

## World Heritage Sites

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## CANADIAN ROCKY MOUNTAIN PARKS CANADA

*The contiguous National Parks of Jasper, Banff, Yoho and Kootenay, with the adjoining Mount Robson, Humber and Mount Assiniboine Provincial Parks, straddle the superbly beautiful continental divide of the central Rocky Mountains at their highest point. They protect 400 kilometres of forested mountain landscape studded with dramatic snow-capped peaks, glaciers, lakes, cascades, canyons and caves. The Burgess Shale fossil site, a World Heritage site since 1980 and famous for its fossil remains of soft-bodied marine animals, is in Yoho National Park.*

### COUNTRY

Canada

### NAME

Canadian Rocky Mountain Parks

### NATURAL WORLD HERITAGE SERIAL SITE

- 1981: The Burgess Shale fossil sites in Yoho National Park designated a World Heritage site under criterion viii.
- 1984: The National Parks inscribed on the World Heritage List under criteria vii and viii.
- 1990: The British Columbian Provincial Parks added to the inscribed sites.
- 2006: Designation under criterion ix withdrawn.

### STATEMENT OF OUTSTANDING UNIVERSAL VALUE [pending]

The UNESCO World Heritage Committee issued the following statement at the time of inscription:

#### Statement of Significance

Renowned for their scenic splendor, the Canadian Rocky Mountain Parks are comprised of Banff, Jasper, Kootenay and Yoho national parks and Mount Robson, Mount Assiniboine and Humber provincial parks. Together, they exemplify the outstanding physical features of the Rocky Mountain Biogeographical Province. Classic illustrations of glacial geological processes – including icefields, remnant valley glaciers, canyons and exceptional examples of erosion and deposition – are found throughout the area. The Burgess Shale Cambrian and nearby Precambrian sites contain important information about the earth's evolution.

**Criterion (vii):** The seven parks of the Canadian Rockies form a striking mountain landscape. With rugged mountain peaks, icefields and glaciers, alpine meadows, lakes, waterfalls, extensive karst cave systems and deeply incised canyons, the Canadian Rocky Mountain Parks possess exceptional natural beauty, attracting millions of visitors annually.

**Criterion (viii):** The Burgess Shale is one of the most significant fossil areas in the world. Exquisitely preserved fossils record a diverse, abundant marine community dominated by soft-bodied organisms. Originating soon after the rapid unfolding of animal life about 540 million years ago, the Burgess Shale fossils provide key evidence of the history and early evolution of most animal groups known today, and yield a more complete view of life in the sea than any other site for that time period. The seven parks of the Canadian Rockies are a classic representation of significant and on-going glacial processes along the continental divide on highly faulted, folded and uplifted sedimentary rocks.

### IUCN MANAGEMENT CATEGORY

Jasper National Park	II National Park
Banff National Park	II National Park
Kootenay National Park	II National Park

Yoho National Park	II National Park
Mount Robson Provincial Park	II National Park
Hamber Provincial Park	II National Park
Mount Assiniboine Provincial Park	II National Park

## BIOGEOGRAPHICAL LOCATION

Rocky Mountains (1.19.12)

## GEOGRAPHICAL LOCATION

This 400 km-long belt of Parks lies along the British Columbia-Alberta border from 100 km west of Calgary to 400 km west of Edmonton, Alberta, straddling the central Rocky Mountains at their highest. From north to south they are: Jasper and Banff National Parks in Alberta, and Yoho and Kootenay National Parks in British Columbia. These adjoin the Provincial Parks, all in British Columbia: Mount Robson Park and Hamber Park south of it, both lying west of Jasper National Park, and Mount Assiniboine Park between Banff and Kootenay Parks. The group is located between 50° 34' to 53° 28'N and 115°10' to 119° 32'W.

