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THE DEVELOPMENT OF A MOSAIC FIRE REGIME USING 'WIND BURNS' FOR THE CHEYNE BAY COASTAL RESERVE.

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INTRODUCTION

Cheyne Bay coastal reserve (R31240, R14986, R14987) is located on the south coast between Cape Riche and the Beaufort Inlet some 100 kms to the east of Albany and 15 kms south of the township of Wellstead (Map 1). It is the largest area of bushland in the Wellstead district totalling over 10 500 hectares. In 1994 a severe summer wildfire caused massive destruction in the eastern end of the reserve causing safety concerns for the community when the fire escaped into nearby farmland.

The Wellstead community has always had an interest in learning about the biodiversity of the district. Over a decade ago the community was involved in various field surveys from which they later published; *Birds of the Wellstead District* 1991, *Eucalypts of the Wellstead District* 1992, *Banksias of the Wellstead District* 1994, *Mammals of the Wellstead District* 1987 and soon to be published *Acacia's of the Wellstead District.*

The Wellstead community has also had a strong interest to undertake and initiate better management of the large, mainly unvested coastal reserve. In 1997 they began work on *The Cheyne Bay Coastal Survey – Cape Riche to Pallinup River*. Consultants were employed to examine physical and biological features of the reserve including surveys of the indigenous flora and fauna. Information on the Aboriginal and European history of the area was also collated. Weed and Dieback (*Phytophthora cinnammomi*) outbreaks were mapped and the impacts of recreational activities and fire were also examined. In 1999 the *Cheyne Bay Management Plan* was produced in consultation with the Wellstead Land Conservation District Committee (LCDC) the City of Albany and the Department of Conservation and Land Management (CALM).

Significant biological records for the reserve include; three Declared Rare Flora (DRF) species, two presumed extinct flora and thirteen plant species listed on the *Priority Floral Species List* (CALM). Two bird species and one reptile species have also been recorded within the reserve and are listed on the *Threatened and Priority Fauna Lists* (CALM).

The *Cheyne Bay Management Plan* recommended that a fire regime needed to be devised that not only considered the safety of life and property but would also ensure protection of flora and fauna, including rare or endemically restricted species. The Fire Emergency Service Authority (FESA) consequently recommended that a fire management plan be prepared which addressed fire prevention, mitigation and suppression within the coastal reserve area and surrounding land.

COMMUNITY DECIDES ON A SUITABLE FIRE REGIME.

Due to the 'unvested' status of most of the reserve no local government agency was willing to be actively responsible for ensuring the fire management of the reserve. Members of the Wellstead community therefore began to devise a plan to develop a fire regime for the Cheyne Bay reserve which took into account both property protection and biodiversity protection. The Wellstead community recorded the fire history of the reserve for the past 35 years (refer to Table 1.)

Table 1: A summary of the approximate dates and apparent causes of fire events in the Cheyne Bay coastal reserves within the last 35 years. It should be noted that there is no official record of a fire being caused in the reserve by lightning strike. Most causes have been related to human activities.

Date	Description of Event
1960	Two fires escaped from Location 6230, 'Blackboy Hill', and passed through Location 6854, 'Jindalee', burning through the study area on to the Pallinup River. Another fire escaped from the same Location 6230 and burnt through Reserve 31240 and down to the coast at Cape Riche.
March 1981	Fire started at Boat Harbour campsite and burnt through Reserve 31240 to Location 7019
March 1983	Fire started at a fisherman's camp at Swan Gully and burnt through Reserve 31240 to the boundary of Location 6853.
April 1984	Fire started near Pallinup River and burnt into Location 6962 and 6228.
April 1984	Fire started near Pallinup River and burnt into Location 6962 and 6228. Fire started on at Swan Gully and burnt through the coastal reserve and Sandalwood Road to Location 7018.
1986	Location 6230 and burnt through Reserve 31240 to the coast.
1989	The Bush Fires Board burnt strips of bush from the Pallinup Estuary track through the study area to the ocean.
1994	Fire started at a campsite in the Paperbark Reserve on the north east side of the Pallinup River and burnt through the study area to the Boat Harbour Road.

The leader of the team was Jeff Ellett who had farmed in the Wellstead area since 1962. In the early 1970's Jeff became the Fire Control Officer for the Kojaneerup Brigade. In 1982 he became the Deputy Chief Fire Control Officer representing the north eastern section of the Albany Shire and he continued in this position until 1995.

Jeff began to investigate any information he could find on fire regimes suited to the coastal mallee heath. A mosaic burning pattern seemed to be the best way of breaking up the vegetation ages and fuel load through the reserve along with providing habitat and food for the wildfire that resided in the reserve. Jeff consulted with many local Noongar people in the region seeking information on how they managed the environment using burning practices and how to start off a mosaic burning program (details are presented in Table 2.) Through this information he learnt about the process of winter burns using northerly winds at a time of the year when cool temperatures and high moisture levels extinguish fires naturally in the evening. This kind of fire is sometimes referred to as 'wind burning' (pers. comm. John Winton, 2002).

