

James River Headwaters 10160001

8-Digit Hydrologic Unit Profile

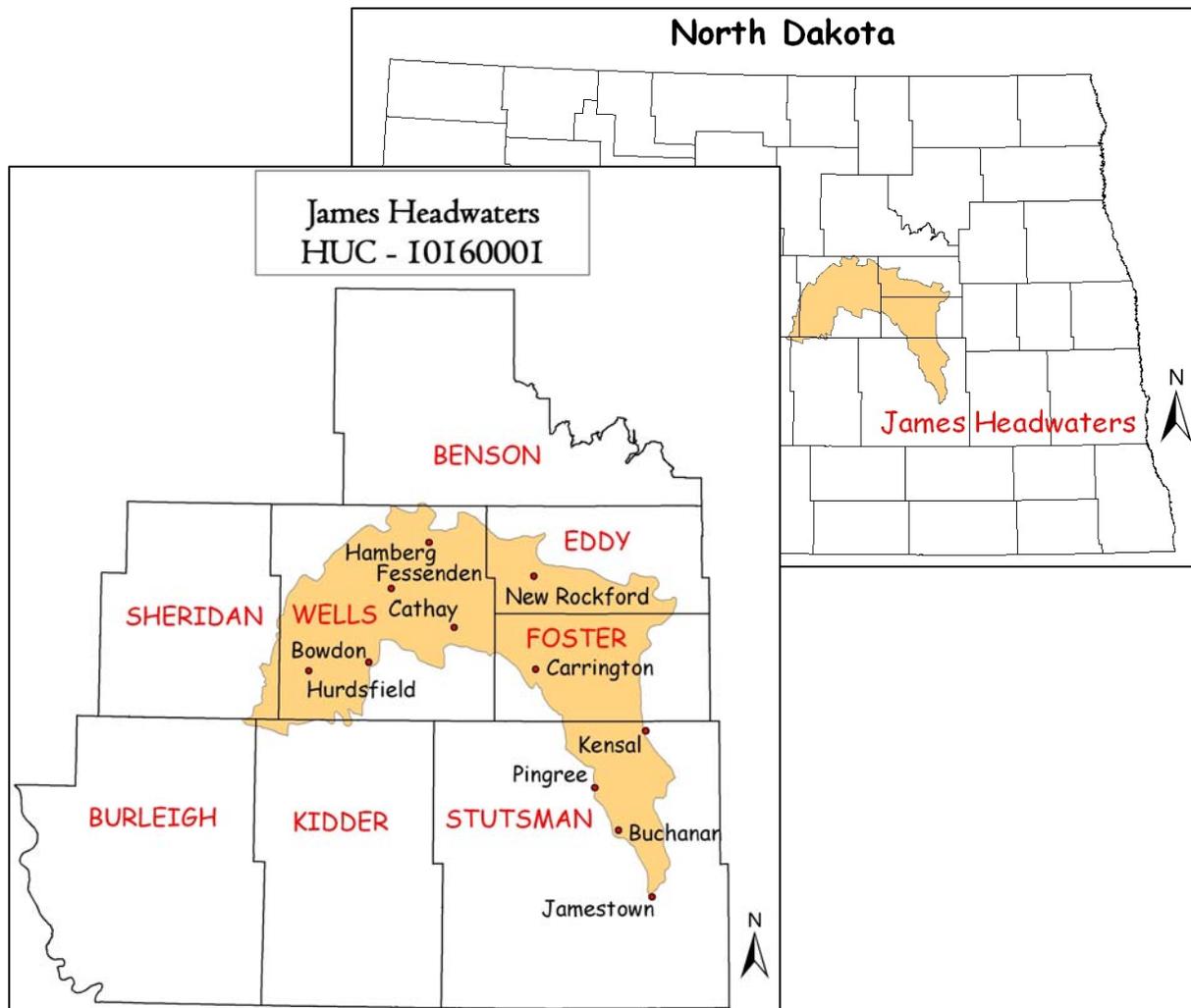
Revised July 2007

Introduction

The James River Headwaters 8-Digit Hydrologic Unit Code (HUC) (10160001) sub-basin is approximately 1,148,900 acres covering parts of 8 counties (Benson, Burleigh, Eddy, Foster, Kidder, Sheridan, Stutsman, and Wells) in the Missouri Region – James Sub-Region. Of the 1,148,900 acres, Wells County contains 48 %, Foster 20 %, Stutsman 15 %, Eddy 13 %, Sheridan 2 %, Burleigh 1 %, and Kidder 1 %. There are approximately 800 farms in the sub-basin.

