came from conflict, conquest and migration during the middle and late 19<sup>th</sup> Century
  - 24 Chiefs
  - Ethnically diverse
- Inserted into this ‘anarchic setting’ were the modernising factors of state formation after the British annexation of 1881 and the Anglo-Boer War of 1889-1902, and the far reach of SA’s minerals revolution

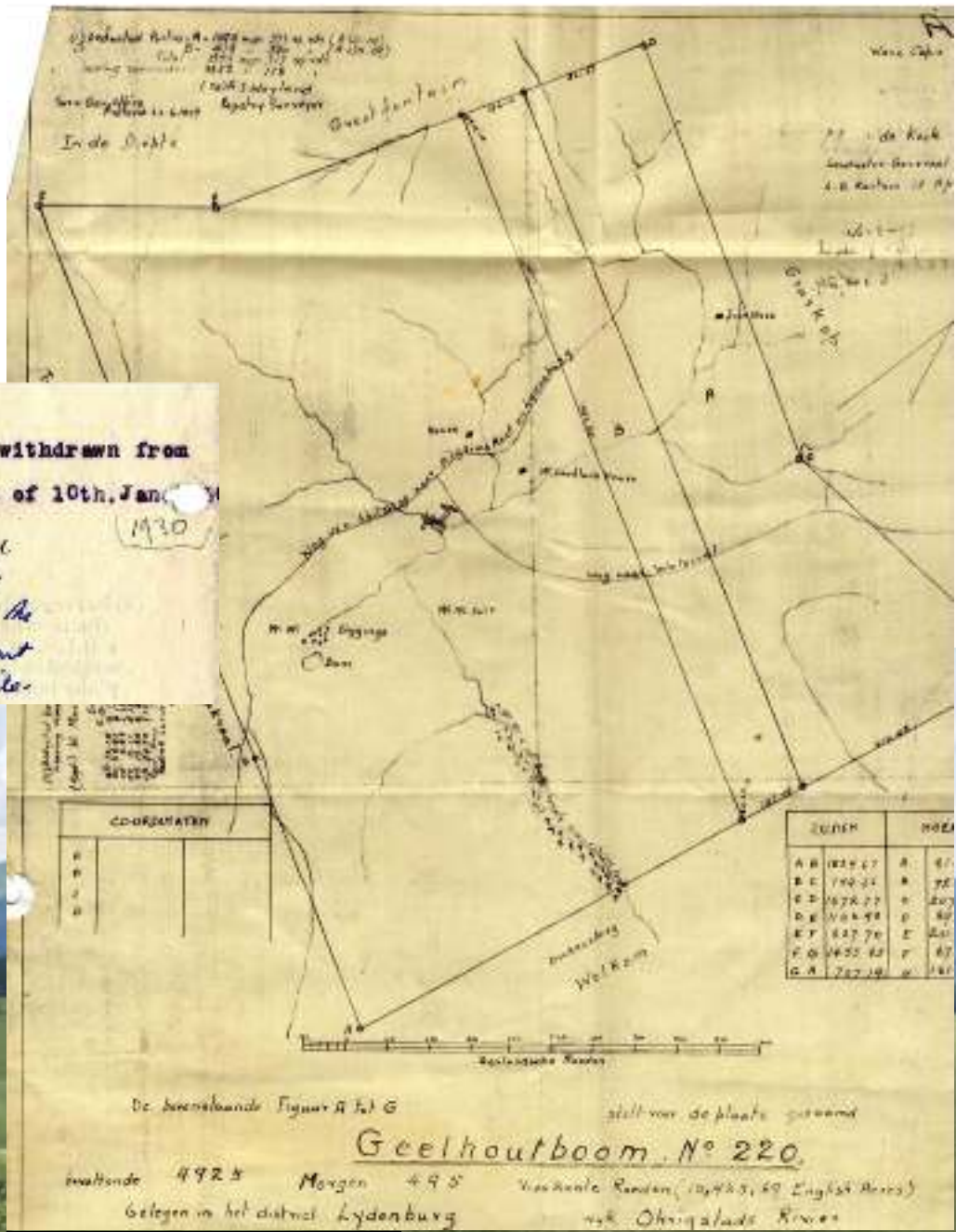
Ritchken, E. (1995). *Leadership and Conflict in Bushbuckridge: Struggles to Define Moral Economies Within the Context of Rapidly Transforming Political Economies (1978 -1990)* (Ph. D. Thesis, unpublished). University of the Witwatersrand, Johannesburg.

