World Heritage Sites

Protected Areas and World Heritage

# DINOSAUR PROVINCIAL PARK
# CANADA

*The Park is in the exceptionally dramatic scenery of the Alberta badlands and covers Upper Cretaceous fossil beds containing some of the most important dinosaur fossil discoveries ever made, numbering some 60 dinosaur species about 75 million years old, of unmatched quantity, variety and quality. The riparian habitat is a complex vegetation community of high quality.*

## COUNTRY
Canada

## NAME
Dinosaur Provincial Park

## NATURAL WORLD HERITAGE SITE
1979: Inscribed on the World Heritage List under criteria vii and viii.
1992-3: Site expanded then slightly reduced under the same criteria.

## STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]
The UNESCO World Heritage Committee issued the following statement at the time of inscription:

**Statement of Significance**
Dinosaur Provincial Park contains some of the most important fossil specimens discovered from the "Age of Dinosaurs" period of Earth's history. The property is unmatched in terms of the number and variety of high quality specimens, over 60 of which represent more than 45 genera and 14 families of dinosaurs, which date back 75-77 million years. The park contains exceptional riparian habitat features as well as "badlands" of outstanding aesthetic value.

**Criterion (vii):** Dinosaur Provincial Park is an outstanding example of major geological processes and fluvial erosion patterns in semi-arid steppes. These "badlands" stretch along 24 kilometers of high quality and virtually undisturbed riparian habitat, presenting a landscape of stark, but exceptional natural beauty.

**Criterion (viii):** The property is outstanding in the number and variety of high quality specimens representing every known group of Cretaceous dinosaurs. The diversity affords excellent opportunities for paleontology that is both comparative and chronological. Over 300 specimens from the Oldman Formation in the park including more than 150 complete skeletons now reside in more than 30 major museums.

## IUCN MANAGEMENT CATEGORY
II National Park

## BIOGEOGRAPHICAL PROVINCE
Grasslands (1.18.11)

## GEOGRAPHICAL LOCATION
In southeastern Alberta approximately100km northwest of Medicine Hat at 50°44’49”N x 111°28’14'W.

## DATES AND HISTORY OF ESTABLISHMENT
1880s: First dinosaur skeletons recovered;

1944: Park created as Steveville Dinosaur Provincial Park under the Alberta Provincial Parks Act;

1970: The Park designated a Natural Preserve;

1974: The Provincial Parks Act of 1974 limited the application of park status to Crown-owned or leased land; 2,959 ha of private land in the Park was therefore excluded;

1992: World Heritage site expanded by 2,133 ha, both north and south of the Park to enclose more fossil-bearing strata;

1993: The site reduced by 423 ha to allow for natural gas exploitation. The total extension was therefore 1,700 ha.

## LAND TENURE
Crown, Province of Alberta. Managed by the Parks & Protected Areas Division of Alberta Community Development. The site area north of the Park is administered by the Special Areas Board for native grasslands; the site area south of the Park is owned and administered by the Eastern Irrigation District.

## AREA
7,493 ha

## ALTITUDE
621m to 727m.

## PHYSICAL FEATURES
The region is a flat to gently rolling plain with exposed bedrock and sandstone cliffs where the Red River Valley has carved an exceptionally eroded badlands of coulees, gulches, mesas and buttes, knife-edges and capped pinnacles (hoodoos) from the layers of light multi-coloured rocks of the valley. The terrain is an outstanding example of ongoing geological processes and fluvial erosion patterns in a semi-arid steppe environment. About 6% of the area is mostly undisturbed riparian habitat, shaped by the meanders of the Red Deer River and characterised by point bars, wide terraces, fans and cutbanks. The badlands, which are the largest in Canada, form a gullied and sculpted landscape of great beauty, constantly eroded by wind and rain, exposing new fossil bone beds.

During the Upper Cretaceous period 75 million years ago, eastern Alberta was a low coastal plain at the edge of the shallow Bearpaw Sea. The climate was subtropical and the rich wildlife included about 35 species of dinosaur, several in herds overcome by flooding. Their bones were buried and preserved under layers of sand and mud deposited in the deltas of sluggish rivers which became the present soft sandstone and bentonite clay shale rocks (the Dinosaur Park formation of the Judith River Group). At the end of the last Ice Age 13,000 years ago, a sheet of glacial ice 600m thick eroded the upper layers of rock, and huge meltwater rivers carved the Red Deer river valley with its badlands of coulees, mesas and buttes, out of the soft rock, exposing this great concentration of fossil-bearing sediments. Since the 1880s, more than 300 dinosaur skeletons of the highest quality have been recovered from a 27-kilometre stretch along the Red Deer River.

