

Environmental Science in Australia

An Environmental Analysis

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Senior Capstone 2011





Environmental Science in Australia

One of St. Olaf College's oft-cited facts is that each year, more than 850 students study off-campus—many internationally. While the programs students embark on vary in destination, scope, and objective, they are all designed to teach students about different cultures and environments in a tangible way that isn't possible in a classroom.

Environmental Science in Australia is one of St. Olaf's four semester-long, uniquely "St. Olaf" programs. Led by faculty in the Environmental Studies department and an Australian partner organization (Global Education Designs in 2010 and Australearn in 2012), it is designed to introduce students to the varied (and fascinating) ecosystems in southern Australia. Students take courses in terrestrial ecology, marine biology, cultural anthropology, and environmental policy throughout the semester; class work includes lectures and workshops but also field trips and research projects in state and national parks.

I was lucky enough to participate in this program in 2010. While our group overall had an amazing time and gained a great deal of knowledge and perspective on an individual level, the irony of a bunch of Chaco-wearing, environmentally-minded college students flying to the other side of the world to drive around in a giant bus was not lost on us. It led me to wonder: what exactly *are* the environmental implications of this program? And study abroad in general?

Surprise: this is a complicated question. "Environmental impact" can mean a lot of things, and the level of variation in things like fuel efficiency and waste from planes, trains, automobiles, hotels, restaurants, and everything else that contributes to the life of a tourist is astronomical. To simplify, I broke things up into general categories: travel, accommodation, food, water, and miscellany. The program also includes two unplanned breaks where we all split up; I used my own break activities as a proxy for the rest of the group.

My intention is not to bash the Environmental Science program or study abroad in general: I think travel has a lot of value, and students that spend time abroad are usually better people for it. In this report, I am simply exploring the ways in which this amazing experience affected my ecological footprint, and ways in which we can have those same experiences while decreasing that footprint. I'm also curious as to the impact programs like this have on students' behavior and mindset in relation to the environment. Enjoy!

ES In Australia: Basic Info:

Time: alternate spring semesters (2010, 2012, etc.)

Eligibility: Bio 126 (Evolution and Diversity) OR ES 137 (Introduction to Environmental Studies) OR OR ES 226 (Conservation Biology)

Courses:

Biology 226 (Terrestrial Ecology)

Biology 224 (Marine Biology)

Sociology/Anthropology 222 (Cultural Anthropology)

Political Science 221 (Environmental Policy)

General itinerary:

Melbourne

Queenscliff

Great Otway National Park

Wilson's Promontory National Park

Jindabyne (Snowy Mountains)

Canberra

Sydney

Brisbane

Aborigine Camp/Other

Lamington Plateau

North Stradbroke Island

Carnarvon Gorge National Park

Bileola Cattle Station

Heron Island (Great Barrier Reef)

Brisbane



Cost:

\$10,010 over and above St. Olaf tuition (\$6455 above comprehensive fee) as of 2008.

For more information:

ES in Australia: www.stolaf.edu/depts/environmental-studies/australia/

Australearn: www.australearn.org

GED: globaled-designs.com

Travel

Transportation—particularly air travel—is the component of tourism with the biggest ecological consequences (Kuo 2009). Travel over long distances consumes fuel and emits carbon dioxide and other pollutants into the atmosphere. This means that the mode of transportation a tourist uses has a significant impact on the total environmental impact of the trip. A feature of the ES in Australia program that makes it different from many other study abroad programs is the amount of domestic travel throughout the semester—students rarely stay in the same place for longer than a week or two. As you can imagine, this significantly increases the “footprint” of the program.