## DATES AND HISTORY OF ESTABLISHMENT

- 1885: 2,600 ha around the Cave and Basin mineral hot springs in Banff declared a Park Reserve;
- 1886: 2,600 ha beside Mt Stephen were set aside as Yoho Dominion Park; the area fluctuated till 1930;
- 1887: The Banff area was formally gazetted as Rocky Mountains Park (67,300 ha) under the Rocky Mountains Park Act; it was renamed and extended in 1930;
- 1907: Jasper Forest Park created (1,295,000 ha); its area fluctuated until 1930;
- 1913: Mount Robson Provincial Park gazetted: (218,795 ha, extended in 1967 by 739 ha);
- 1920: Kootenay Park gazetted on land relinquished by the state in exchange for Federal Government grant to complete Highway 93, the Parks' main road) (152,000 ha in 1930, since reduced);
- 1922: Mount Assiniboine protected (5,200 ha);
- 1930: The Rocky Mountains Park renamed Banff National Park and extended to 669,500ha (5,400 ha were excised in 1949); Jasper and Yoho Park areas finally determined;
- 1941: Hamber declared a Provincial Park (1,009,112 ha) but reduced to present size in 1961/62;
- 1973: Mount Assiniboine Provincial Park extended to protect the watershed, alpine areas, and to link the park to Banff and Kootenay National Parks;
- 1981: The Burgess shale fossil sites in Yoho National Park made a World Heritage site.

## LAND TENURE

The National Parks occupy federal land and are administered by Parks Canada. The Provincial Parks are British Columbian provincial crown land, administered by BC Parks.

## AREAS

The total area of the seven Parks of the World Heritage site is 2,306,884 ha:

Jasper National Park	1,087,800 ha
Banff National Park	664,100 ha
Kootenay National Park	140,640 ha
Yoho National Park	131,310 ha
Mount Robson Provincial Park	219,535 ha
Mount Assiniboine Provincial Park	39,050 ha
Hamber Provincial Park	24,520 ha

Contiguous local and provincial parks in Alberta, from north to south are:

Willmore Wilderness Park	459,671.ha
Siffleur Wilderness Area	41,215 ha

Whitehorse Wildland Park	17,500 ha
Ghost River Wilderness Area	15,317 ha
White Goat Wilderness Area	44,457 ha
Kananaskis Provincial Park	50,308 ha

## ALTITUDE

1,036m - 3,954m (Mount Robson); 3,783m (Mt Columbia, Jasper NP); 3,662m (Mt Forbes, Banff NP).

## PHYSICAL FEATURES

The central Canadian Rocky Mountains are a high massif of sedimentary rock dating from the Precambrian to Cretaceous periods, oriented northwest-southeast along the Continental Divide. They consist of the Western Ranges, the Main Ranges, the Front Ranges and the eastern Foothills. The Western Ranges in the Provincial Parks, the southern part of Kootenay and western part of Yoho include formations of folded thick shales. The Main Ranges form the Continental Divide and are present in all the Parks. They are formed of limestone, dolomite, sandstone and shale and include nearly all the highest mountains, including Mounts Robson, Columbia, Forbes, Alberta and Assiniboine which all exceed 3600m. In the Main Ranges of Yoho Park, fossil beds occur in the Burgess Shale layer of the Stephen Formation. They are of global significance as they show well preserved evidence of evolution in a large number of species, ancestral and extinct, during the mid-Cambrian period 535 million years ago. The preservation in mudstone of soft-bodied animals is exceptional. There are also preCambrian fossil sites in Mt. Robson Park. The Front Ranges in Banff and Jasper Parks are composed of thick layers of limestone and shale. These ranges often have a tilted, tooth-like appearance: Mt. Rundle in Banff and Roche Miette in Jasper Parks are characteristic. The Foothills make up the easternmost extensions of the Rockies and only occur in a small southeastern part of Jasper Park.

Active glaciers and icefields still exist throughout the region, particularly in the Main Ranges. The Columbia Icefield is the largest in North America's sub-arctic interior. Covering 325 sq. km, it spans both the Continental Divide and the boundary between Jasper and Banff Parks and is considered the hydrographic apex of North America. The Parks contain the headwaters of four major river systems: the North Saskatchewan and Athabasca Rivers which flow northeast, and the Columbia and Fraser Rivers which flow southwest. The Park waters of Yoho and Kootenay flow to the Pacific Ocean through the Columbia drainage, and those of Mount Robson, via the headwaters of the Fraser River. Hamber Park contains Fortress Lake watershed. There are numerous lakes in Mount Assiniboine Park, most of which are located in broad alpine valleys and plateaus in glacially scoured depressions in the limestone bedrock. The landscape of dramatic mountain peaks, glacial lakes and alpine meadows is of exceptional ecological integrity and natural beauty.

