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Catchment Management

Senior Geography
Fieldwork Sites and Activities

Acknowledgement

All field work activities occur on land which has been cared for and managed over tens of thousands of years by Indigenous people. We acknowledge their custodianship of the country we walk on and pay our respects to their elders, past, present and emerging.

Duggan Park, Toowoomba

[*Note*: Duggan Park at this stage has no toilet facilities. The nearest facilities are at Picnic Point, a 5 minute bus drive away. Portable toilet hire is also an option.]

J. E. Duggan Park at the corner of Leslie and Collier Streets in Toowoomba is an 8-hectare bushland park on Toowoomba's eastern escarpment, not far south of Picnic Point. One limiting factor for this site is that it does not at present have toilet facilities. For an extended field excursion, portable toilet hire is an option.

In late 2007, a prescribed burn occurred in Duggan Park which began as a 'cool' fire but progressed into a hot burn. The effects of this on vegetation can still be observed.

Senior Geography Unit 1: Natural & Ecological Hazards

Depth study of a natural hazard (e.g. effects of drought or fire) or an ecological hazard (e.g. invasive species or disease).

1. Natural hazards

In 2007, a prescribed burn occurred in Duggan Park which began as a 'cool' fire but progressed into a hot burn. The effects of this on vegetation can still be observed.


LOCAL NEWS

Environmentalist devastated by 'bonfire and massacre'

Park burn-off sparks angry cry of protest

Article from the Toowoomba Chronicle

Community concern following the fire highlighted several issues, including:

- A lack of community consultation prior to the event
- Differences of opinion between FEP members and environmentalists on the one hand, and some local residents on the other, as to how Duggan Park should be developed and managed
- A possible lack of clarity/understanding around the purposes for the fire – reducing fuel loads (and thus reducing fire hazards for local residences) and ecological regeneration may require different kinds of fire.

Field activities could include:

- Assessing the effect of hot and cool fires on biodiversity. (E.g. what is the effect of hot and cool fires on the density or distribution of particular species such as Oleander Wattle *Acacia neriifolia*, Forest She-Oak *Allocasuarina torulosa* or Sandalwood *Santalum lanceolatum*?).
- Assessing fuel loads currently in the park and determining options for managing this. (What is the balance between ecological and urban development imperatives? For example, fallen timber and dead plant matter is essential for plant and animal habitat, but represents a fire risk for local homes. The many pioneer wattles which became abundant in the 'hot fire' areas, chiefly *Acacia neriifolia*, are now reaching the end of their lifespan and beginning to die off, adding to fuel loads. Yet the park's

ecological values are important for aesthetic and recreational activity, as evidenced by recent walking track upgrades and signage about native plants and animals.)

- Assessing how management practices in the park have affected fire risk through preparedness, mitigation, prevention and adaptation. (Friends of the Escarpment Parks, whose volunteers have managed weeds and helped maintained the park for many years are often happy to provide a speaker on a field excursion day to address these issues from their perspective.)

2. Ecological hazards

Friends of the Escarpment Parks have been managing weed infestation at Duggan Park over many years.

The introduced Ochna serrulata

Field activities could include:

- Assessing the prevalence of non-native species and the effectiveness of weed management in the park.
- Using the Invasion Triangle model to assess the likelihood of success for particular weed species in the park. (E.g. Ochna *Ochna serrulata*, Lantana *Lantana camara* or Basket Asparagus Fern *Asparagus aethiopicus*. Amaroo can provide site-specific fact sheets and activities for these species if needed.)
- Specific activities, depending on the characteristics of the chosen invasive species, could include:
    - basic plant identification
    - soil testing (nutrients, pH etc.)
    - using a belt transect + quadrats to survey frequency/density of the target weed species, canopy cover, ground cover, competitor species and the ecological condition of the site
    - surveying invertebrates to gauge presence/absence of predators

Senior Geography Unit 3: Land Cover Transformations

Depth study investigating the link between land changes and biodiversity, and depth study investigating land cover change.