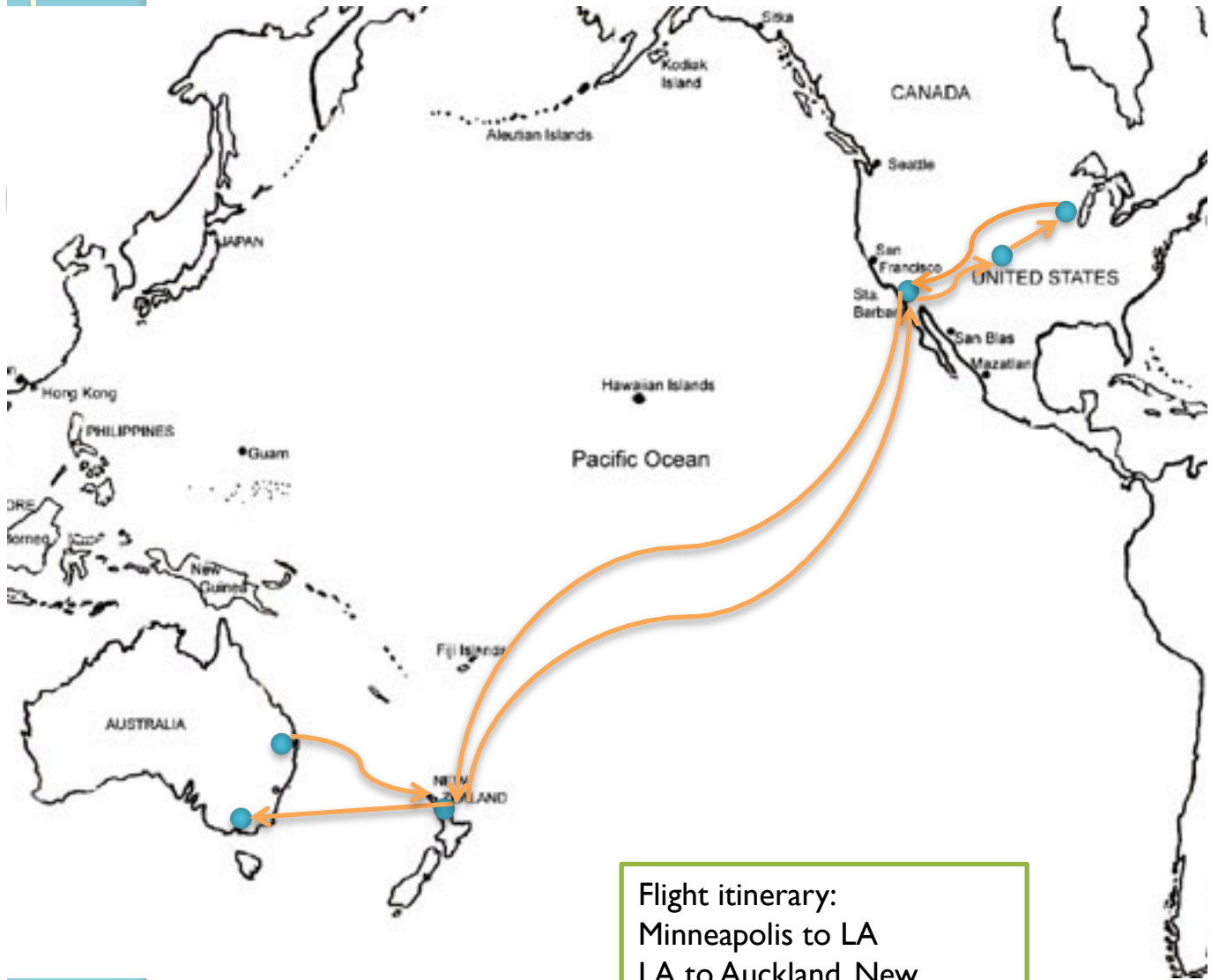
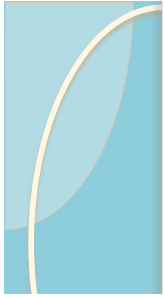
To calculate the CO₂ emissions from our travel to, from, and around Australia, I used an online carbon calculator from **Carbonfund.org**. For air travel emissions, the calculator assumes 0.18 kg CO₂ per passenger mile for long flights and .24 kg CO₂ per passenger mile for shorter flights. Rail travel is based on a 0.42 lbs CO₂ per passenger mile standard, and bus travel assumes .18 lbs CO₂ for long trips (over 20 miles) and .66 lbs CO₂ for short trips (20 miles or under). The information for the ferry is from **CarbonIndependent.org**, and assumes emissions of .2 kg/mile/passenger.

Like any kind of calculator, this isn't exact. However, it is a useful tool for determining the approximate amount of CO₂ emitted by our transportation.

For reference, Carbonfund estimates that the **average American emits 22.7 metric tons of CO₂ a year** through running their homes, driving their cars, air travel, food, electricity, etc.

Transportation Type	Miles	Metric tons CO ₂ (per person)
Coach Bus	2,516.93	0.205
Airplane	20,110	3.66
Car	257.87	0.067
Ferry	108.12	.022
Train	574.77	0.109