The soils are generally shallow and immature, but marked variations do occur. In Jasper, chernozems are found on steep subalpine grassland slopes, whilst podzols are found in upland areas and gleys in poorly drained areas. At Lake Louise in Banff, the soils consist of moraine material.

## CLIMATE

The Parks experience continental cool summer to sub-arctic conditions, where temperatures can range from 30°C in the summer to -30°C in the winter. In the valleys, mean annual maximum and minimum temperatures are 8.6°C and -3.3°C respectively, while at higher altitudes temperatures are generally five to seven degrees cooler. Annual rainfall is 250mm. Annual snowfall at lower elevations is 160mm; at higher elevations and along the continental divide, it is 650mm (Parks Canada, 2002a).

## VEGETATION

The Rockies in this area can be divided into four major ecosystems: alpine meadow, sub-alpine grassland with non-vegetated ground, montane wetlands and montane boreal forest. Floral species counts in Banff and Jasper Parks indicate about 996 vascular plants, 243 mosses, 407 lichens and 53 liverworts. Montane vegetation extends over some 18,432 ha and occurs in major valley bottoms, on the foothills and sun-exposed slopes of lower mountainsides, especially in the front ranges. Forest cover, generally found between 1200m and 1800m, ranges from 50.09% in Banff Park and 58.21% in Yoho to 77.07% in Kootenay. The first two have less cover because they are located on the drier Front range (Parks Canada, 2002). Typical species include Douglas fir *Pseudotsuga menziesii*, white spruce, *Picea glauca*, aspen *Populus tremuloides* and poplar *Populus balsamifera*. Montane wetlands and meadows occupy areas next to major rivers such as the Bow and Red Deer valleys in Banff and Athabasca and Brazeau River valleys in Jasper. Typical species include lodgepole pine *Pinus contorta*, which rapidly

colonises after fire, and aspen; black spruce *Picea mariana* is occasionally found along these river valleys.

The sub-alpine ecosystem occurs on mountainsides between 1800m and 2100m, and in valley bottoms at higher elevations. This is the most extensive ecoregion in the Rockies and can be subdivided into lower and upper sub-alpine occupying 69,120 ha and 46,080 ha, respectively. The principal forest community of the lower sub-alpine zone comprises Engelmann spruce *Picea engelmannii*, limber pine *Pinus flexilis* and lodgepole pine. Subalpine fir *Abies lasiocarpa* dominates the upper sub-alpine zone, although it thins towards the treeline. South of Bow Pass, pure stands of Lyall's larch *Larix lyalli* dominate the upper limit of this ecoregion.

The alpine ecosystem occurs above the treeline and covers an area of about 13,824 ha. It is characterised by diminutive hardy vegetation such as low-growing willow *Salix arctica* and dwarf birch *Betula glandulosa*, heath *Cassiope tetragona*, mountain avens *Dryas integrifolia*, *D. hookeriana*, sedge *Carex nigricans*, *Kobresia bellardii*, *Phylodoce glandulifolia* and *Antennaria lanata*. Around Emerald Lake in Yoho, pockets of wetbelt forest typical of the Pacific Coast region can be found. Species include western red cedar *Thuja plicata*, western hemlock *Tsuga heterophylla* and western yew *Taxus brevifolia*, all at the extreme easternmost extent of their range. Vascular plants found in Mt. Assiniboine Park include American alpine smelowskia *Smelowskia calycina*, Raynold's sedge *Carex raynoldsii*, Cusick's Indian paintbrush *Castilleja cusickii*, stalked-pod locoweed *Oxytropis podocarpa*, sub-alpine grassland *Saussurea nuda* and apetalous campion *Silene uralensis attenuata*. Those found within Mt. Robson Park include low sandwort *Atenaria longipedunculata*, slender Indian paintbrush *Castilleja gracillima*, western Indian paintbrush *C. occidentalis*, sulphur indian paintbrush *C. sulphurea* and arctic cinquefoil *Potentilla hyperborea*.

## FAUNA

56 mammalian species are recorded. Characteristic species found in alpine meadows include Rocky mountain goat *Oreamos americanus*, bighorn sheep *Ovis canadensis*, northern pika *Ochotona princeps* and hoary marmot *Marmota caligata*. Forest mammals include moose *Alces alces*, mule deer *Odocoileus hemionus*, white-tailed deer *O. virginianus*, caribou *Rangifer tarandus*, red deer *Cervus canadensis* and red squirrel *Tamiasciurus hudsonicus*. Carnivores include grey wolf *Canis lupus*, grizzly bear *Ursos arctos horribilis*, black bear *U. americanus*, wolverine *Gulo gulo luscus*, lynx *Felis lynx canadensis* and puma *F. concolor*.