Jeff also recognised that weather data for the area between Mt. Barker, Albany, north to the Stirling Ranges and east to Gairdner River is very poor. No data available portrays the change in temperature gradient which can occur from the coast through to the Stirling Ranges in the summer and autumn seasons. There is also very little data recording the dramatic wind changes which can occur during the different seasons in the south coast region. A high proportion of prescribed burns in the region escape the prescribed area due to unpredicted wind changes.

Table 2: Information on the use of fire management provided by Noongar people to Jeff Ellett.

Aboriginal people did most of their burning over the summer / autumn period, always very late in the day because burning at this time allows the bush to regenerate more quickly
They never did any burning from early August through to the end of December (depending on the season) because all the wildlife were breeding and rearing young.
They would know when the breeding season started when reptiles became active after hibernation.
Due to the changed fire management of the bushland since Europeans arrived, many large blocks of bush have uniform age. To begin a mosaic pattern of burning in a large area of bush the first burn should occur in the middle of winter. Any section of the bush that will actually ignite should be burnt. In the following years other sections of the bush that will ignite with slightly less moisture in the fuel load should be burnt. Each year the bush is ignited slightly earlier in the winter moving toward late autumn conditions.
By the third spring after a burn there is enough food and shelter for the wildlife to reinhabit the site.

BEGINNING A MOSAIC BURN REGIME FOR CHEYNE BAY COASTAL RESERVE.

After gaining permission and support from FESA in Albany the Wellstead community decided to try and start the mosaic burn pattern for the reserve. Large maps of the Cheyne Bay Reserve were created so that any burns could be placed on record. Decisions were made on desirable wind directions and wind speeds to carry out the first of the mosaic winter burns in the reserve. Inspections were carried out in the reserve examining accessibility to vegetation communities which were believed to be inflamable in the cool, moist conditions of winter. It was recognised that the most flamable species in the coastal heath vegetation of the reserve is the Dryandra (the common name being the kerosene or petrol bush.) The vegetation survey of Cheyne Bay reserve revealed that there are nine species of Dryandra in the reserve.

After carefully examining weather maps and listening to morning forecasts a day in July 2000 appeared to be suitable. The wind was north – north easterly at a speed of about 15 – 20 km. per hour. This kind of wind would take a fire started along the northern fire break boundary down toward the ocean. The intention was to light up strips of about 300 metres in length and leave the same length unburnt inbetween.

With only two persons required, strips along the northern firebreak of the reserve adjacent to Cape Riche were lit using liquid fuel to ignite the bush. Sites which contained Dryandras tended to ignite well. Other sites where Dryandra were sparse and thin on the ground did not tend to ignite. The strips were lit at about 11am and the fires extinguished naturally at about 2.30pm. The second day the wind was more northerly and the wind speed was a bit stronger so attempts were made to light up more areas. The fire's were started mid morning and stopped naturally at 3.30pm. By nightfall there was no fire remaining burning.

A few weeks later a local pilot was able to fly over the site and take aerial photographs showing the path of the strip burns. None of the fires had burnt as far as the coast and each one had retained a fairly narrow width and traversed over a range of elevations and vegetation communities (refer to images 1, 2, 3, 4.)

The following year more strips were burnt in the middle of the reserve and over near the eastern edge over three separate days in July 2001. Detailed records were made of wind direction, strength and the time of lighting. One of these burns did reach the coastline (refer to table 3 and images 4, 5, 6.)

Table 3: Mosaic burns done by Wellstead Community

Date	Description of Event
July 2000	Burning of sections of Reserve adjacent to Cape Riche. Weather conditions were north – north easterly wind at a speed of about 15 – 20 km. per hour. Fire started on first day at about 11am and stopped at 2.30pm. The second day the wind was more northerly and the wind speed was a bit stronger. The fire was started mid morning and stopped at 3.30pm. All fires died in the night.
14th July 2001	Corner of 'Nangunia' No. 3 two piece
15th July 2001	Corner of 'Barooga' No. 2 one piece
21st July 2001	Burnt to the coast, NNW winds

MONITORING OF EFFECTIVENESS OF MOSAIC FIRE REGIME.

Monitoring stations measuring floral regeneration and faunal reestablishment have been set up in one of the sites burnt in July 2001. Assistance has been provided by staff from *Land For Wildlife*. The monitoring has been kept to simple techniques so that the Wellstead community can carry out much of the data collection. It is intended that the long term results will be collated and will increase understanding on the effect of winter burns on biodiversity.

The records of future wildfires in the reserve will also reveal whether mosaic burns reduce the number of uncontrollable fires which burn out large areas of the reserve and their impact on the safety of neighbouring farms and the biodiversity of the reserve.

SUMMARY

The Wellstead community believes that this technique of creating a mosaic using wind driven fires will provide a method of reducing the wildfire hazard to life and property posed by unburnt coastal heath, whilst at the same time ensuring the maintenance of local flora and fauna.