## CLIMATE
The climate is continental semi-arid with a mean annual temperature of 3.8°C and frequent high winds. The cold dry winters, averaging between -18 °C and -25 °C, are sometimes warmed by chinook winds from the west, and the heat of the summers is tempered by low humidity and rapid evening cooling. The mean annual precipitation is 406mm, most falling in the late spring and early summer.

## VEGETATION
There are three distinct habitats in the Park: riverine, badlands and prairie. The narrow river terraces support lush and diverse vegetation in various stages of succession, of pioneer stands of willow, cottonwood forest, tall shrub thickets and ephemeral wetlands. Such riparian cottonwoods are among the most threatened habitats of semi-arid regions. The hot dry badland soils bear dense sagebrush flats and open shrubland dominated by *Artemisia* and Chenopodiaceae with several other ecologically specialized plant species. Prairie grasses in dry mixed grass communities dominate the landscape above the valley rim. Remnant and recently created grasslands occur on buttes and large pediments. Rare species, or those at the limit of their biogeographic range include *Stephanomeria runcinata*, *Atriplex powellii*, *Orobanche ludoviciana*, *A. suckleyi*, *Oryzopsis micrantha*, *Lupinus pusillus*, *Plantago elongata*, *Muhlenbergia racemosa*, *Erigonium cernuum* and *Antennaria dimorpha*.

## FAUNA

60 species of dinosaurs in 45 genera and 7 families have been found in the Park, including specimens from every known group of dinosaurs from the Cretaceous period, over 300 being of museum quality (Parks Canada, 2004). The best represented families are the Hadrasauridae, Ceratopsidae, Ornithomimidae, Pachycephalosauridae, Tyrannosauridae, and Dromaeosauridae. There are also fossil remains of fish, turtles, frogs, lizards, flying reptiles and even marsupials.

The relatively mild winter microclimate, coupled with an abundant food supply, provides critical winter range for native ungulates such as pronghorn *Antilocapra americana*, mule deer *Odocoileus hemionus* and white-tailed deer *O. virginianus.* The richness and abundance of breeding birds is notable: over 160 species have been recorded. The area supports a number of species locally threatened or at their biogeographic limits, including golden eagle *Aquila chrysaetos*, prairie falcon *Falco mexicanus*, ferruginous hawk *Buteo regalis*, loggerhead shrike *Lanius ludovicianus*, merlin *Falco columbarius*, Brewers sparrow *Spizella breweri* and grasshopper sparrow *Ammodramus savannarum*. The beautiful mountain bluebird *Sialia curricoides* is common. Plains spadefoot toad *Scaphiopus bombifrons* and the poisonous prairie rattlesnake *Crotalis viridis viridis* also occur (Alberta Provincial Parks Service, 1989).

## CONSERVATION VALUE

The site is of great international significance to palaeotology. The Park contains a wide range of dinosaur remains from the late Cretaceous period. Between 1979 and 1991, 23,347 fossil specimens were collected, including 300 dinosaur skeletons from at least 35 distinct species. In addition, the riverbanks support cottonwood forests, the plains are covered by structurally complex grasslands and the badland terrain is continually eroded, revealing yet further bones (Parks Canada, 1991).

## CULTURAL HERITAGE

Several archaeological sites representative of the native Plains Indian Culture have been found, including a Vision Quest site and tipi rings. A glyphstone, a rare native cultural artifact with carved figures found on now agricultural land, was moved to the Park for protection after consultation with the Siksika Nation (Parks Canada, 2004).

## LOCAL HUMAN POPULATION

Brooks, a community of 10,000 inhabitants, lies about 50 km southwest.

## VISITORS AND VISITOR FACILITIES

In 2000, 84,340 people visited the Park, mainly between late May and late August, 61% for the day, 39% camping overnight, with a high percentage coming from outside Alberta. This is over twice the attendance in 1990. There is a visitors' centre at the Dinosaur Field Station with a small amphitheatre, visitor education program and book store-shop. There are five interpretative bus tours, four insitu palaeontological displays, one a mock-up of the *Centrasaurus* bone bed, five signed hiking trails, a large well provided 126-site campsite with a fast food, laundry, washroom and shower service concession, a group camp, picnic areas, canoe launch and a historic cabin. The Natural Preserve restricted zone contains the main fossils open to the public but only if these are accompanied by a guide. (Parks Canada, 2004). Road access is easy from the nearest airport at Calgary, 200 km west.