This sub-basin encompasses commodities ranging from soybeans, wheat, barley, corn, canola, sunflowers, and field peas to beef cattle, swine, poultry, and bees.

Conservation assistance is provided by eight Natural Resources Conservation Service (NRCS) Service Centers and three Resource Conservation & Development offices.



*Produced by
the Natural
Resources
Planning Staff
Bismarck, ND*

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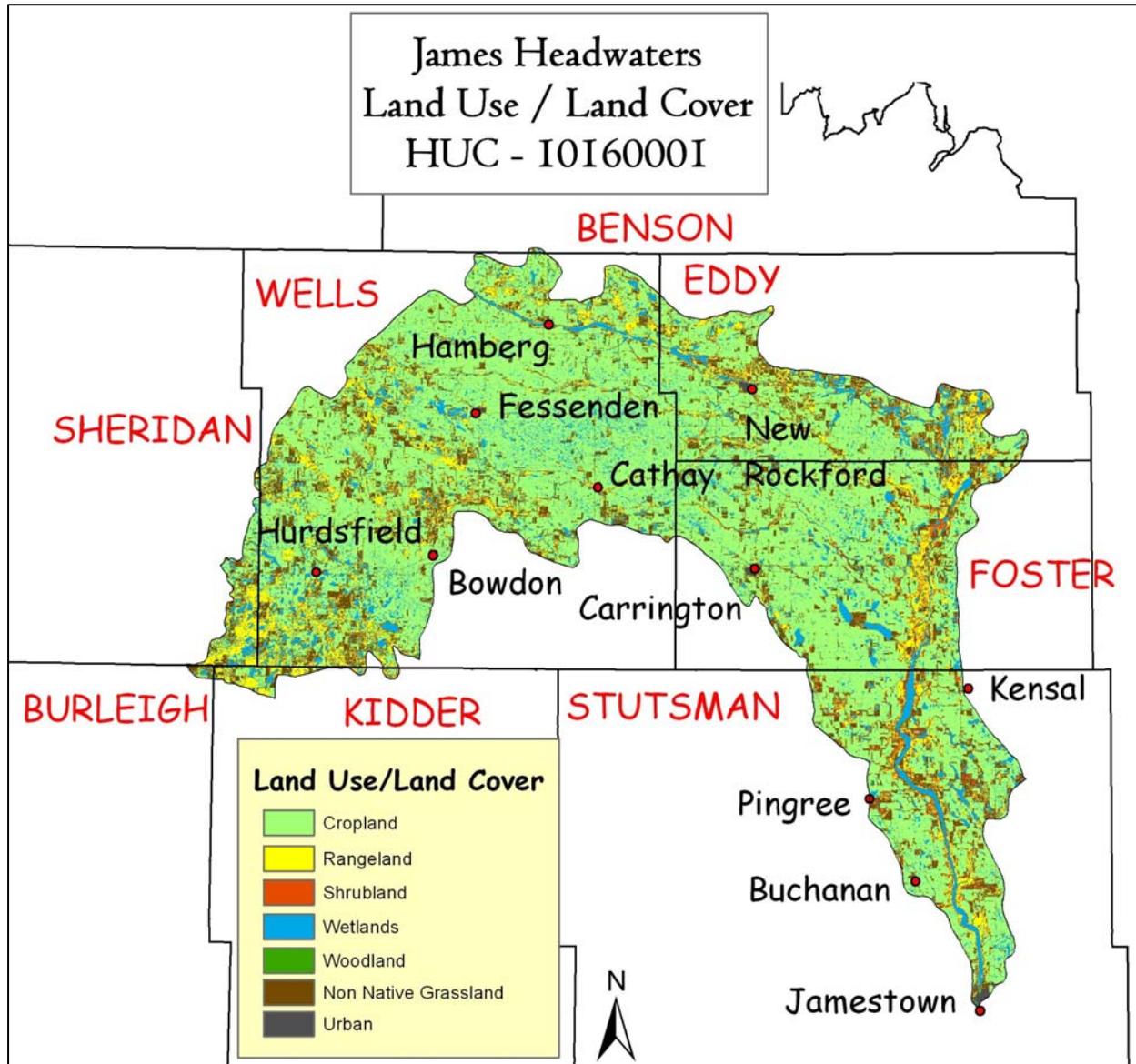
Physical Description

The following table and map show land use / land cover within the sub-basin.