Image 1: Mosaic burns done in July 2000 with a 15 knot NNE wind. (Sandalwood Rd . leading down to Cape Riche).

Image 2: Further eastward in the reserve. Two burns done in July 2000 from the northern boundary of the reserve.

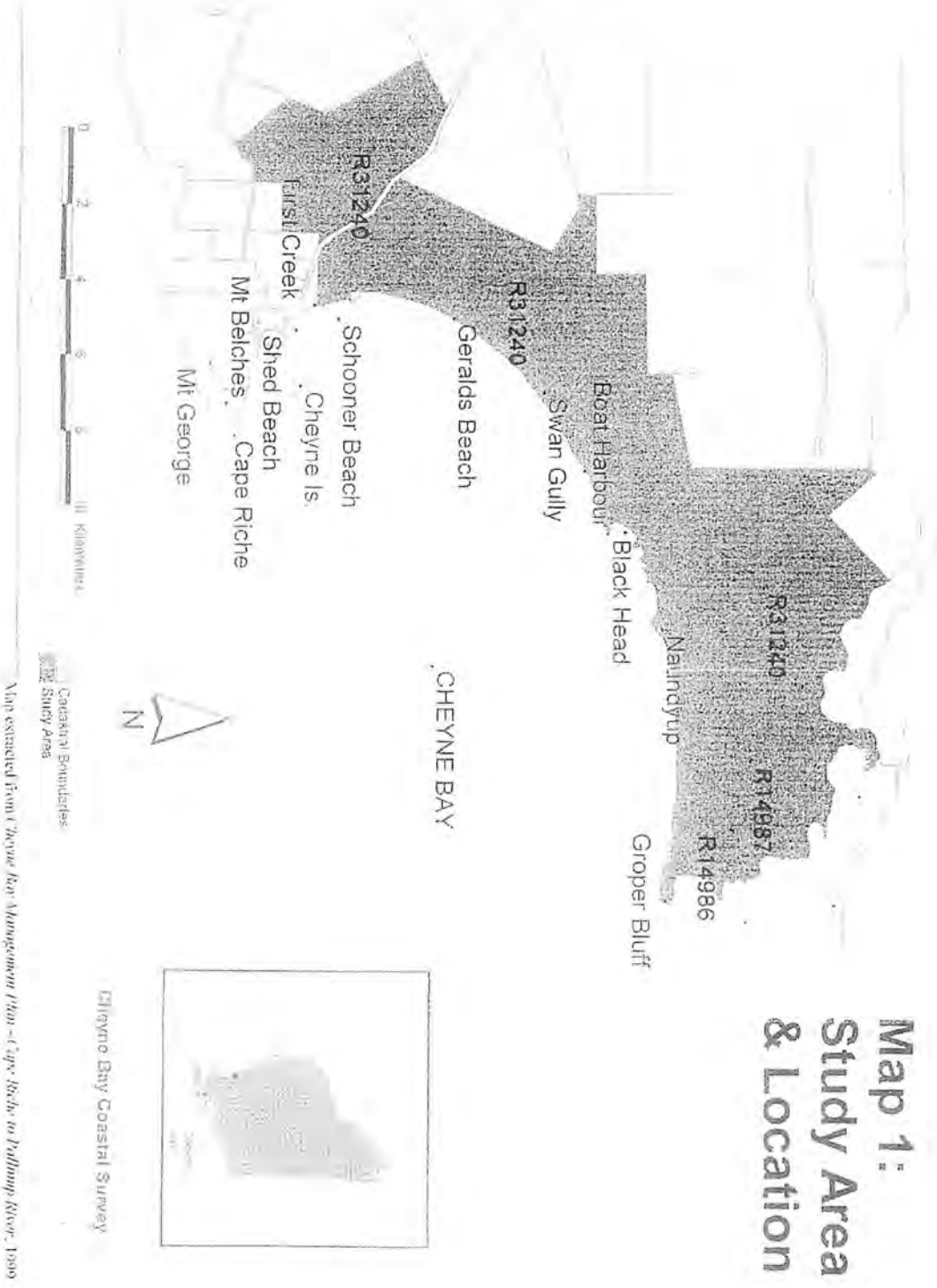
Image 3: A view northwards from Swan. The photo gives an impression of the difficulty to access this coastal terrain.

Image 4: Burns done in July 2000 & 2001 from the northern boundary of Cheyne Bay Reserve

Image 5: Burn done in July 2001 from northern boundary of reserve down to Jacks Beach. Maximum width of burn approx.800 metres.

Image 6: The July 2001 burn reignited from smouldering litter from under an old firebreak bulldozer pile. The fire burnt slowly eastward along cliff tops above Jack's Beach.

Map 1: Map showing Cheyne Bay Coastal Reserve. ***(map extracted from the Cheyne Bay Management Plan)***



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