

# Montana Reservation Land and Native American Agricultural Survey

## Land Cover Mapping of Crow and Northern Cheyenne Reservations, MT

U.S.D.A.  
National Agricultural Statistics Service (NASS) Washington, D.C.  
Intertribal Agriculture Council  
Billings, MT

1994

### Introduction

In 1993 the Intertribal Agriculture Council (IAC) made a cooperative agreement with USDA NASS to improve agricultural statistics information on Native American farms and ranches in Montana. A one year pilot program was developed with two deliverable products: 1) state level probability survey estimates of the number of Native American operations, crop acreage and livestock counts, 2) crop and land cover mapping of the Crow Indian Reservation and Northern Cheyenne Indian Reservation using the Landsat satellite TM data. This agreement with IAC was motivated by a need to improve the information base on Native American agriculture and IAC's belief that Native American farmers and ranchers were undercounted.

Cooperatively working within their respective domains, USDA NASS and the IAC produced a very successful pilot agricultural statistics survey with quite useful estimates and color land cover maps. USDA NASS staff developed a creative survey design to accurately estimate Native American farm and ranch statistics. The voluntary response of Native American farmers was very high and even exceeded NASS's normally high survey response rates.

The IAC Boards of Directors were very pleased with the survey results and the land cover maps. They feel that the survey results were the most detailed and accurate profile in the history of Native American farms and ranches at the state level.

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The primary mission of USDA NASS is current agricultural statistics. NASS maintains sampling frames for all states. When approached by the IAC to conduct a pilot survey of Native American ranchers and farmers, NASS had a good probability surveying process already in place in Montana. The existing sampling frames were designed for state level agriculture estimates for all agriculture operations as a whole.

To achieve accuracy and precision for reservation estimates, the NASS sampling frames were augmented and public relations meetings were held. More sample plots of farm land from Montana Reservations were selected for enumeration. An additional name list of Native American farmers was created from information provided by the Consolidated Farm Service Agency (CFSA), the IAC, and informed individuals within each reservation. IAC staff met with tribal representatives to discuss the survey's benefits to Montana Native American farmers and to ask for their support.

NASS conducted the reservation surveys during June 1994 with the regular Montana statewide survey. NASS provided **estimates** of crop acreage, livestock counts and number of farms. The overall results point to a serious historic under count of Native American **farms**. The IAC Board of Directors is very pleased with the survey results.

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## Land Cover Mapping of Crow and Northern Cheyenne Reservations, MT

Using Landsat Thematic Mapper (TM) satellite data from June 20 and June 27 1993, the research staff of NASS created land cover maps for the Crow and Northern Cheyenne Indian **Reservations**. The dates of the imagery were near optimum for small grains and sugar beets which were the major crops of interest.

The land cover maps were created by converting the raw energy readings from the satellite data into land cover types. First **Ground** data points were obtained from NASS sampled fields, USDA\CFSA program data and personal observations. These ground observations points were used to train a converting algorithm to discriminate among crops. Each pixel of satellite data was categorized to a land cover type (grain, beets, forest, etc.). The process is a statistical probability process and is not errorless since different land covers can have similar energy readings.

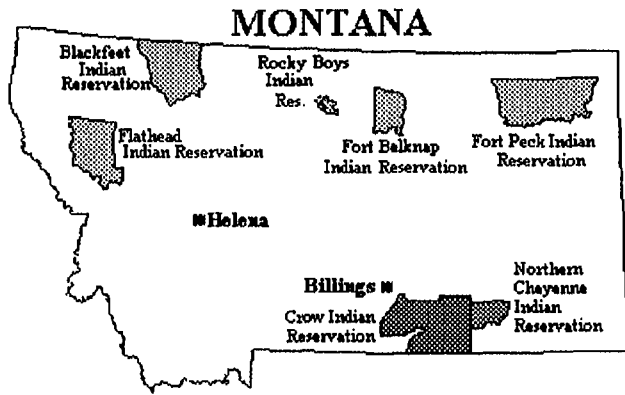
A small nine by nine kilometer **Sample** of the Crow Indian Reservation Map is included with this demo. The land cover maps show very well the location of sugar beets along the Big Horn River and more interestingly the extent of small grain production. If the fallow land and small grain fields are visualized together, it is easy to see the extent of cropland available for small grain production from year to year.