Land Use/ Land Cover (<i>National Resources Inventory [NRI]</i>) ¹	Acres	Percent of HUC
Forestland	0	*
Cropland	743,700	65%
Conservation Reserve Program (CRP) Land ² a	89,900	8%
Tame Grass/Hayland	38,400	3%
Pastureland	8,300	1%
Rangeland	160,700	14%
Urban/Farmstead/ Transportation Land	72,300	6%
Water/Wetlands	16,300	1%
Federal Lands	19,300	2 %
North Dakota HUC Totals ^b	1,148,900	100% *
<p><i>* Less than one percent of total acres. See below for special considerations. a: Estimate from Farm Service Agency records and include CRP/CREP. b: Totals may not add due to rounding and small unknown acreages.</i></p>		
Irrigated Land <i>(Farm Services Agency)</i> ³	1,950	<1%

Physical Description – Continued

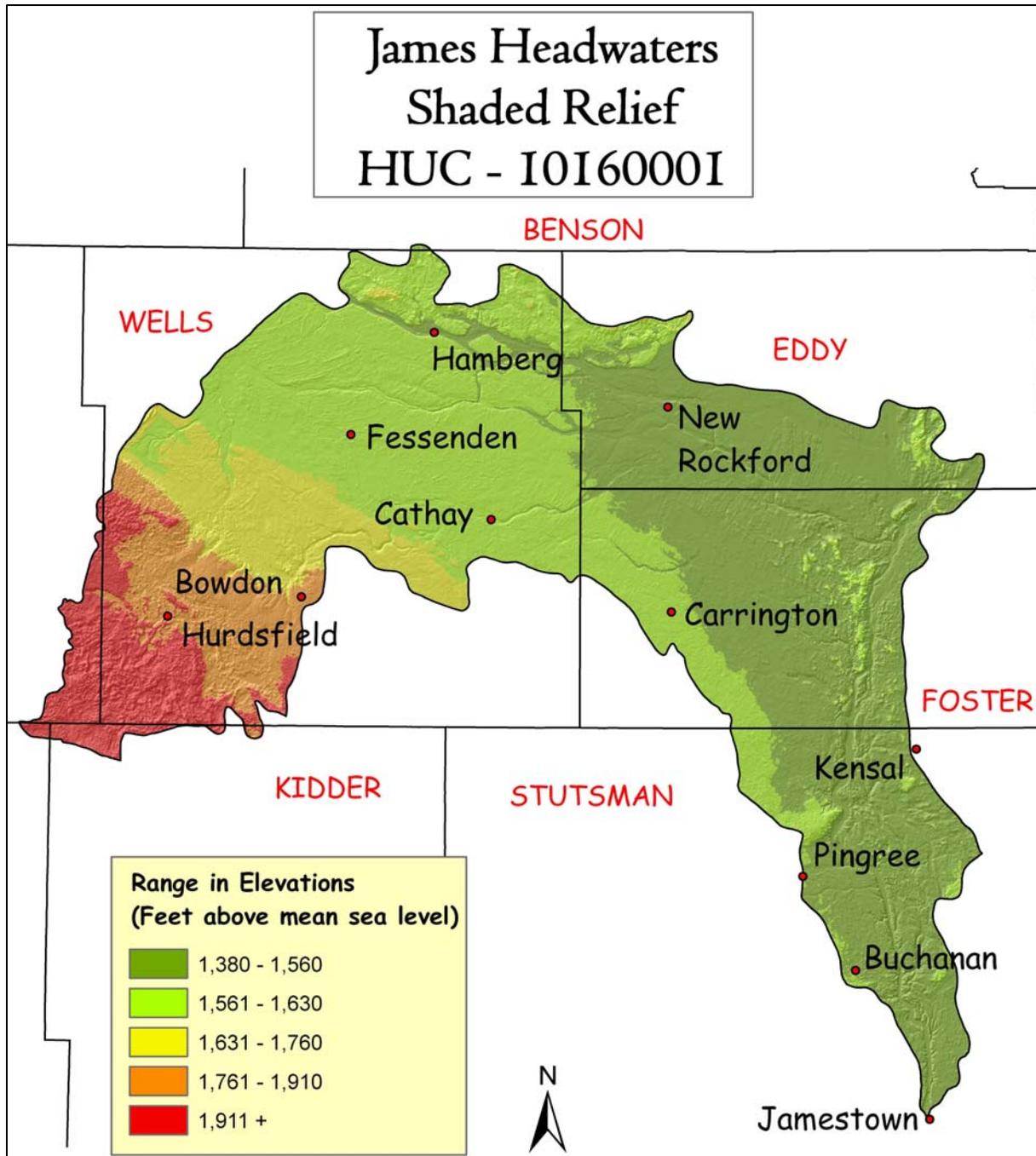
Land Use/Land Cover Map



The above map was developed from U.S. Geologic Survey's (USGS) ND Gap Analysis Program data.⁴