- Examining the work of Friends of the Escarpment Parks (FEP) and/or Toowoomba Regional Council as local initiatives designed to address the effects of biodiversity loss and/or land cover change. Activities could include:
    - observing evidence of the work of these groups (e.g. development of paths to provide visitor access while lessening trampling of other areas; provision of facilities such as car parking to encourage visitors; planting formerly degraded areas with native species; signage to educate/inform the public about local native plant and animal species; weed management)
    - examining the prevalence of factors which may degrade the area (e.g. weed infestation, erosion, public behaviour within the park, feral animals). FEP members are sometimes willing/able to speak to students on field excursions

- Land transformation and degradation can be discussed in the context of Indigenous land management practices such as use of fire. Amaroo can assist with contacts in local Indigenous groups who may be willing to speak about these practices.

Examining the current and pre-clearing extent of the endangered Regional Ecosystem represented at Duggan Park, and implications for native plants and animals (e.g. reduced connectivity and impacts on maintaining regeneration and genetic diversity; increase in edge effects from fragmentation of the ecosystem). Edge effect, for instance, could be investigated through sampling edge and 'core' habitat for incidence of introduced species.

Irongate Conservation Park near Pittsworth

Irongate Conservation Park is a 29-hectare reserve which protects an endangered Brigalow-Belah ecosystem with vine scrub understory. It also features an area of Mountain Coolibah woodland with a grassy understory.

The Park has basic toilet facilities and is a 10 minute drive from Pittsworth.

Senior Geography Unit 1: Natural & Ecological Hazards

Depth study of a natural hazard (e.g. effects of drought or fire) or an ecological hazard (e.g. invasive species or disease).

Ecological hazards

Pittsworth Landcare, together with rangers from the Queensland Parks and Wildlife Service, has been managing weed infestation at Irongate CP over many years.

Mother of Millions infestation

Field activities could include:

- Assessing the prevalence of non-native species and the effectiveness of weed management in the park.
- Using the Invasion Triangle model to assess the likelihood of success for particular weed species in the park. (E.g. Mother of Millions *Bryophyllum delagoense* or African Boxthorn *Lycium ferocissimum*. Amaroo can provide site-specific fact sheets and activities for these species if needed.)
- Specific activities, depending on the characteristics of the chosen invasive species, could include:
    - basic plant identification
    - soil testing (nutrients, pH etc.)
    - using a belt transect + quadrats to survey frequency/density of the target weed species, canopy cover, ground cover, competitor species and the ecological condition of the site
    - surveying invertebrates to gauge presence/absence of predators
- Examining the work of Pittsworth Landcare and/or the Queensland Parks and Wildlife Service at Irongate CP as local initiatives designed to address the effects of biodiversity loss and/or land cover change. Activities could include:
    - observing evidence of the work of these groups (e.g. development of paths to provide visitor access while lessening trampling of other areas; signage to educate/inform the public about local native plant species; weed management)
    - examining the prevalence of factors which may degrade the area (e.g. weed infestation, agricultural spray drift, lack of connectivity to other habitat areas,

feral animals). Pittsworth Landcare members are sometimes willing/able to speak to students on field excursions.

- Land transformation and degradation can be discussed in the context of Indigenous land management practices such as use of fire. Amaroo can assist with contacts in local Indigenous groups who may be willing to speak about these practices.
- Examining the current and pre-clearing extent of the endangered Regional Ecosystem represented at Irongate CP, and implications for native plants and animals (e.g. reduced connectivity and impacts on maintaining regeneration and genetic diversity; increase in edge effects from fragmentation of the ecosystem). Edge effect, for instance, could be investigated through sampling edge and 'core' habitat for incidence of introduced species.

Senior Geography Unit 3: Land Cover Transformations

Depth study investigating the link between land changes and biodiversity, and depth study investigating land cover change.

- Examining the work of Pittsworth Landcare and/or the Queensland Parks and Wildlife Service at Irongate CP as local initiatives designed to address the effects of biodiversity loss and/or land cover change. Activities could include:
    - observing evidence of the work of these groups (e.g. development of paths to provide visitor access while lessening trampling of other areas; signage to educate/inform the public about local native plant species; weed management)
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Goomburra Valley & Dalrymple Creek

Dalrymple Creek stretches from the Goomburra section of Main Range National Park through camping areas/farmland in the valley and the township of Allora to join the Upper Condamine river system. It provides three points of comparison for water quality assessment: the relatively pristine environment at Poplar Flat Camp Ground near the head of the creek; the more heavily used and peopled recreation and camping grounds; and the golf course at Allora.