FOR FURTHER INFORMATION CONTACT:  
George Hanuschak  
US Department of Agriculture  
National Agricultural Statistics Service  
3251 Old Lee Hwy. Room 305  
Fairfax, VA 22030  
Telephone: (703) 235-5218  
Facsimile: (703) 235-3386  
Internet: ghanuschak@ag.gov  
Greg Smitman, Executive Director  
Intertribal Agriculture Council  
100 North 27th Street,  
Suit 500  
Billings, MT 59101-2054  
Telephone: (406) 259-3525  
Larry Beard, State Statistician  
North Dakota State Statistical Office  
Box 3166  
Fargo, ND 58108  
Telephone: (701) 239-5303  
Facsimile: (701) 239-5613

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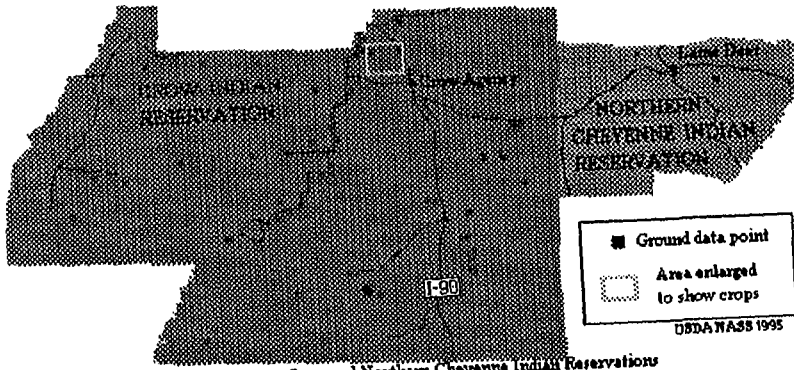
STATE OF MONTANA AND MONTANA RESERVATIONS	USDA NAS =====			Other Sources
	State of Montana Total 1994	Reservation Farms and Ranches Operated by =====		Native American
		Total June 1, '94	Native American June 1, '94	Bureau of Indian Affairs 1993
ACRES OF CROPS PLANTED AND HAY HARVESTED 1/ AND LIVESTOCK NUMBERS 2/.				
Crops (Planted):			Planted Acres	
Small Grains:	6,976,000	947,000	205,000	193,495
Winter Wheat	1,950,000	200,000	25,000	--
Spring Wheat	3,400,000	525,000	105,000	--
Barley	1,300,000	210,000	75,000	--
Oats	146,000	12,000	--	--
Hay (Harvested):				Harvested Acres
Alfalfa Hay	1,550,000	150,000	35,000	--
Other Hay	750,000	95,000	50,000	--
Livestock			-- Head --	
Cattle and Calves	2,500,000 2/	430,000	150,000	46,353
Sheep and Lambs	502,000 2/	21,000	13,600	1,154
Horses and Ponies	--	12,500	5,000	1,584

1/ These are estimated 1994 planted/harvested acres and do not include any acres that were fallowed during 1994.

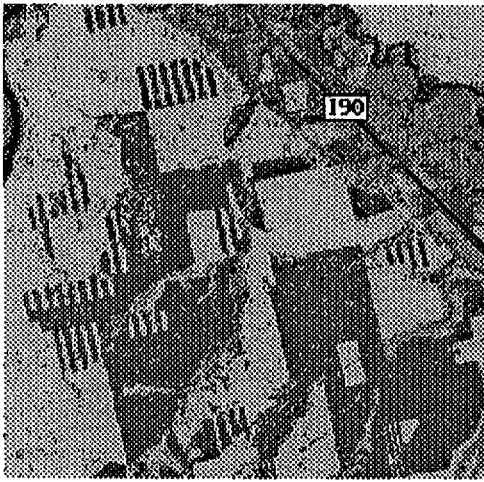
2/ January 1, 1994 reference date.

MONTANA RESERVATIONS	USDA NASS		Other Sources	
	Reservation Farms and Ranches Operated by		Native American	
	Total June 1, '94	Native American June 1, '94	1992 Census Dec. 31, '92	Bureau of Indian Affairs 1993
NUMBER OF FARM AND RANCH OPERATIONS, TOTAL BY SALES IN DOLLARS AND BY PRIMARY INCOME.	----- Number -----		----- Number -----	
Category				
Farms and Ranches				
Native American	--	900	431	1102
Non-Native American	2,000	--	--	1145
By Sales Class				
\$1,000-\$9,999	720	180	--	--
\$10,000-\$39,999	860	290	286	--
\$40,000-\$99,999	550	320		--
100,000+	770	110		--
Primary Income Source				
Farming/Ranching	79%	67%	--	--

GIF image 500x250 pixels



Land Cover Mapping Area -- Crow and Northern Cheyenne Indian Reservations



- Small Grains
- Sugar Beets
- Fallow
- Hay\Pasture
- Water
- Forest
- Range\Other
- Non-ag. Land

I-90 North of Crow Agency, MT. (June 1993)