Some 280 species of birds have been seen, including northern three-toed woodpecker *Picoides tridactylus*, white-tailed ptarmigan *Lagopus leucurus*, grey jay *Perisoreus canadensis*, mountain bluebird *Sialia currucoides*, Clark's nutcracker *Nucifraga columbiana*, golden eagle *Aquila chrysaetos*, mountain chickadee *Parus gambeli* and rock pipit *Anthus spinoletta*. Other fauna recorded includes one species of toad, three species of frog, one species of salamander and two species of snake. The tiny Banff Springs snail *Physella johnsoni*, discovered in 1926, is listed as endangered by the Committee on the Status of Endangered Wildlife in Canada. It only inhabits five warm mineral springs on Sulphur Mountain in Banff National Park (Parks Canada, 2002a).

## CONSERVATION VALUE

The area has majestic natural beauty, floral and faunal diversity, and is a prime example of ongoing geological processes such as glaciation and canyon formation. The Rocky Mountains are also regionally important to ensure the protection of heritage resources and large tracts of wilderness.

## CULTURAL HERITAGE

Since prehistoric times, the Kootenay valley has served as a major north-south travel route. The Kootenai Indians settled in the region about 11,000 to 12,000 years ago. Pictographs found near the hot springs indicate this was a meeting place for plain and mountain bands. Banff's Vermillion Lakes is one of Canada's oldest known archeological sites, dating from 10,500 B.P, and some pre-historic artifacts in Jasper have been dated to 9,000 B.P. European fur traders and explorers first reached the area in the 1800's seeking transportation routes through the high mountain passes. They were followed by homesteaders and entrepreneurs who realised the commercial potential of developing areas such as Radium Hot Springs

## LOCAL HUMAN POPULATION

The latest figures for the main population centre give: Banff, 7,600, Jasper, 4,700, Lake Louise, 1,900 and Field approximately 300, largely dependent on and varying with tourism, logging and maintenance

of the parks. Development limited to park-related workers has led to the expansion of gateway communities (Parks Canada, 2004).

### **VISITORS AND VISITOR FACILITIES**

Visitation which has been fairly constant, in 2002 totalled 10,218,000: 9,667,000 in national parks and 551,000 in provincial parks. The parks are easily accessible by main highways and railroads and between eight and ten million people visit the World Heritage site each year. Facilities include 4 ski areas, 3 hot pools, 2 golf courses, a snow coach tour and 3,600 km of trails including guided interpretive trails. There is a wide range of accommodations including 20 campgrounds with 5,200 sites, 12 hostels and 25 outlying commercial accommodation areas along with souvenir shops, restaurants and service stations. Four year-round visitor centres and hotels are located in Banff, Lake Louise, Jasper, Field and elsewhere. Four seasonal visitor centres are located at the Columbia Icefield, in Radium Hot Springs near the west entrance to Kootenay National Park, and Mount Robson Provincial Park visitor centre at the west entrance to the park. Recently management plans have incorporated heritage tourism measures to reduce visitor impacts on the parks' ecology by removing some facilities from sensitive sites (Parks Canada, 2004).

### **SCIENTIFIC RESEARCH AND FACILITIES**

Research has been carried out into: fire management and ecology, grizzly bear survival, wolf access to wintering elk herds, aquatic ecosystems and the restoration of lake stocks, the state of exotic fish species, and the movements and distribution patterns of wildlife; also into the biology and ecology of ungulates, woodland caribou, lynx, cougars, wolverines, small mammals, birds, amphibians, forest fragmentation, ecological land classification, tourism and recreation. Scientific studies contribute to park management plans, decisions and operations, environmental assessments, visitor education, business plans and management of neighbouring land. Research into the world-famous fossils of the mid-Cambrian 565-year old Burgess shale has been ongoing intermittently since their discovery by C. Walcott in 1907. 120 species of ancestral and extinct marine animals have been unearthed. Banff has its International Research Station and there is a Learning Centre at Field.