Dalrymple Creek near Poplar Flat Camping Area

Toilet facilities are available.

Senior Geography Unit 1: Natural & Ecological Hazards

Depth study of a natural hazard (e.g. effects of drought or fire) or an ecological hazard (e.g. invasive species or disease).

Three sites in the Goomburra Valley are usually available for field work: the Poplar Flat area within Main Range National Park, the nearby Gordon Country campground and the golf course area where Dalrymple Creek passes through Allora.

1. Natural hazards

If there have been significant recent climate/weather events, a study could be made of the effects of flooding, storm or drought on Dalrymple Creek and the surrounding Goomburra valley.

Field activities could include:

- Assessing the biotic and abiotic indicators for water quality in Dalrymple Creek to compare with data from non-flood/drought periods.
- Assessing the effects of flooding/drought on recreational activities and business enterprises in the Goomburra valley (e.g. camping in National Park areas, commercial campgrounds, farms). Issues such as water quality, road conditions, general amenity, loss of crops/stock and environmental damage could be considered in the field.

2. Ecological hazards

Field activities could include:

- Assessing the prevalence of non-native species and the effectiveness of weed management at one or more of the three sites.
- Using the Invasion Triangle model to assess the likelihood of success for particular weed species at one or more of the sites. (E.g. Lantana *Lantana camara* at Poplar Flat. Amaroo can provide a site-specific fact sheet and activities for this species if needed.)
- Specific activities, depending on the characteristics of the chosen invasive species, could include:
    - basic plant identification
    - soil testing (nutrients, pH etc.)

- using a belt transect + quadrats to survey frequency/density of the target weed species, canopy cover, ground cover, competitor species and the ecological condition of the site
- surveying invertebrates to gauge presence/absence of predators

Senior Geography Unit 3: Land Cover Transformations

Depth study investigating the link between land changes and biodiversity, and depth study investigating land cover change.

- Examining the work of the Queensland Parks and Wildlife Service at Poplar Flat as an initiative designed to address the effects of biodiversity loss and/or land cover change. Activities could include:
  - observing evidence at Poplar Flat of the work of the QPWS (e.g. development of fences, paths and facilities to provide for visitor use while lessening trampling of other areas; signage to educate/inform the public about local native plant species; weed management)
  - examining the prevalence of factors at poplar Flat which may degrade the area (e.g. weed infestation, public misuse, grazing, feral animals).
- Comparing ecological condition/biodiversity at the three main sites (e.g. abundance of introduced weed species, water quality). The different sites could be investigated through sampling for variation in water quality, vegetation biocondition and/or incidence of introduced plant species.

Curriculum links to field work activities – content descriptions

UNIT 1 Natural and ecological hazards

The nature and causes of the selected hazard and how the activities of people can intensify its impacts (ACHGE016/ACHGE022)

The magnitude, frequency, duration, temporal spacing and effects of the hazard (ACHGE017/ACHGE023)

The spatial distribution of the hazard, and how an understanding of biophysical and human processes can be used to explain the patterns that are identified (ACHGE018/ACHGE024)

The physical and human factors that why some places are more vulnerable than others (ACHGE019/ACHGE025)

The sustainable policies, procedures and practices designed to reduce the impacts of the hazard through preparedness, mitigation, prevention and adaptation (ACHGE021/ACHGE027)

UNIT 3 Land cover transformations

Indigenous peoples' land management practices and their impact on land cover over time including those of Aboriginal and Torres Strait Islander Peoples. (ACHGE070)

Human-generated land cover change and its consequences including: the competitive advantages of indigenous and introduced species; the balance within each of these groups; and the effects such changes might have on land cover changes and biodiversity (ACHGE073)

A local initiative designed to address the effects of biodiversity loss or change (ACHGE082)

Approaches to land cover restoration and rehabilitation, and the mitigation of future land cover changes, for example, debt-for-nature swaps and preservation strategies (ACHGE083)

A program designed to address the issue of land cover and its consequences at a local (for example, coast dune rehabilitation, urban zoning regulations) (ACHGE084)

The selected program's environmental, economic, and social benefits and costs (ACHGE085)

An assessment of the program's effectiveness (ACHGE086)