



While it is relatively easy to recognize the perennial grasses and seed-eating sparrows as characteristic of meadows, the ecosystems exist in their fullest sense underground. What we see aboveground is only the outer margin of an ecosystem that explodes in intricacy and life below.

AMY SEIDL

EARLY SPRING: AN ECOLOGIST AND HER CHILDREN WAKE TO A WARMING WORLD. (BEACON PRESS, 2009)

SCIENCE

EVIDENCE FOR CLIMATE ACTION

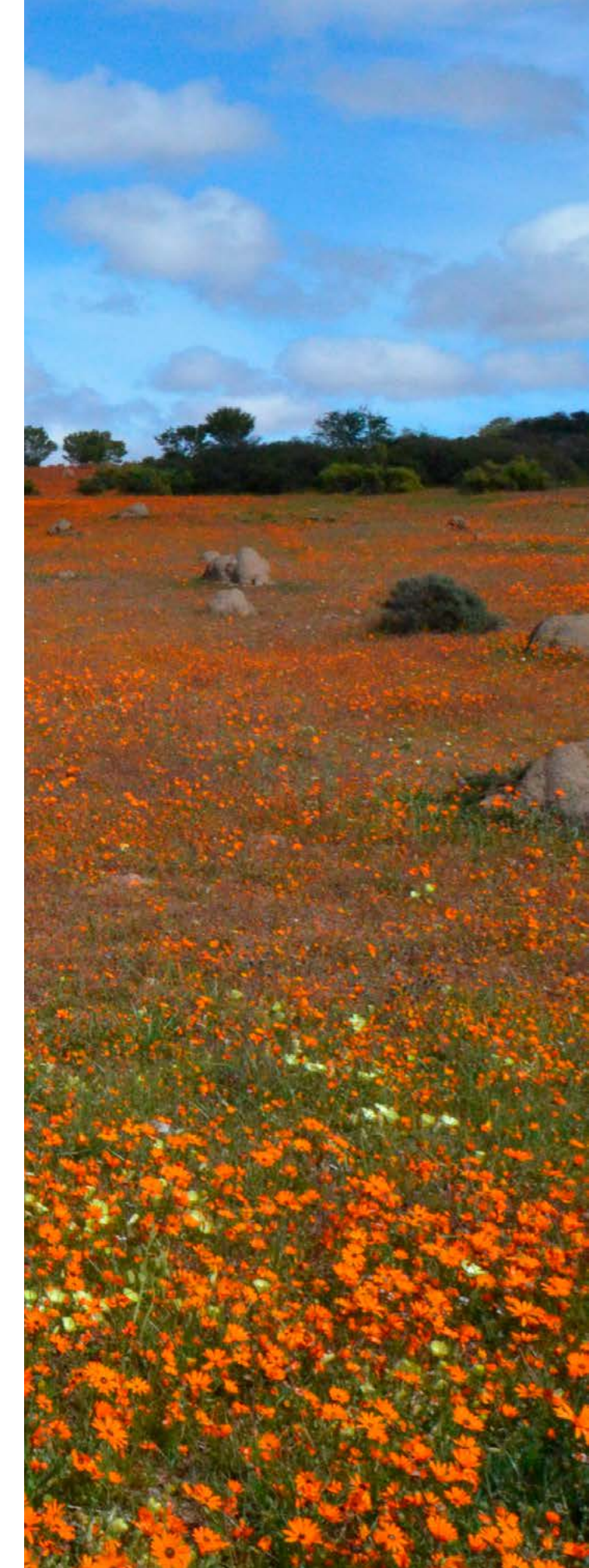
Science guides Conservation South Africa's rangeland restoration actions and informs its future strategies. For example, planned grazing and burning has informed draft Grazing Guidelines and validated the Ecosystems-based Adaptation low-cost restoration model. We have also demonstrated effective small livestock herding practices that can fend off and protect wild predators without lethal or toxic methods.

For the period July 2018 to December 2019, our new Monitoring and Evaluation, Research and Learning (MERL) protocol was designed and implemented across all three demonstration landscapes. Six post-graduate students conducted research on the demonstration sites and one PhD student (Zander Venter) completed and submitted a thesis entitled "Managing herbivory over space and time: consequences for vegetation and cattle responses in African rangelands".

