Geotourism: some examples from around the world and setting an agenda for the future

Resolving the definition

Some examples of geotourism:
Kalbarri (self-guided geotrail)
Hyden (self-guided geotrail)
Undara Caves (guided geotours)
Grand Canyon (visitor centre and view points)
West Coast Fossil Park, South Africa (geo-activities)
Walter Sisulu Gardens, SA (integrated)

An agenda

David Newsome, Murdoch University, Western Australia
Resolving the definition of geotourism

Geotourism is a form of natural area tourism that specifically focuses on geology and landscape. It promotes tourism to geosites and the conservation of geo-diversity and an understanding of earth sciences through appreciation and learning. This is achieved through independent visits to geological features, use of geo-trails and view points, guided tours, geo-activities and patronage of geosite visitor centres.

Newsome and Dowling 2010
Where is Geotourism taking place?

Natural Environments
- Natural Landscapes
- Wilderness
- Protected areas

Human Modified Environments
- Mine Pits / Quarries
- Road sections
- Urban Settings
Kalbarri Coastal Geotrail;
Welcome to Rainbow Valley

Mushroom Rock – Rainbow Valley Trail
1.5km return allow 2 hours

Trail Classification — Class 4

Walk this 1.5 km trail (allow about 2 hours) and discover how the coastal landscape was formed. Learn about the ancient Tumblagoona Sandstone and its curious fossils and features.

Expect loose rocks, uneven surfaces and steep sections.

Cliff Risk Area

Beware of:
- Undercut cliff edges
- Strong winds
- King waves

For your safety:
- Keep to the trail
- Stand well back from cliff edges
- Supervise children closely

Forgotten something?

+ + + + +

Department of Environment and Conservation
Signs of life

This extraordinary ‘pipe rock’ is made of fossilized burrows created by ancient worm-like organisms known as *Skolithos*. They lived in a shallow, sandy marine environment and the burrows probably took minutes to hours to build.

Similar burrows used for feeding and escaping from waves are found today in the Murchison River estuary.
Cross bed

The vertical stack of trough-shaped features was once a channel of sand-laden coastal current that flowed into a coastal bay. On the ground behind you, these same channels form ridges of curved sandstone ridges.

Shells of sandstone shells like these probably took millions of years to form. Similar curved ridges form today in the sandy bed of the Murchison River.
Cliffs of ages

These rounded boulders of grey sandstone are much younger than the surrounding red Tumblagooda Sandstone. They were deposited during the Cretaceous, about 130 million years ago, as layers of sand at the base of an ancient sea cliff of Tumblagooda Sandstone. The grey sandstone probably represents several hundred thousand years of sand accumulation. Similar deposits form at the base of today’s sea cliffs.
Location of Wave Rock in Western Australia
Granite - one type of rock in the landscape
WAVE ROCK WALK CIRCUIT

Seen the Rock and wondering what to do next? Keen to explore the area a little further? Looking for a walk to stretch your legs before getting back on the road? Then the Wave Rock Walk Circuit is for you!

- The trail is 900 metres long (2.25 miles).
- It will take between 40 minutes to a break walk and an hour and a quarter, stopping to enjoy the scenery.
- It is virtually flat and has a wide smooth surface, making it easy walking.
- Pedal power is an option: bikes, velo-tours, and gourds are available at the trailhead.

The surrounding Wave Rock is fascinating, and the Circuit will introduce you to a wide range of natural and cultural features. Several interpretive panels have been installed along the route, to help you learn about and understand this amazing landscape. You can also take some your own journey, pass Hippo’s Yawn, experience wildlife, danger, and landscape, and enjoy the spectacular views of the Rock as you return.

It is recommended that you walk one side of the Circuit in an anti-clockwise direction. For the best view, follow the trail markers that clearly define the route and mark each intersection.

For your comfort and safety, and for the enjoyment of others, we suggest you:
- Be safe: Carry all water with you. 
- Be prepared: please keep your drinks with icy water and take them with you.
- Be careful: Take some drinking water and wear sturdy shoes.
- Be cool: Wear a sunhat, long-sleeve shirt, and sunscreen.

Site 1 — Trail-Head
Central Walk

Distance: 2.5 km. Time: 1.5 hour. Moderate difficulty.

Rubber soled shoes recommended. Walk involves ascending and descending Hyden Rock (some 50 m high); suggest not for persons with cardiovascular or respiratory problems.


Plant notes are included for most sites.

Begins and ends from the marker rock at the eastern end of Wave Rock.

C1. Wave Rock

Wave Rock is a 110 m long, 14 m high, overhanging flared slope, with a platform extending several metres from the base before plunging steeply at its outer edge. Flared slopes originated beneath the land surface as a result of water weathering. The shoulder at the top of the concavity marks the old junction of hillslope and plain, and where you are standing was once about
Walk up from the apex and cross the low wall near

C12. Isolated boulder with talus, on a plinth. This boulder overhangs the flared slope seen to the east of the apex at C11. Note the vein already seen at C6 on the other side of Hyden Rock.

C13. Narrow pop-up, or A-tent about 2 m long. The crestal fracture runs more-or-less north-south, indicating compression or squeezing from east and west.