Total (individual)	23, 567.69	4.06
Total (group of 28)	659,895.32	113.76

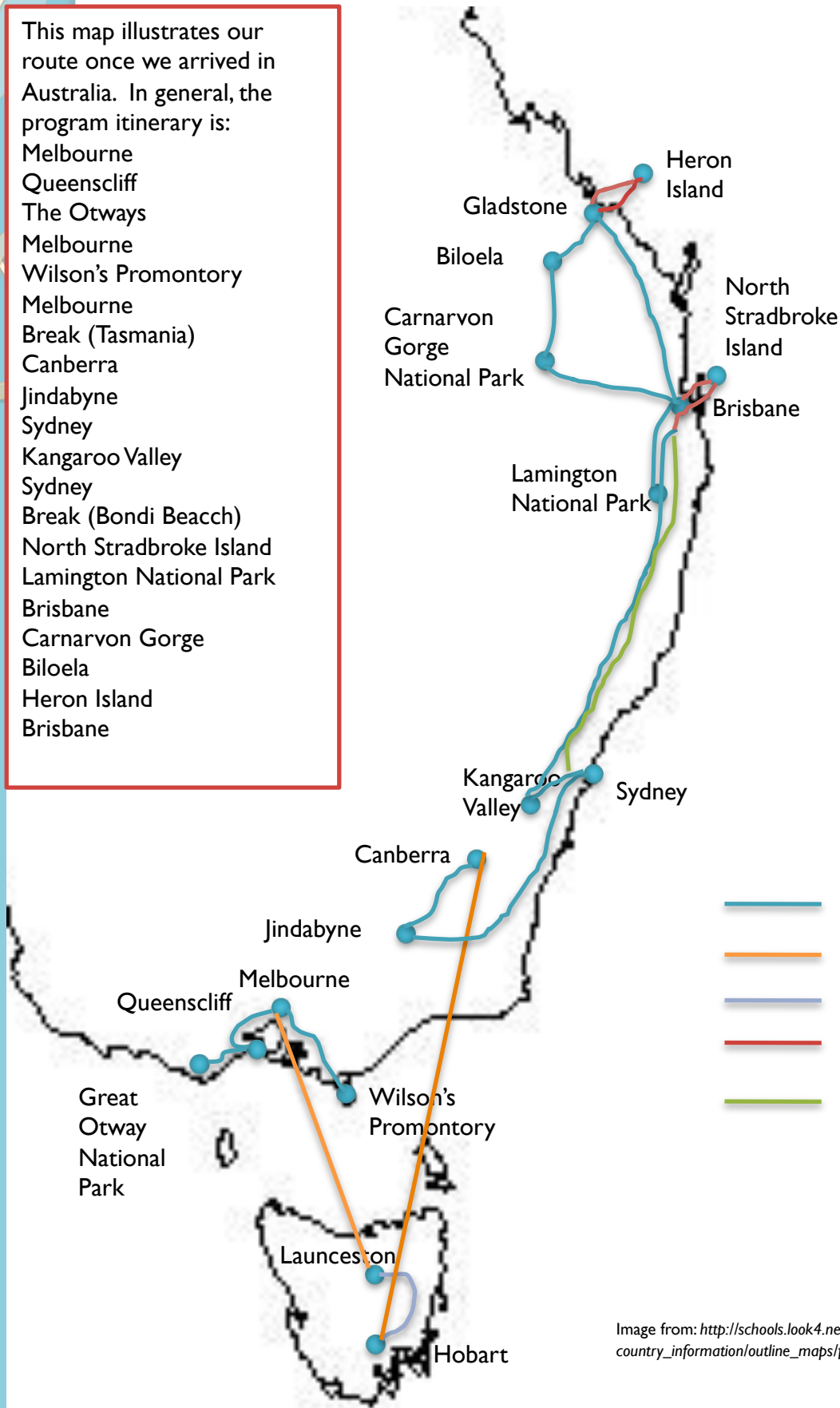


Flight itinerary:
Minneapolis to LA
LA to Auckland, New Zealand
Auckland to Melbourne
Canberra to Auckland
Auckland to LA
LA to Denver
Denver to Minneapolis



This map illustrates our route once we arrived in Australia. In general, the program itinerary is:

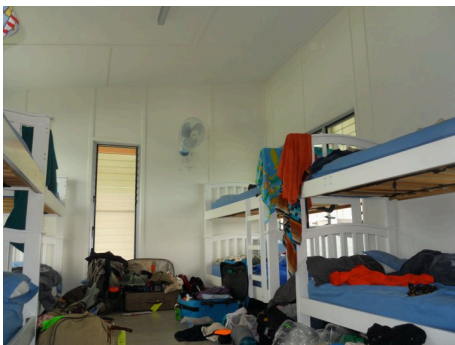
- Melbourne
- Queenscliff
- The Otways
- Melbourne
- Wilson's Promontory
- Melbourne
- Break (Tasmania)
- Canberra
- Jindabyne
- Sydney
- Kangaroo Valley
- Sydney
- Break (Bondi Beach)
- North Stradbroke Island
- Lamington National Park
- Brisbane
- Carnarvon Gorge
- Biloela
- Heron Island
- Brisbane



- Coach Bus
- Plane
- Car
- Ferry
- Train

Image from: http://schools.look4.net.nz/geography/country_information/outline_maps/files_OM/australia.jpg

Accommodations



From top: a campground in Lamington National Park, cabins in the Otways, and a bunkhouse on Heron Island.

Accommodations are another major source of ecological impact in the tourism sector. Like transportation emissions, the factors affecting energy usage and emissions in a given accommodation are many and varied, making them difficult to quantify. To gain a baseline estimate, I simplified our various accommodations into categories: hotels, cabins, backpackers, and campgrounds. A study by Becken et al. from Lincoln University in New Zealand used a similar delineation and found that energy consumption was highest in hotels and bed & breakfasts, dropping substantially in backpackers and campgrounds. The literature provided a range of values for both energy consumption and CO₂ emissions from different accommodations types. I used numbers from a study by Stefan Gössling, an expert in sustainable tourism, to calculate the energy use in the accommodations for our program.

The homestay component of the program was difficult to incorporate into this estimate—while individual family homes are fairly energy-intensive, the addition of a single individual to the home does little to increase consumption. Because of this, I decided to include the homestay in the “backpacker” category of Gössling’s.

This rough estimation yielded an approximate 1.27 metric tons of CO₂ emitted to house each traveler for the three and a half months of this program. As a frame of reference, Carbonfund’s calculator estimates that a four-person home in Northfield would emit roughly 5.52 metric tons over that same time period (1.38 per person). On the accommodation front, it seems, things come out fairly even.

Accommodation Type	Energy Use (MJ/visitor night)	CO2 Emissions (kg/visitor night)
Hotel	130	20.6
Cabin	90	14.3
Campground	50	7.9
Backpacker	25	4.0

*Source: Gössling

Accommodation Type	Number Nights	Energy Use (MJ/person)	CO2 Emissions (kg/person)
Hotel	25	3250	515
Cabin	37	3330	529.1
Campground	18	900	142.2
Backpacker	25	625	100
Total	105	8105	1286.3 (or 1.28 metric tons)

Accommodation Details

Location	Accommodation Type	Number Nights	Energy Use (MJ/visitor night)*	Total Energy Use (MJ/visitor)	CO2 Emissions (kg/visitor night)*	Total CO2 Emissions (kg/visitor)
Melbourne	Hotel	14	130	1820	20.6	288.4
Queenscliff	Cabin	6	90	540	14.3	85.8
Otways	Cabin	2	90	180	14.3	28.6
Wilson's Prom	Cabin	5	90	450	14.3	71.5
Tasmania	Campground	6	50	300	7.9	47.4
Canberra	Backpacker	4	25	100	4	16
Jindabyne	Cabin	5	90	450	14.3	71.5
Sydney	Hotel	8	130	1040	20.6	164.8
Kangaroo Valley	Cabin	5	90	450	14.3	71.5
Bondi Beach	Backpacker	6	25	150	4	24
Straddie	Cabin	3	90	270	14.3	42.9
Lamington	Campground	6	50	300	7.9	47.4
Brisbane	Private Home	15	25	375	4	60
Carnarvon	Campground	6	50	300	7.9	47.4
Biloela	Cabin	3	90	270	14.3	42.9
Heron Island	Cabin	8	90	720	14.3	114.4
Brisbane	Hotel	3	130	390	20.6	61.8