In the same period, three new predictive models were developed, including a soil carbon map (random forest model), a savanna carbon model (Daily century model) and an Ex-ACT carbon balance tool for use in grasslands and savannas. Six new learning tools were developed, including a community guide to veld sanitation and several standard operating protocols for ground surveys, online surveys, the use of GPS and Google Earth, data management and data templates.

Two important findings from our research

- Simple, low-cost erosion control methods were shown to be twice as effective as traditional approaches, supporting nature-based solutions to climate change.
- Traditional and simple rotation grazing approaches were shown to be as effective as complicated approaches across South African biomes.



SCIENCE

In the coming year, Conservation South Africa will give specific attention to strategies that reduce greenhouse gas emissions as part of efforts to attain the United Nations Sustainable Development Goal on Climate Action: [Take urgent action to combat climate change and its impacts](#).

Climate-smart rangelands

The condition of rangelands determines the extent to which ecosystems absorb and store water and carbon. Rangeland ecosystems that are intact and functional, store carbon from the atmosphere and support livelihoods. When rangelands are degraded by overgrazing and erosion, carbon is released into the atmosphere as carbon dioxide, a greenhouse gas, and soil loss pollutes water courses and wetlands and reduces soil fertility. The bare ground that results contributes to heat and water stress for people and nature.



SCIENCE

The science behind carbon sequestration

Carbon balance is the net balance of all greenhouse gases, expressed in carbon dioxide equivalents (CO₂-e) that is either emitted or sequestered because of project implementation. Studies show that restored rangelands can contribute to a positive carbon balance.

Most of the carbon in grasslands, and to a lesser extent in savanna, is stored below the ground (rather than above). Increased plant growth and carbon dioxide absorption (photosynthesis) increases soil carbon slowly over time. The global stored soil carbon pool is ca. 2,300 billion tons, about twice that of the above-ground pool.

Baseline measurements and a biogeochemical model show that controlled burning and grazing results in ca. 5,000 g carbon per m², (50 tons of soil carbon per hectare), about double that of poorly managed areas. Where there are frequent fires, there is either over-grazing or no grazing.

Solving the climate crisis is the greatest and most complex challenge that homo sapiens has ever faced. The main solution, however, is so simple that even a small child can understand it. We have to stop our emissions of greenhouse gases.

GRETA THUNBERG
SWEDISH ENVIRONMENTAL ACTIVIST

STRATEGIES TO LIMIT GREENHOUSE GASES

Over a period of three years, Conservation International, in partnership with Conservation South Africa, plans to:

- Develop a framework for linking rangeland Ecosystem-based Adaptation actions to carbon sequestration and sustainable development outcomes.
- Consolidate two carbon verification models (biogeochemical modelling and predictive soil mapping) and implement standardised ground- and remote-sensing-based baselines, model verification and validation for savanna and grassland habitats in at least three African countries.
- Evaluate and refine one sustainable development verification model and implement standardised baselines in rangeland restoration sites in at least three African countries.
- Identify and map 1,000,000 hectares of rangeland in at least three African countries that have high potential to deliver carbon and community benefits by 2030.
- Identify 132,000 hectares of rangeland that are suitable for carbon verification and sustainable development verification and implement the required baselines, governance arrangements and verification and processes for the sale of carbon and sustainable development credits by 2023.
- Implement rangeland restoration and livelihood development activities on 132,000 hectares and expand existing community rangeland areas under conservation agreement to 300,000 hectares by 2023, benefiting at least 3,000 farmers and 3,000 women and youth.
- Validate the predicted soil carbon gains in the first 132,000 hectares, using the same approaches as in the baseline (monitoring and evaluation) starting with 12,000 in year one and building to 132,000 by year three.

Once the verification models have been tested and the carbon and sustainable development credits on the first 132,000 hectares are sold, Conservation International will work rapidly to expand the number of rangeland hectares under conservation agreements by a further 200,000 hectares, to bring the total hectares verified for the sale of carbon and sustainable development credits to at least 332,000 hectares by 2030.