## SCIENTIFIC RESEARCH AND FACILITIES

Long-term research into palaeontology, geology, sedimentology and palaeobotany is ongoing, particularly in the fossil beds, which are the most extensive in Canada. A drainage basin in the natural preserve has been set aside for research into geomorphic processes. The Park was surveyed and was subsequently included in the International Biological Programme. All scientific studies and research are rigidly controlled through a Park research and collection permit system. The Dinosaur Field Station of the Royal Tyrell Museum of Palaeontology in Drumheller, 100 km to the northwest,was opened in 1987. This supports palaeotological research and provides public education and interpretation. For most of the field season between May and early July there are typically 5 or 6 research staff from the Museum, and from September to March one or two members work about 2 days a week in the Field Station. There are also often one or two visiting scientists and students in camp, and an annual paying-participant program attracts between 40 and 50 participants. Since 1985 the largest collection of finds from the Park has been housed in the Royal Tyrrell Museum Over 300 museum-quality specimens have been recovered and are displayed in some 30 major museums

world wide (Parks Canada, 2004). Many publications attest to the amount and depth of the research done here. Prairie rattlesnakes and the riparian cottonwood are also studied.

## MANAGEMENT

The Park is managed by the Parks & Protected Areas Division of Alberta Community Development under the Provincial Parks Act. The World Heritage site area north of the Park is administered by the Special Areas Board for native grasslands; that to the south of the Park is owned and administered by the Eastern Irrigation District. Both bodies administer and manage the cattle grazing on these lands. Closer working relationships with these landowners, lessees and museum research staff has helped to minimize unobserved public access to remote areas of the site (Parks Canada, 2004). An administration office is located in the field station of the Royal Tyrell Museum.

Under the provisions of the Alberta Historical Resources Act of 1978 all palaeotological, prehistoric and historic resources are protected on both crown and private lands. There is no zoning system except for the establishment of a Natural Preserve in 1970 which allows control of visitor access in order to preserve the major palaeotological and geomorphological resources. The Cultural Facilities & Historical Resources Division of Alberta Community Development conducts most of the fossil research in the Park and manages the research in the Dinosaur Field Station. A resource management plan was completed in 1990. A general management plan prepared with public input was updated in 2003. It provides for periodic review and revision to direct future uses, development, management, interpretation and education in the Park. Implementation of the plan through annual operating plans and monitoring has been ongoing since the earliest drafts.

## MANAGEMENT CONSTRAINTS

Five gas wells, all now abandoned, were drilled in the Park before it was inscribed on the World Heritage List. Gas-well development continues on land surrounding the Park, with a number of gas wells and ancillary pipelines on upland areas north and south of the river. These wells are allowed with a 150m setback from the top of the badland slopes but only under stringent conditions to minimise their impacts (Parks Canada, 1991). There are no grazing leases inside the Park, but no plans to extinguish those outside it (J. Thorsell, pers. comm., 1995). Tourist pressure increasingly threatens the quality of the experience with campfire smoke, erosion and devegetation from hiking and scrambling. Illegal pilfering and excavations in the past have removed many bones in the most visited Facility zone of the Park, and access to the restricted Natural Reserve zone is only permitted if accompanied by guides. A watch is kept for illegal pilferering.

## STAFF

In 2004 a full time highly qualified staff of 5 comprised Site Manager, Office Manager, Visitor Services Officer, Maintenance Supervisor and Conservation Officer. Seasonal summer staff include 7 in visitor services, 5 in maintenance, 3 in conservation and 6 in administration. A Planning Team Leader, Heritage Appreciation Leader and Heritage Protection Leader were added in 2003. In the 2003 spring field season the Royal Tyrrell Museum of Palaeontology had 11 staff working in the World Heritage Site, a lesser number is present during the summer. This research staff ranges remote areas of the site to help minimize unauthorized fossil collection.The services of 3 regional officers are also available since 2003: a Planning Team Leader, a Heritage Appreciation Team Leader and a Heritage Protection Specialist (Parks Canada, 2004).

## BUDGET

Can$419,573 (US$ 310,000) in 1995, excluding capital funding (Alberta Environmental Protection, pers. comm., 1995). The annual budget in 2004 was C$602,211(US$463,700) (Parks Canada, 2004).

## LOCAL ADDRESSES

Site Manager, Dinosaur Provincial Park, P.O.Box 60, Patricia, Alberta TOJ 2KO,

Director, Parks & Protected Areas Division, Alberta Community Development, Box 1690 Provincial Building, 220,4th Avenue West, Brooks Alberta T1R 1C5.

Alberta Community Development, 2/F.Oxbridge Place, 9820,106 Street, Edmonton, Alberta, T5K 2J6.

Parks Canada, Dep't of Canadian Heritage, 25 Eddy Street, Gatineau, Quebec, K1A 0M5, Canada.

## REFERENCES

The principal source for the above information was the original nomination for World Heritage status.

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DATE

1984. Updated 9-1989, 7-1995, 10-2007, 8-2010, 5-2011, January 2012.