*Source: Gössling

Food

As anyone who has ever taken an environmental studies course knows, what we eat has a huge impact on the environment. Because ES in Australia is such a mobile semester, food is usually provided by a caterer that accompanies the group on portions of the trip. The rest of the time, students either cook for themselves, eat out, or eat with their homestay families. The centralized, family-style food distribution of a caterer is a pretty efficient way to go for programs like this. We rarely had food waste, although whether this is a testament to the set up or the metabolisms of the individuals involved is up for discussion. However, one way I could envision significantly lowering the ecological footprint of travel food is simple: serve less meat. In keeping with the culture of carnivorous Australians (livestock grazing takes up most of Australia's agricultural land), we had meat at nearly every meal (Australian Government). The USDA recommends only 5 to 6 oz of meat or meat equivalent a day—probably less than we were getting (USDA). Some research suggests that red meat is about 150% more GHG intensive, over average, than chicken or fish. It is also more water intensive: it takes roughly 16,000 liters of water to produce a kilogram of beef, but only 1350 liters to produce 1 kilogram of wheat (Weber and Matthews 2008, EPA Victoria). A casual heads-up to the caterers could do a lot to lessen the environmental costs of feeding a horde of hungry college students

To go a step further, students could make a concerted effort to eat local and in-season produce when they have the option to cook for themselves. These foods are recommended during the Australian autumn (March-May):

Sydney and New South Wales:

Apples, berries, kiwifruit, pears, persimmons, strawberries, beans, broccoli, capsicum, cauliflower, chilies, Chinese cabbage, mushrooms, okra, pecans, pumpkin, tomatoes, and white turnip.

Melbourne and Victoria:

Apples, figs, grapes, mandarins, melons, Valencia oranges, pears, strawberries, beans, Brussels sprouts, cabbage, cauliflower, celery, chilies, corn, cucumber, eggplant, parsnips, peas, spinach, squash, sweet potatoes, tomatoes, and zucchini.



Water

We use water for a lot of things. We need it for our showers, our toilets, and our washing machines. We use it to grow, process, and cook our food, to make coffee, to drink, and to swim in. We use it to manufacture items that we use daily. While we in Minnesota are lucky to have a relatively steady supply of clean water, many parts of the world aren't so lucky. Many people predict that water will be the defining environmental crisis of the 21st century (World Water Council).

Our water demands probably don't change a whole lot when we're traveling. However, the backdrop from which we take water does. Australian cities have clean and reliable water, but Australia overall is a dry, dry place—the driest inhabited continent, in fact (Australian Government). Climate forecasts are predicting that Australian rainfall will decline, particularly in the south, and that rain events will become more episodic (CRC for Sustainable Tourism). This means that even in cities, water is simply a much bigger deal in Australia than it is here.

Hands-on education about the effects of limited water on an entire continent makes the “water crisis” far more real than any number of books and articles read from the hydrated comfort of Minnesota ever could. While the dry Australian outback has its own kind of rugged beauty, there's no denying that it's a hostile environment for life. The point is obvious but easily forgotten in MN: water is important.

When casually surveyed, many of my 2010 travel buddies identified water conservation as the biggest “environmental lesson” they took from this program. In the words of one friend: “It made me use less water—WAY less water!”



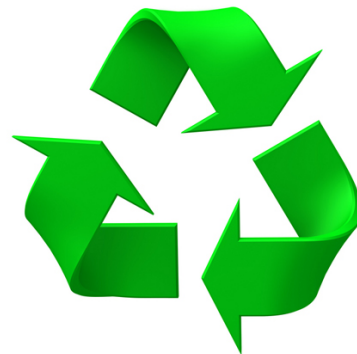
Walking through Melbourne (left), brings into question some of Australia's water policies—especially when contrasted with the obvious drought on these rangelands (right).

Miscellany

One big planetary pro for this trip: a 4-month power outage for our cell phones and laptop commuters. While a few people brought computers, most did not. Short, periodic sessions on public library computers were usually sufficient to stay in touch. In addition to the energy savings, our group came to the general consensus that life is more fun when you spend less time plugged in.

Waste is another significant environmental impact of tourism (and life in general). As a traveler, it's just as important to recycle and consume minimally as it is at home. Several of my friends mentioned that their recycling habits had improved dramatically after the program. This made me realize an intangible benefit of this type of academic experience: living in close community with environmentally-minded people can have a significant impact on beliefs and behaviors. Other changes participants noted: an increased consciousness of the environmental impacts of everyday life, a sense of urgency in addressing climate change, an increased awareness of space, an appreciation for the outdoors, and a smorgasbord of small habit changes (unplugging electronics, turning off lights, water conservation, limiting food waste, etc).

The value of intentional traveling communities is not easily quantified, but is a hugely important aspect of this program. It provides an opportunity for friendship, personal growth, and the internalization of an ecological consciousness that develops through lessons and experiences throughout the semester. This academic travel is a very specific type of travel, as it seeks to engage students in the physical and social processes of their changing surroundings.





Ecotourism

My gut reaction to the word “ecotourism” is not a good one. It makes me think of middle-aged accountants in Hawaiian shirts who combat the impending midlife crisis by patronizing “ecoresorts,” because it allows them to ethically justify paying exorbitant amounts of money to fly around the world and escape from everyday mediocrity. Something about the word “ecotourism” sounds inherently hypocritical.