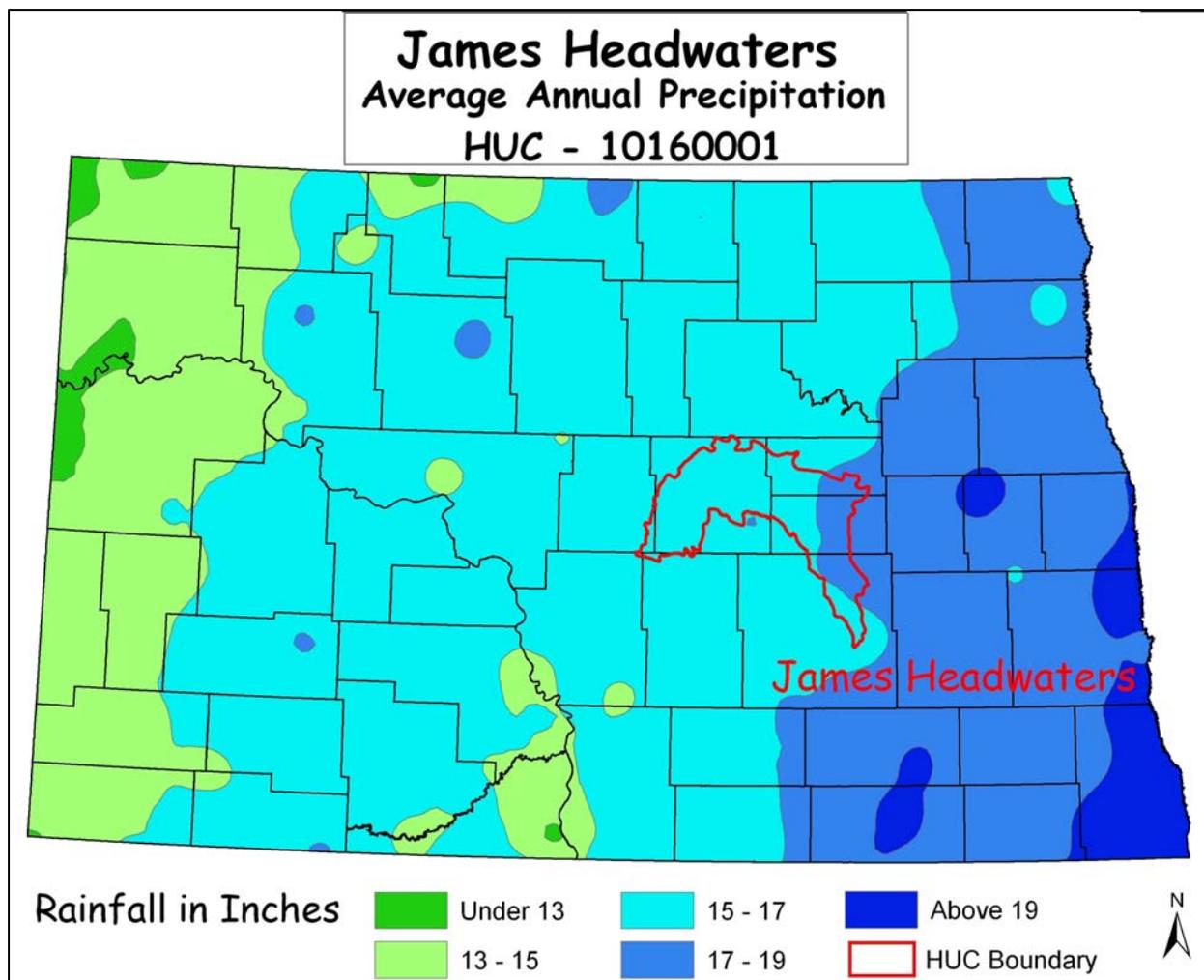
Physical Description – Continued

The sub-basin is part of the Missouri River Region - James River Sub-Region. The drainage patterns flow to the southeast ending at the Jamestown Reservoir. The following map shows the relief for the sub-basin.⁵



Physical Description – Continued

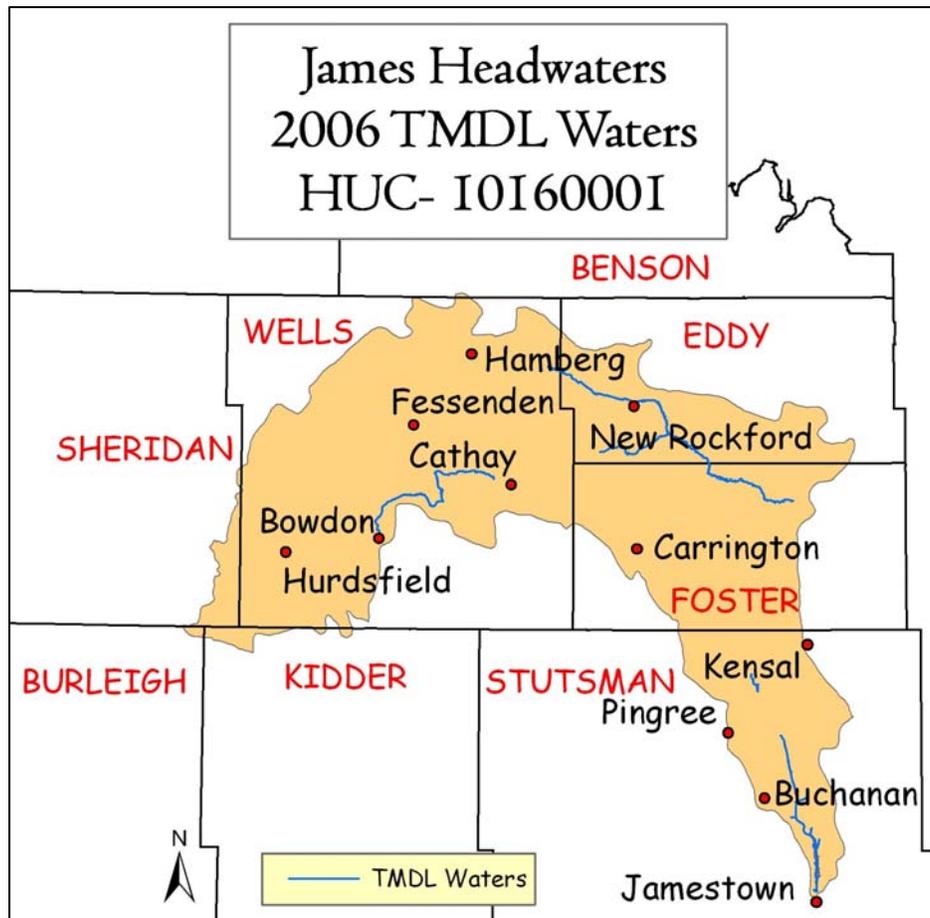
The following map is a plot of 1961-1990 annual average precipitation contours from National Oceanic and Atmospheric Administration (NOAA) Cooperative Stations and (where appropriate) USDA-NRCS Snowpack Telemetry (SNOTEL) Stations. Christopher Daly used the PRISM (Parameter-elevation Regressions on Independent Slopes Model) model to generate the gridded estimates from which this map was derived: the modeled grid was approximately 4x4 km latitude/longitude, and was resampled to 2x2 km using a Gaussian filter. Mapping was performed by Jenny Weisberg and Nathaniel DeYoung. Funding was provided by USDA-NRCS National Water and Climate Center. (4/20/98)



Physical Description – Continued

The North Dakota Department of Health collects water quality data on major water bodies. The following table shows the total miles of streams and acres of lakes/reservoirs within the sub-basin and also the miles and acres that have a water quality limitation. A map showing the TMDL waters within the watershed follows the table. TMDL is the amount of a particular pollutant that a particular stream, lake, estuary, or other waterbody can "handle" without violating state water quality standards.