# A land history: Graskop

- 1884 demarcation and reservation as 'crown' land
- 1915: Graskop 'Forestry Reserve'
- 1936: demarcation into Forest Act

(13) Object of Reservation:—  
**Afforestation and Protection of Water Supplies.**

(14) General Remarks and Observations:  
**Portion A, in extent 1094 morgen 377sq.roods, withdrawn from pegging of claims by G.N.No.66 in Govt.Gazette of 10th, Jan. 1930**  
*held under Surface right Permit No E 7/33.*  
*Outspan Site of 42 morgen 579 roods reserved for basis into ed 9.11.36 in file L1540/1*  
*Surface Right Permit No E 7/33 amended by the exclusion of a portion 9 m 450 sq Rds. in patent granted to C.V. Wright for purposes of Metal Sile.*



Courtesy Tom Vorster, DAFF

MINUTE

5

Act Secy.

I have obtained a batch of  
from your office  
applications for permission to prospect in  
the Sabie Game Reserve from all of  
which it is abundantly clear that  
the Govt will not grant any such  
applications. Moreover prospecting in  
the Reserve is forbidden by Govt Notice

1204/4.

2. It is presumed that the present  
application will be dealt with as the  
previous ones have been. I can find  
no trace of Middlebrook's previous  
application

R.H. Keaton  
A.R.M.R.

B. 500



# Mining

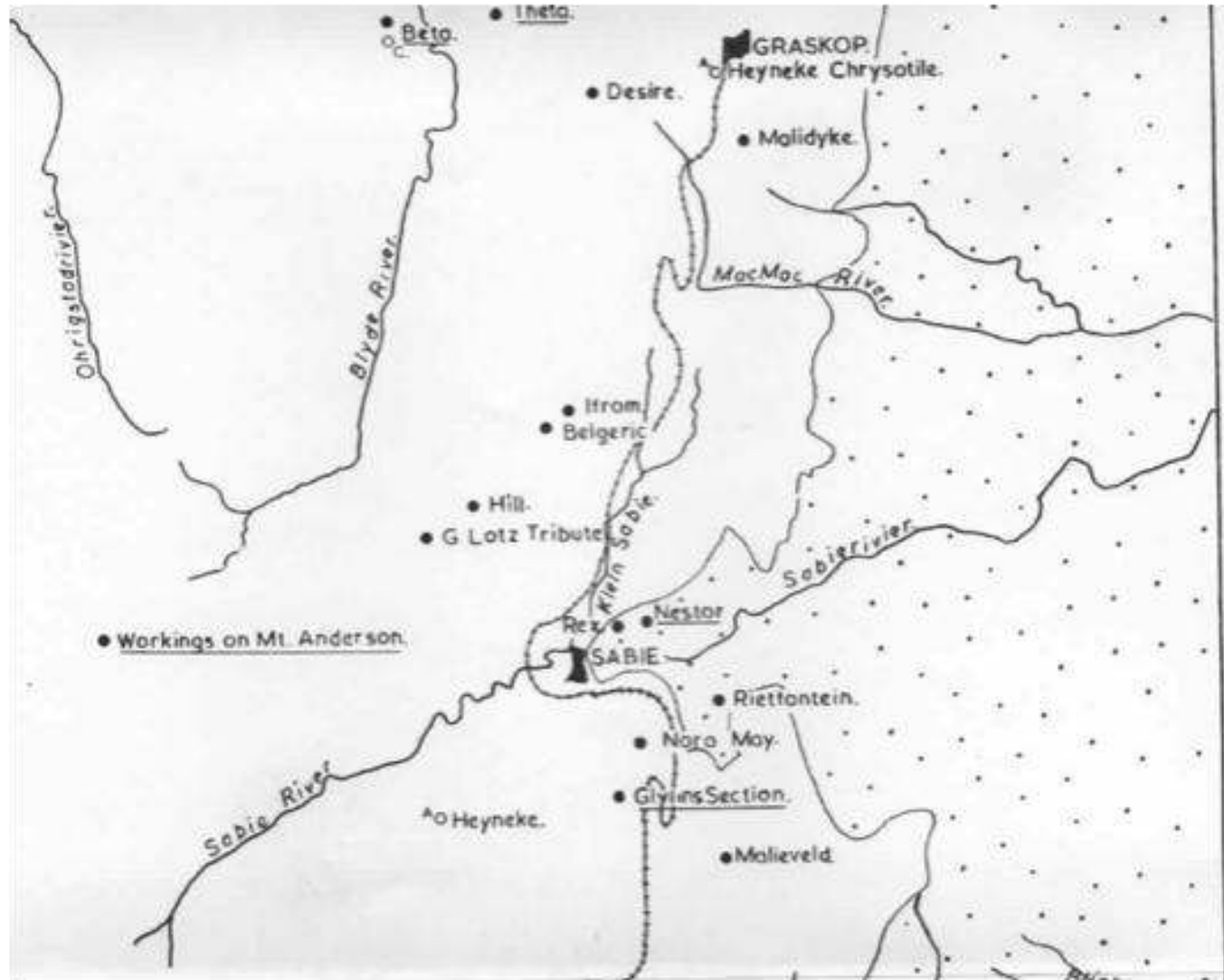
- Long history:
  - First strike Spitzkop 1872
- By March 1873, 180 diggers operating at Mac-Mac,
- Around 1902, about 30,000 claims registered in the Pilgrim's Rest District (which included Sabie)
- c. 1910: 'There was a rush of diggers to the district, and claims were pegged over almost every square yard of of the farm Waterval, north of Sabie.'
- Glynn's Lydenburg Mine, Sabie: 1897 – 1950