Plant note: The 50 cm tall bousai shrubs here with erect sticky aromatic dark green leaves 5-6 cm long and 1-5 mm wide are Narrowleaf Hopbush (Warning - Daresia rupestris subsp. attenuata). These tough survivors love full sunlight, and can occupy the smallest cracks in the rock. After rain, a fragrant perfume emits from the wax on the leaves to reward the walker.
Undara geotour, Australia
Tourist Experience and learning

300,000 yrs of volcanic activity

Lava flows at 1000 cubic m/sec

Lava flowed in depressions and formed a tube as the hot surface in contact with air cooled

When the eruption ceased the ‘insulated’ lava drained away leaving a pipeline
Tourism is a business that depends on satisfied tourists. Tourists rate their visits according to the experiences that they have. Network of prof. tour guides (training, standards, code of conduct and best practice)
Grand Canyon National Park

World Heritage Site

Accommodation (hotel style, motel style and camping)
Hiking
Mule rides
Rafting
Museums
Visitor centres

4 million visitors per annum
Viewpoint Grand Canyon, USA
Visitor centre Grand Canyon

Theme of how the rocks formed
Grand Canyon Skywalk

Hualapai own and manage the western rim

Plexi-glass based walkway cantilevered over a side canyon of the Grand Canyon on Tribal land ($US 30 million)

200,000 visitors since 2007 (Las Vegas source of visits)

Unique visitor experience

Employment and income
Grand Canyon Skywalk

Juts 20 metres out over the canyon edge, 1,200 metres above the canyon floor
Grand Canyon Skywalk
Tourists pay US$75 each can get a bird's eye view of the canyon from the horseshoe-shaped walkway
West Coast Fossil Park, South Africa

Geo-activities
West Coast Fossil Park, South Africa
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West Coast Fossil Park, South Africa
Beds of quartzite and shale
At Walter Sisulu Gardens
Take a walk through time...

Follow the path and you will journey through South Africa's history in rock, starting from the oldest and ending with the youngest.

The rocks are arranged in order of age or the age of the event which they represent.

Geological Display Garden
These quartzite rocks are formed from sand which was on the shore of an ancient, shallow sea.

The sand would have become sandstone first and then, under the immense pressure and heat from being buried, changed into hard quartzite.

**Rock Facts**

Quartzite is used to make silicon and glass.

Quartzite is part of the Witwatersrand Supergroup which also contains conglomerates and shale.

These specimens are 2,950 million years old.

All the ridges around Johannesburg are quartzite.
The whitish patches are veins of the mineral quartz that intruded this quartzite rock.

While the hard quartz was broken by faulting, boiling steam penetrated along the fractures. This steam contained dissolved silica which crystallised into quartz.
No picnicking at the waterfall

This may seem unreasonable but this area is unable to withstand the wear and tear.

14 000 pairs of feet walk here per month.

Enjoy the view and marvel at the eagles but please choose another spot to have your picnic.
Welcome to the JCI Geological Trail. This trail is designed to show some of the fascinating geology of the Witwatersrand area which can be seen from the hill.

The trail is approximately 3.5km long and takes about two and a half hours with some resting times. This trail is done at your own risk and it is advised that you walk in small groups. Children under 12 must be accompanied by an adult. A trail guide is available at the entrance building.

The cliff face on your left is composed of quartzite of the Orange River Formation at the base of the Witwatersrand Supergroup, a thick succession of ancient sedimentary rocks that contains the largest known deposits of gold in the world.

The quartzite represents hardened sand beds that were laid down in an ancient shallow sea that covered an area some 2550 million years ago. Ripple marks, formed by wave action in sand on the floor of the ancient sea, can be seen on the surface of the quartzite cliff face to the left of the waterfall. Immediately above the pool...
Walter Sisulu Botanic Gardens

Geological garden rocks set out in order from oldest to youngest

Landscape viewing

Waterfall

Geotrail

Outings, lectures and courses
Geotourism: an agenda for the future

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Newsome and Dowling 2010
There are many different types of Tourism

<table>
<thead>
<tr>
<th>Type of Tourism</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle niche tourism</td>
<td>Extreme tourism, wine tourism, health tourism and gay tourism</td>
</tr>
<tr>
<td>Educational</td>
<td>Farm tourism, war tourism, distinct educational component</td>
</tr>
<tr>
<td>Festival</td>
<td>Arts festivals</td>
</tr>
<tr>
<td>Sporting events</td>
<td>Olympics, Commonwealth Games, Adventure races</td>
</tr>
<tr>
<td>Cultural / Heritage</td>
<td>Grand tours of historic cities, archaeology, sustainable tourism, distinct educational component</td>
</tr>
<tr>
<td>Adventure</td>
<td>White water rafting, mountain climbing, jet boating and bungee jumping</td>
</tr>
<tr>
<td>Wildlife</td>
<td>Gorilla viewing, birdwatching, whale watching, sustainable tourism, distinct educational component</td>
</tr>
<tr>
<td>Ecotourism</td>
<td>Hiking, camping in natural areas, wildlife viewing, sustainable tourism, distinct educational component</td>
</tr>
<tr>
<td>Geotourism</td>
<td>Landscape viewing, visits to geosites, sustainable tourism, distinct educational component</td>
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</tbody>
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Relationships between ecotourism and geotourism, cultural tourism, soft adventure tourism

There may be integrated packages
Not geotourism but cultural tourism
Not geotourism BUT adventure/sports tourism
Geotourism
An agenda for the future

Geologically based

Environmentally educative

Tourist satisfaction

Sustainable

Locally beneficial
The end of the talk

But the real beginning for geotourism!