Well, is it? Kind of. The best thing for the planet would probably be if we all just stayed put. But that’s not very exciting. So if we’re going to travel, might as well do it responsibly—and that’s where I decided that ecotourism deserved another shot.

Ecotourism Australia, an organization dedicated to promoting—you guessed it—ecotourism in Australia, defines ecotourism as “ecologically sustainable tourism with a primary focus on experiencing natural areas that fosters environmental and cultural understanding, appreciation, and conservation.” This is kind of vague. Essentially, the key to ecotourism is that it benefits the social and ecological environment of the destination, rather than exploiting them. The focus of the ecotourism movement is primarily on developing countries, as a means to provide jobs and build up economies. “Around the world, ecotourism has been hailed as a panacea: a way to fund conservation and scientific research, protect fragile and pristine ecosystems, benefit rural communities, promote development in poor countries, enhance ecological and cultural sensitivity, instill environmental awareness and a social conscience in the travel industry, satisfy and educate the discriminating tourist, and, some claim, build world peace” (Honey 4).

Ecotourism, ideally, provides a balance: tourists provide jobs and dollars to fund research and conservation, and in return they receive a vacation and an appreciation of unique and beautiful environmental phenomena they would otherwise never get to experience. This is also a temporal balance, as perfect ecotourism does not degrade the environment that is the source of its appeal, meaning that the industry can be sustained indefinitely. This is a lofty goal, and easily corrupted—hence my own skepticism towards ecotourism.

“At its best ecotravel promotes environmental conservation, international understanding and cooperation, political and economic empowerment of local populations, and cultural preservation. When ecotravel fulfills its mission, it not only has a minimal impact, but the local environment and community actually benefit from the experience and even own or control it. At its worst ecotravel is environmentally destructive, economically exploitative, culturally insensitive, “greenwashed” travel.”

--Deborah McLaren, *Rethinking Tourism and Ecotravel*

Is ES in Australia an example of ecotourism? In many ways, yes.

Tourism plays an enormous role in a lot of conservation projects; often, the “price tag” of a given ecosystem or species is determined solely on the basis of the tourism revenue it generates. The program fee that each student paid to go on this trip covered a lot of things: food, transportation, lecturers, housing, etc. It also covered the entrance fees into a series of National Parks and conservation areas. These fees help the parks operate, preserving some of the most beautiful and unique ecosystems in the world, funding monitoring and research, and maintaining hiking trails that allow visitors to experience the park with minimal impact.

Sometimes, increased tourism actually can go a long way towards preserving natural areas. A study of World Heritage Sites—designated as such for their ecological and cultural significance—suggests that listing an area as a World Heritage Site both increased tourism to the site and played a positive role in its conservation (Tisdell 2010).

Australia is the home of seventeen World Heritage Sites, including the Great Barrier Reef, the Gondwanan rainforest in Lamington National Park, and the Sydney Opera House.



From top: a waterfall in Lamington National Park, a close-up of coral and a sea turtle—both residents of the Great Barrier Reef. Left: The Sydney Opera House.

Australia's National Parks

Central to Australia's tourism (or ecotourism) industry is its national parks. Australia has one of the best-developed national parks systems in the world, covering a range of diverse ecosystems. Overall, 7.85% of Australia's total land mass falls in designated protected areas. However, the creation and management of national parks is primarily designated to state governments (Australian National Parks).

Australia is divided into six states: Queensland, Western Australia, South Australia, New South Wales, Victoria, and Tasmania. Some areas are designated "territories," and these include the Northern Territory and the Australian Capital Territory.



ES in Australia travels through the states of Victoria, New South Wales, and Queensland (and Tasmania, in some cases). The program teaches students a significant amount about the management systems these states use to govern their national parks, in addition to the ecology of the parks themselves. Although going into detail about all of these organizations would be redundant, I do want to highlight one organization: Parks Victoria.

Image from: http://upload.wikimedia.org/wikipedia/commons/1/16/Australia_location_map_recolored.png

Parks Victoria

The benefits of national parks to a society are environmental, social, and economic. But since money is necessary to keep parks operating—not to mention a driving force in most governing decisions—the economic value of parks is perhaps the biggest driver of management decisions. Parks Victoria is one example of a management system that capitalizes on the non-consumptive use of natural resources to benefit the state government.



The Twelve Apostles are a part of Port Campbell National Park

Defining itself as “the custodian of a diverse estate of significant parks in Victoria,” Parks Victoria is committed to preserving the environmental and cultural value of its parks while engaging in comprehensive environmental policy, planning, and research. Parks Victoria relies heavily on spending by tourists, both directly (within the parks) and indirectly (the money that tourists attracted by the parks bring to other businesses in the region).

A study by PrincewaterhouseCoopers in 2003 estimated the economic value of the three major parks in Victoria: Grampians National Park, Port Campbell National Park, and Wilsons Promontory National Park. Together, these three parks contribute \$486.6 million annually to Victoria’s economy (Parks Victoria).




Tidal River, Wilsons Promontory

Wilson’s Promontory contributes roughly \$50.2 million annually to Victoria.

Additionally, its Total Recreational Value was estimated at \$11 million (in 2003). This is different from its \$50.2 million economic value because it reflects the amount that surveyed visitors were willing to pay to enjoy the park (rather than the actual expenditure derived from park use).

“The Prom” is a peninsula of forested granite mountains, sloping down to headlands and sandy beaches. It’s covered in eucalypt forest, rainforest, fern gullies, swamps and heathland, and is home to 700 native plant species, 30 kinds of mammals, and around 180 bird species.