• **Present: Stonewall Resources**  
Andriess et al 1954. "Minerals and Mining" Barberton: Lowveld Regional Development Association.

Cartwright, A.P. 1974. *Valley of Gold*. Second. Cape Town: Howard Timmins.

# Gold mines in the Sabie Catchment c. 1950

Present: Stonewall Resources develops dormant mines and old tailings



Andrews, E. T. E., A. R. C. Fowler, C. B. Genis, and R. R. Uren. 1954. "Minerals and Mining." In *A Survey of the Resources and Development of the Southern Region of the Eastern Transvaal Lowveld*, 58–74. Barberton: Lowveld Regional Development Association.

<http://stonewallresources.com/projects/> on 15 March 2016

# Historic state of the catchment

- Of the countryside around Sabie, 1908: 'It was a beautiful setting of mountain scenery much marred by the scars of alluvial diggings'—EB Glaeser, Government Forester
- Graskop 1908: 'Suddenly we came to the edge of an appalling sight. ... an immense declivity cut between the side of two hills exposing the bare red subsoil ...'Glaeser
- Vicinity Graskop: 'These areas had been prospected over for many years, sometimes leaving ugly scars of erosion on the mountain slopes and then abandoned for want of success'—KA Carlson 1916

# Mining and hydrology

- Mine infrastructure especially slimes dams were vulnerable:
  - January 1909 storm: ‘Central cyanide compound [at Pilgrim’s Rest] washed away’
- 1927 Elandsdrift mine pierces artesian drainage ex dolomite
- Dolomite waters into the Sabie: ‘At one time 12,000,000 gallons of water [i.e. c. 1 cusec] flowed daily from the tunnel [at Glynn’s Lydenburg mine] into the Sabie River.’ (Andrews at al 1954)

# Afforestation

- Mining timber demands strip the indigenous forests as well as savannas of the Lowveld
- Transvaal Gold Mining Estates from 1904 onward
- Transvaal Government Graskop 1906
- Several locations by state 1921-1935 and later
- Often motivated by the 'climatic forestry' idea

# State intervention

- 1934: ‘At an inspection by the Minister ... instructions were given for
  - the acquisition of all farms on the eastern escarpment from Mariepskop to Witwater
  - for the protection of indigenous forests and
  - conservation of their water resources in the interests of properties in the Lowveld and the game reserve (Kruger National Park)’
- Catchment “closed” c. 1960, progressive improvement in Sustainable Forest Management