### **MANAGEMENT**

Banff, Jasper, Kootenay and Yoho National Parks are administered by the Canadian government under the National Parks Act which was amended in 2000 to make ecological integrity its first priority, and the Parks Canada Agency Act of 1998 through the Agency's Guiding Principles and Operational Policies. 95% of the national parks are legally protected as wilderness. Boundaries for communities in National Parks were set and development was capped (Government of Canada, 2000). Community plans for Banff, Jasper, Lake Louise and Field were completed. The Parks Canada Agency participates in cooperative programs with other federal and provincial agencies including wildlife monitoring especially of grizzly bears and wolves, fire management, pine beetle control, and search and rescue. In 1996 the minister responsible for Parks Canada commissioned a study of the Banff-Bow valley to ascertain the state of the environment in the core of Banff National Park and in 1999 commissioned a second study, on the ecological integrity of Canada's national parks. Reports produced as a result of these studies have provided direction for management plans and strategies, emphasising the restoration of ecological integrity and restraints on development (Parks Canada, 2004)

Management plans for Banff, Jasper, Kootenay and Yoho National Parks were completed between 1997 and 2002 with some involvement of the public. For management purposes these National Parks are divided into five zones: Zone I, Special Preservation Areas where access and use are strictly controlled, cover 3% of the land; Zone II, Wilderness, where only activities requiring primitive facilities are permitted, covers 94% of the land; Zone III, Natural Environment, where low-density outdoor recreation is permitted, occupies 3%; Zone IV, Outdoor Recreation, provides for higher intensity recreation with supporting infrastructure such as downhill ski-areas; Zone V, covers Park Services: the service centres, towns and major infrastructure such as highways and railroads (Parks Canada, 2002a). Monitoring, with 5-yearly reports, is extensive. Topics include water and snow conditions, atmospheric conditions, vegetation, wildlife habitat and populations and visitor numbers.

Mount Robson, Hamber and Mount Assiniboine Provincial Parks are administered by the British Columbia Parks Agency within the provincial Ministry of Water, Lands and Air Protection, under the Parks Act and Protected Areas of British Columbia Act. BC Parks prepares management plans, sets out objectives and actions for the conservation, development, interpretation and operation of provincial protected areas for ten to twenty year periods. Management plans completed between 1989 and 1992 based on current information about natural and cultural values, recreation opportunities and resource

activities in surrounding lands divided the provincial parks into four zones: wilderness conservation, natural environment, wilderness recreation and intensive recreation. For Mount Robson Provincial Park these zones are: wilderness conservation 58%, wilderness recreation 22%, natural environment 16% and intensive recreation 3%. A variety of interagency committees exists for coordination and collaboration between park managers.

## **MANAGEMENT CONSTRAINTS**

Much of the land bordering the Parks in British Columbia and Alberta is designated for multiple resource use. This includes logging, coal, oil and gas extraction and recreation. In 2005 development of an open-pit coal mine within 2 km of Jasper National Park was legally permitted (Sierra Club, 2005). The roads serving such activities are increasing public access to formerly remote areas. This is clearly evident at Ensign Creek, Yoho where logging has brought access roads very close to Amiskwi Wilderness Area, adjacent to the Park boundary (Canadian Parks Service, 1988d). Within Jasper National Park, the construction of Highway 16, the Canadian National Railway and the Trans-Mountain Pipeline had a profound effect on the hydrology of the lower Athabasca and Miette River valleys. Past fire suppression measures reduced biodiversity and left forests more vulnerable to intense fires and insect invasions as by the mountain pine beetle. The aesthetic impact of the Yellowhead River corridor and wildlife mortality were also problematic: about 1,000 animals were killed between 1970 and 1980 (Parks Canada, 2000c).

One of the biggest threats facing the Parks is that of the development encouraged by increased tourism. Two national highways and railways and many secondary roads cross the park. Nearby Calgary and Edmonton are growing rapidly and development along park borders is increasing. The townsite region of Jasper is an ecologically important area located at the junction of three watersheds. During the winter, wildlife concentrates in the area but development has led to a disturbance in ungulate migration routes around the town, the destruction of key habitats and conflicts between bears and humans (Parks Canada, 2000c). Regular proposals for expansion of the four downhill ski resorts in the Parks are made and continue to cause controversy. Among the effects of these developments are a reduction of the populations of mountain goats, caribou and wolves.