Tourism in and around The Prom supports 9% of the local workforce.



A publication put out by Parks Victoria offers the following guidelines to responsible park users:

Group Sizes

- Maximum of 25 people
- Split into smaller groups for intertidal activities
- For in-water activities such as canoeing and snorkeling, lower group : leader ratios should be adopted
- Smaller groups improve safety and provide protection of natural values

Operator Permits

- Commercial tour operators must obtain a permit
- Permit holders are responsible for managing their group
- All groups undertaking research within the parks are required to obtain a permit from Parks Victoria

Responsible Handling

- All organisms and rocks should be returned to their original locations and orientations if disturbed
- Marine life (animals) should be kept in water when displaying them
- Organisms can be viewed underwater using sea scopes or clear containers
- Ensure that no animals or plants are unduly stressed or damaged during activities
- No animals should be killed
- No tools should be used to dislodge animals eg. knives, keys
- Large wildlife should be viewed from a non-intruding and safe distance

Wildlife Conservation Issues

- Excursions should avoid locations and times of year when there are critical events occurring (such as bird breeding on islands)
- When walking on beaches groups should keep close to low tide mark in hooded plover nesting areas
- Understanding why certain areas cannot be accessed during critical times should be promoted
- Highly sensitive areas (like saltmarsh and other fragile habitats) should be avoided by groups
- Sensitive areas will be identified and made known to operators

Codes of Practice

- A code of practice should be developed by education and interpretation providers that reflect the protection of natural and cultural values along with safety
- Parks Victoria will provide guidance to ensure minimal impact code of practice is understood by all operators

Paraphrased from "Minimal Impact Education/Interpretation Guidelines for Victoria's Marine National Parks and Marine Sanctuaries."Victoria, Healthy Parks/Healthy People, and Parks Victoria.

Values

- Parks Victoria provide a number of key messages for Marine National Parks and Marine Sanctuaries that should be included in all education programs as part of the introduction to the site
- All activities within the parks must be conducted as “no-take” activities for all animals, plants, shells, sand, seaweed, and other artifacts
- Providers should promote awareness of the positive changes brought about by establishing protected parks and sanctuaries

Cultural Respect

- Awareness of cultural sites that exist within Parks along the coast and respect for these areas should be promoted
- Local Aboriginal groups should be consulted in developing interpretation/ education programs for indigenous cultural sites

Minimal Impact Adventure Activities

- Use only specified locations for high-impact activities (like water access for snorkeling and canoeing)
- Ensure that beginners in activities like snorkeling, diving, and canoeing conduct them in more resilient environments

Personal Responsibility

- Understanding impacts on parks through visitor behavior should be promoted
- Awareness of impacts of personal behavior at home on marine and coastal environments (storm water litter, nutrient runoff, etc) should be promoted
- Collection of litter on hikes should be encouraged, as should involvement in activities to reduce human impact on coastal environments

Access

- Stay on the tracks to avoid disrupting habitat



Culture

The opportunity to become immersed in another culture is one of the primary motivations for many students to study abroad. However, it was (personally) an insignificant factor in my decision to participate in ES in Australia—since I was traveling with a St. Olaf group, I figured my opportunities to really embrace a different culture would be minimal. Besides, I naively assumed that the well-developed, culturally “western” Australia would simply be a laid-back version of America against a backdrop of venomous snakes, kangaroos, and koalas.

ES in Australia is not the type of cultural immersion that a semester-long homestay or enrollment in a foreign university would provide. However, I was pleasantly surprised as to the degree of attention culture and history were given in the study of the Australian environment. With an entire course dedicated to Cultural Anthropology, we received a crash course in the history and social structure of both white Australians and Indigenous Australians.

As the section on Ecotourism outlined, attempting to understand the culture and history of a place you’re visiting is an essential component to responsible travel. While it’s not likely that an American will make a cultural faux pas in Melbourne, Brisbane, or another major and cosmopolitan city, reconciling tourism with Indigenous Australian culture is another issue altogether. For one thing, there is no “Indigenous culture” as the term “aboriginal” or “indigenous” could refer to any of over 250 different language groups that occupied Australia before European settlement—each with its

own stories, law, and unique history.

This map gives some indication of the sheer number of indigenous nations that existed in Australia at one time. While I don’t want to generalize amongst these groups, one overarching theme of indigenous culture that emerged in our program was a close tie between indigenous people and certain areas of land.