# Hydrology and policy

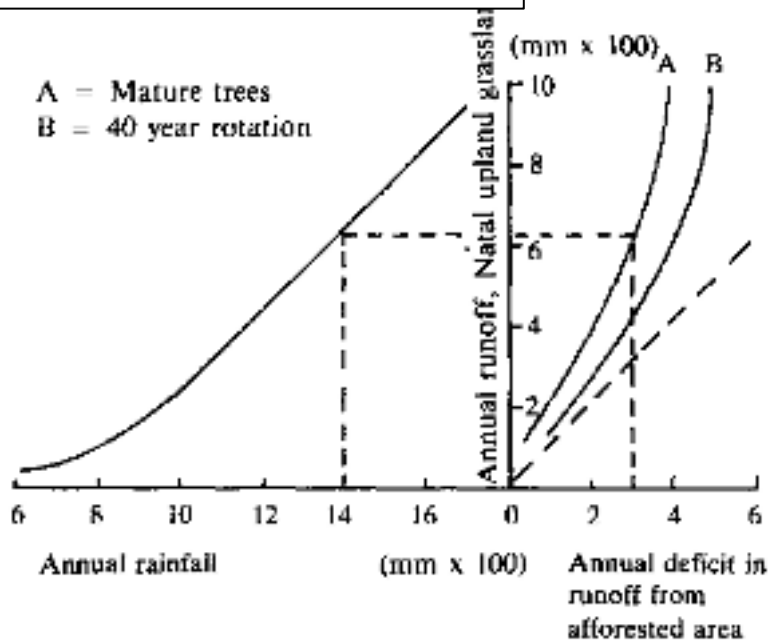
- Policy responses to the growing body of knowledge progressed from 1932 onwards
- From practice within the forest management unit (e.g. riparian zone protection)
- To 'guide planning' and planned trade-offs regulated via afforestation permits
- To detailed regulation (1998 onward)

# A science policy trajectory

First catchment experiment results 1963  
Early modelling: the Nänni curves

(1968)

Nänni curves: headwaters scale



Afforestation  
Permit System



Midgley-Pitman runoff  
model for quaternary  
and larger catchments

# The forests-water policy time line and the Sabie

1912: Union Government Afforestation Policy

1913: Union Forest Act

1932: riparian zone protection (voluntary)

1935: British Empire Forestry Conference

1935: Integrated forestry policy: indigenous forests, catchments and plantations complementary

1949: Wicht: *Forestry and Water Supplies in South Africa* (Bulletin No. 33)

1953: Establishment of Sabie River Irrigation District and Board

1968: *Report of the Interdepartmental Committee of Investigation into Afforestation and Water Supplies in South Africa*

1970: *Report of the Water Commission*  
1970: Mountain Catchment Areas Act

1972: Amended Forest Act: afforestation permits

1980: Report *Water Planning for the Eastern Transvaal*

1975 Interdepartmental Afforestation Priorities Committee

1989: State President's Minute assigns mountain catchments to Provinces

1998: National Water Act

2004: NEM: Biodiversity Act

2014: NEMBA Invasive Alien Species regulations

# 1980 Report *Water Planning for the Eastern Transvaal*

- Wide consultation in 1973, 40 Irrigation Districts, 'Tribal Authorities', etc
- Estimated actual water use for 'Eastern Transvaal'
  - in 1970 1.67 m m<sup>3</sup>/yr,
  - projected 3.27 m m<sup>3</sup>/yr in 2000
- 'Allocates' to:
  - Environmental flows (the Park) and international obligations
  - a 3x increase in the provisions overall for primary rural use, towns, industry and power generation, 1.5x for irrigation, and 1.4x for forestry
- Of 17 catchments, 8 closed to further or any afforestation, including Sabie

# Comments in conclusion

- This partial, periodised analysis of the Sabie SHS suggests that further work is worthwhile
  - Focus on the upper Sabie?
- Consider the historic force of ideas: 19<sup>th</sup> – 20<sup>th</sup>-Century desiccationism; what of today's narrative and rhetorical forces?
- The Sabie aquatic ecosystem proves to be resilient, but vulnerable
- The path-dependency of the present state of the catchment and its resources and institutions is evident:
  - present-day institutions effective for up to 70 years
  - 'beneficial use of water in the public interest', to quote the NWA, has been locked in by high employment, linkages, of water use
  - users are highly adaptive, innovative, progressively improving value addition

# Acknowledgements

- Tom Vorster and colleagues at DAFF
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- SANParks Scientific Services and Groenkloof Archives



*Thank you*