## **STAFF**

The total staff for the four National Parks is 490 full-time employees: Banff, 171, Jasper, 158, Lake Louise, Yoho & Kootenay combined Field Unit 153. This is 78% of the total of 625 cited in 2002. The staff for the provincial parks totalled 7 in 2004: Mount Robson & Hamber, 4 fulltime, Mount Assiniboine, 3 seasonal (Parks Canada, 2004).

## **BUDGET**

The budget for the four National Parks in 2004 was C\$34,723,000. In 2002 a similar sum was divided between Banff, C\$9,12,000,000, Jasper, C\$11,000,000, Kootenay, Yoho & Lake Louise, C\$10,500,000. The three provincial parks are budgeted regionally, not as separate parks (Parks Canada, 2002; 2004).

## **LOCAL ADDRESSES**

Chief Executive Officer, Parks Canada, Mountain Parks, Box 900 Banff, Alberta T1L 1K2, Canada.

The Superintendent, Banff Field Unit, Box 900, Banff, Alberta T1L 1K2, Canada.

The Superintendent, Jasper Field Unit, P.O. Box 10, Jasper, Alberta T0E 1E0, Canada.

The Superintendent, Yoho & Kootenay Field Unit, Box 213, Lake Louise, Alberta T0L 1E0, Canada.

BC Parks Assistant Deputy Minister, 5/F, 2975 Jutland Road, Victoria, B.C. V8T 5J9, Canada.

Omineca Regional Manager, Mount Robson & Hamber Provincial Parks, 4051, 18<sup>th</sup> Ave, Prince George, B.C., V2N 1B3, Canada.

Kootenay Regional Manager, Mount Assiniboine Provincial Park, 205 Industrial Road, Cranborne, B.C. V1C 7G5, Canada.

Websites:

Parks Canada: [www.parkscanada.gc.ca](http://www.parkscanada.gc.ca).

BC Parks: [www.gov.bc.ca/bcparks](http://www.gov.bc.ca/bcparks).

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BC Parks Division (1987). *Hamber Provincial Park Master Plan*. British Columbia Ministry of Environment, Land and Parks.

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----- (2000c). *Jasper National Park Management Plan*. Ministry of Supply & Services Ottawa.

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----- (2004). *Report on the State of Conservation of Canadian Rocky Mountain Parks*. Periodic Report on the Application of the World Heritage Convention. Section II. Parks Canada, Gatineau, Quebec.

Sierra Club of Canada (2005). Court allows massive mine on doorstep of Jasper National Park despite objections from feds and conservationists. *Sierra Club of Canada News*, August.

Statistics Canada (2002). [www.statcan.ca](http://www.statcan.ca).

### **Digital Maps:**

All National Parks:

- a) National Topographical Data Base - digital copy of 1:50,000 hardcopy maps.
- b) Ecological Land Classification (vector format):  
Ecoregion-Vegetation communities-Slope-Moisture-Dominant Vegetation- Landform.  
Forest Stand Origin (raster format) - Year of forest origin
- c) Lakes-Rivers-Trails-Roads-Railroad-Burned areas (natural & prescribed)-Wetlands.  
Digital elevation model with slope & aspect.  
Facilities, backcountry & frontcountry.

Banff, Kootenay & Yoho National Parks:

- a) Greenness models (NDVI & Tasselled Cap).
- b) Insolation model by month (heating values watts/sq.meters).
- c) Fire severity maps (from landsat TM).
- d) Vegetation model (from landsat TM).
- e) Hydrology model (with watershed basins).

Satellite Images:

- a) Indian Resource Satellite Images Aug.1988:  
- 5 meter resolution, panchromatic error <10meters.

- b) Landsat 5 & 7 TM All bands:
- Landsat 5 43/24 Sept.25 1987
  - Landsat 5 44/24 Sept.2 1988
  - Landsat 5 43/25 Sept.11 1988
  - Landsat 5 43/24 Sept.20 1987
  - Landsat 5 43/24 Sept.7 1988
  - Landsat 5 43/24 Oct. 6 2000
  - Landsat 5 43/24 June 22 2002

**DATE**

1983. Updated 11-1994.10-1995, 7-1997, 12-1998, 12-2002, 8-2005, 9-2009, 10-2010, 5-2011, January 2012.