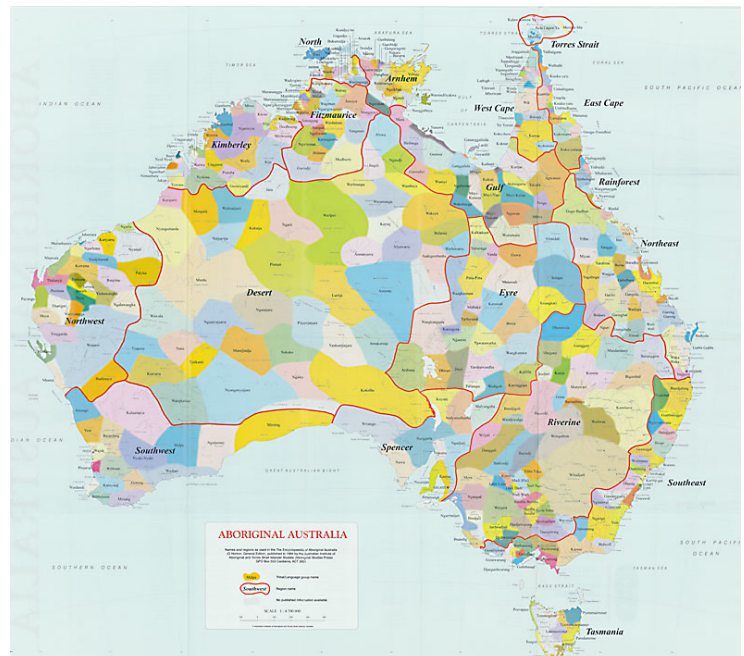



Image from: <http://www.mos.umu.se/CCEng/files/44018.jpg>



This has posed a serious problem for the survival of indigenous cultures. Australia's colonial history is long and bloody, and the treatment of Australian indigenous people by the white majority is moderately appalling (although shamefully similar to the U.S.). Soon after contact with the British, many aboriginal populations were wiped out by smallpox, measles, and other diseases. Shortly thereafter, the British began to alter the landscape by converting it to agriculture and grazing lands. Indigenous people were killed, removed from their land, and their children taken away—in what is known as the “Stolen Generation,” many children were removed from their families and taken to missions where they were taught to blend in to white culture.

In 2008, then-Australian Prime Minister Kevin Rudd offered a formal apology to his nation's indigenous population on behalf of the past and present government. Although the situation of indigenous Australians has significantly improved since the years of the Stolen Generation, it leaves much to be desired. Like many American Indian reservations, indigenous Australian communities have high rates of alcoholism, drug abuse, diabetes, and violence. With their cultural ties to the land disrupted by forced moves and developments, many people feel uprooted and are having trouble maintaining cultural practices. Most national parks give a nod to the Aboriginal Traditional Owners of their land. Although it's a small gesture, it's important as tourists to keep in mind the traditional owners of the country we pass through and to treat it with respect.

Besides lectures and everyday life, the “cultural” education of ES in Australia involved several components. In 2010, one was a weeklong stay at an “Aboriginal Camp” designed to simulate the historical way of life of Australia's indigenous people. “Ab Camp” was an interesting study in one group's attempt to carry on and educate others about their culture. The 2012 edition of ES in Australia is substituting this experience for a week spent engaging in a service project with the Park Service and a local indigenous group.

The other big component of this course is a 2-week homestay with families in Brisbane. Like any homestay, this resulted in a range of experiences and some interesting insights into the life of suburban Australians. While Australia does resemble America in many ways, to assume there are the same would be to ignore a culture that is fascinating and often contradictory. I don't think it's safe to say that you can ever fully “get” a culture that is not your own, but I am certainly grateful to have gotten a glimpse of Australia's.

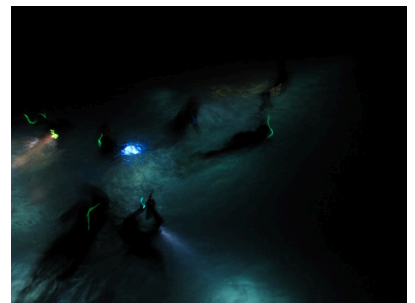
Heron Island

One of the most charismatic destinations of this program is Heron Island, a small sand cay in the Capricorn-Bunker group of the Great Barrier Reef.

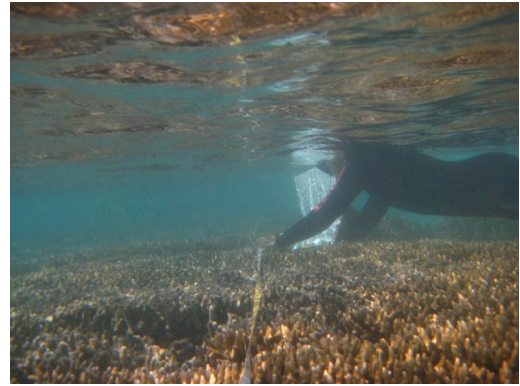
Heron Island is home to a fancy resort and the Heron Island Research Station (the St. Olaf students' home for a week). HIRS is an internationally recognized marine research and education facility operated by the University of Queensland; it is an important collection site for long-term oceanographic data and an integral part of the Great Barrier Reef Ocean Observation System.

In addition to gathering important scientific information, education is a primary goal of HIRS and an important source of its funding. Groups like ES in Australia, as well as Australian schoolchildren, come out to the island to learn about marine science and the importance of reef conservation. I think it would be physically impossible to visit Heron Island and not fall in love with reef ecosystems. Bringing the academic background of reef ecology into the awe-inspiring physical space gives students a level of appreciation for the reef's intricacy and beauty that would not be possible on a casual touristy snorkel (at least, in my opinion).

Coral reefs are formed by many individual coral polyps, which live in colonies and secrete calcium carbonate skeletons that form the reef structure. Corals live symbiotically with algae called zooxanthellae, which provide the coral with energy and nutrients in return for shelter. Over vast periods of time, the coral grow and die and the living colonies build upon the structure that the dead corals leave behind. Cays like Heron Island are formed when dead coral rubble is eroded away, compacted, and cemented together as algae grows on it. The rubble is condensed into reef rock, which forms the basis of the island. Eventually sand accumulates on top of the reef rock, plants and animals colonize it, and a beautiful tropical paradise is born. But it's a dynamic system: due to the wind and ocean currents, Heron Island is actually shifting slightly over time as the reef rock erodes on one side and accumulates on the other. This living, growing, shifting coral bed provides an astonishing rich ecosystem for a whole host of fish, invertebrate, and algae species with complex trophic relationships.



From left: Heron Island, a ray swimming in the shallows, and a group of St. Olaf students on a night snorkel.



Personally, our visit to Heron increased my sense of urgency regarding climate change and global warming. It gave me a place to be connected to, a physical location that would be impacted far more and far sooner than the other places I feel a connection to (which are mostly in the resilient, landlocked Midwest).


Understanding the delicate balance that is a coral reef ecosystem made understanding the threat to places like the Great Barrier Reef much easier. Soil from Queensland frequently washes into the GBR after heavy rainstorms, damaging the coral. Coral is also very particular about temperature, and temperature fluctuations result in bleaching events (when the polyps become stressed and expel their zooxanthellae). Although coral can recover from bleaching, it gets permanently damaged if these events occur too frequently. Another predicted effect of higher atmospheric CO₂ concentrations is a drop in the pH of the world's oceans; more acidic oceans would impede the ability of coral to secrete the calcium carbonate shells that compose their structure. A warming Pacific also threatens the current patterns of El Niño, which relies on the sinking and upwelling of water masses due to differing temperatures.

As ocean currents change, fish and squid that are moved by the currents tend to move farther offshore, often too far for land-dwelling creatures (like Heron Island's substantial and endearing mutton bird population) to reach them.

Recently, a collaborative project called the Free Ocean Carbon Enrichment experiment was installed on the reef crest of Heron Island. This experiment is designed to chemically alter water flowing over a section of Heron's reef for an extended period of time, to gain a better sense of the impact climate change and ocean acidification could have on reefs. The system adds low pH water to experimental chambers on the reef, simulating the predicted effects of atmospheric CO₂ enrichment in the next 50-100 years. Hopefully, research like this will enable scientists and policymakers around the world to better brace for—and hopefully mitigate—the effects of climate change.

“Guldberg [a marine scientist at the University of Queensland] wants people to understand what ecologists know: **What happens on Heron Island is connected to every other place, even thousands of miles away.**”

-“Pacific Island Cultures Brace of Climate Change,” NPR



All in all, I think the ES in Australia program does a good job of facilitating environmental tourism in a relatively low-impact manner. Far and away, the greatest impact of the program is the CO₂ emissions from air travel—which are pretty unavoidable. But there are some major ways this program is already pretty good:

- The bus: on a per-passenger basis, this is actually a fairly efficient way to travel (much better than a fleet of cars, were we all traveling independently).
- The duration: if you're going to travel overseas, you get a lot more bang for your buck (and your CO₂ emissions) if you stay for a while.
- The education: combining tourism with a range of academic courses is beneficial to both the students and the host country, as it facilitates more responsible tourism.
- The group aspect: traveling in an intentional community has intangible but very real benefits in terms of personal growth and the development of an ecological ethic.

Recommendations for the program

1. **Carbon offsets:** Offsets are a major way that many travel companies boast of “going green.” While not the magic bullet they are sometimes marketed as, paying a sum to finance conservation projects that will theoretically mitigate CO₂ emissions is a reasonable place to start for lowering the footprint of a study abroad experience. It would cost each individual on the 2010 Australia trip \$40.41 to offset emissions from transportation alone through Carbonfund. With that option, the money would go towards financing renewable energy, energy efficiency, and reforestation projects around the world. Another option would be to utilize the framework of STOCARB, which the St. Olaf musical groups use to offset their tour emissions by partnering with local farmers who engage in no-till agriculture.
2. **Reduce meat on the menu:** Challenge students eat as vegetarians for part or all of the program. While maintaining energy and cultural sensitivity is important, one huge advantage of the large-group-with-caterer model is that it gives program organizers a degree of control over the ecological footprint of food. Obviously, students should try the occasional meat pie and kangaroo steak and whatever their host families cook. But budgeting more vegetarian options into the menu could cut down on the group's impact in a big way.
3. **Choose accommodations with care:** While most of this program's accommodations are cabins, campgrounds, or other relatively low-impact varieties, rethinking the hotel stays could also go a long way towards reducing energy consumption and CO₂ emissions. By staying in backpackers instead of hotels and encouraging students to use hostels and campgrounds over breaks, ES in Australia could probably cut back on both environmental impact and cost.



Recommendations for individuals

Many of the lifestyle changes that individuals can make at home also apply when you're a tourist. A few ideas:

- Pack light—more baggage weight means more fuel to transport you and your stuff. Plus it's easier to walk (instead of take a cab) when you have less to haul.
- Eat locally and seasonally. Since you're in a new place, you might as well enjoy that in the culinary sense.
- Don't eat out for every meal. Restaurants usually generate more food waste than individuals. Plus, cooking for yourself occasionally is cheaper.
- Take short, cold(er) showers.
- Recycle books and brochures
- When you're staying in a city, use public transportation! Melbourne and Brisbane both have pretty good public transit systems to get around, which are cheaper (and usually more entertaining) than a homestay parent's car or a taxi. Walking is also a great way to get places *and* see the city.
- Don't transport plants, seeds, and fruits between countries. Australian airports are fanatic about checking, but save them the trouble and just don't do it.
- Reduce waste—take (and use) only what you need.
- When visiting parks, split into smaller groups, stay on the trail, and don't take anything (common sense, but worth mentioning).
- The injustice done to Indigenous Australians is not a problem that an individual tourist (or even a bunch of tourists) can solve. But one can be knowledgeable and informed, and can exercise discretion in souvenir-buying and recreation activities. Many Indigenous groups preserve their culture by selling crafts to tourists. However, many gift shops also exploit the romanticized notion of "the native" with cheap boomerangs and dot paintings that are mass-produced overseas with little (if any) of the money making it back to actual Indigenous communities. On this point, common sense can take you a long way.
- Use low-emission modes of transportation (like trains) over breaks.

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