		Units	James River Headwaters Sub-basin ⁶	James River Headwaters Impaired Water Quality (303d) ⁷	Percent Impaired* James River Headwaters
Water Quality Data <i>*Percent of Total Miles and acres in HUC</i>	Total – Major Water bodies				
	Rivers/Streams	Miles	712	81.1	11.4 %
	Lakes/Reservoirs	Acres	6,536	2,086	31.9 %



Physical Description – Continued

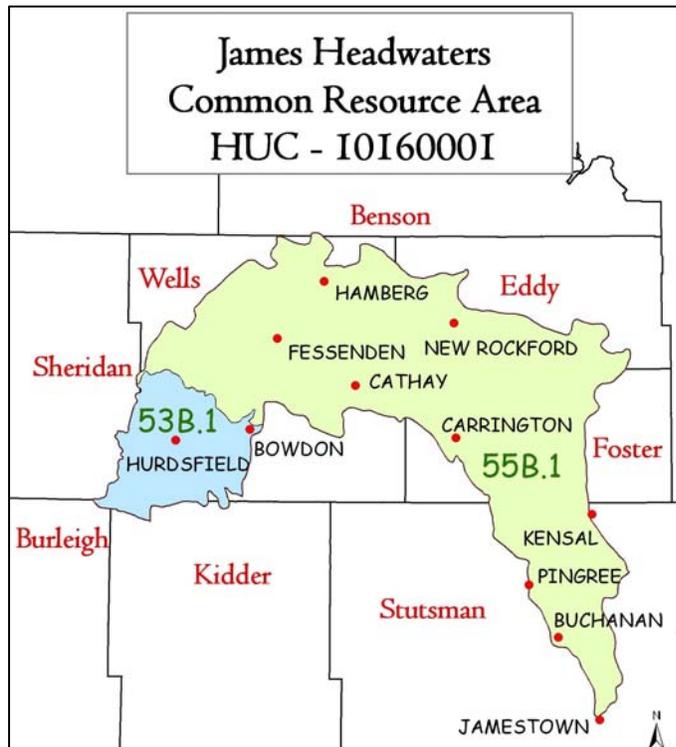
The following two tables show feeding operations, permitted operations, and livestock numbers. The first table lists the number of animal feeding operations and animals as tracked by the North Dakota Department of Health. The second table shows livestock numbers for all cattle, beef cows, dairy cows, hogs and pigs, and sheep and lambs. These livestock numbers were extrapolated from 2002 Agricultural Census county data to 8-digit HUC's.

Animal Feeding Facilities – North Dakota Department of Health Permit⁸					
Animal Type	Dairy	Beef	Swine	Other	Total
Number of Animal Feeding Operations	1	15	1	1	18
Number of Animals	50	15,000	2,300	1,000	18,350
Number of State Permitted Operations					13

Livestock Numbers (rounded to nearest 100)⁹					
	Cattle and Calves	Beef Cows	Dairy Cows	Hogs and Pigs	Sheep and Lambs
North Dakota	1,873,200	982,300	34,500	138,800	114,000
James River Headwaters	43,100	19,900	600	3,300	3,100
James River Headwaters as a percent of North Dakota	2.3%	2.0%	1.7%	2.4%	2.7%

Physical Description – Continued

Common Resource Areas (CRAs) are geographical areas where resource concerns, problems, or treatments are similar. Landscape conditions, soil, climate, human considerations, and other natural resource information were used to determine the geographic boundaries. CRAs are subsets of Major Land Resource Areas. The following map¹⁰ shows the CRAs for James River Headwaters sub-basin with the descriptions below.



53B.1 – Central Dark Brown

Glaciated Plains: The Central Dark Brown Glaciated Plains are a nearly level to rolling with steeper areas along rivers. This region marks a transition to drier conditions. Land use is a mosaic of cropland and rangeland. Soil textures range from the dominant loamy glacial till to areas of coarse textured outwash and fine textured lacustrine materials. Most soils are moderately deep and deep, well drained and moderately well drained, and have a frigid temperature regime.

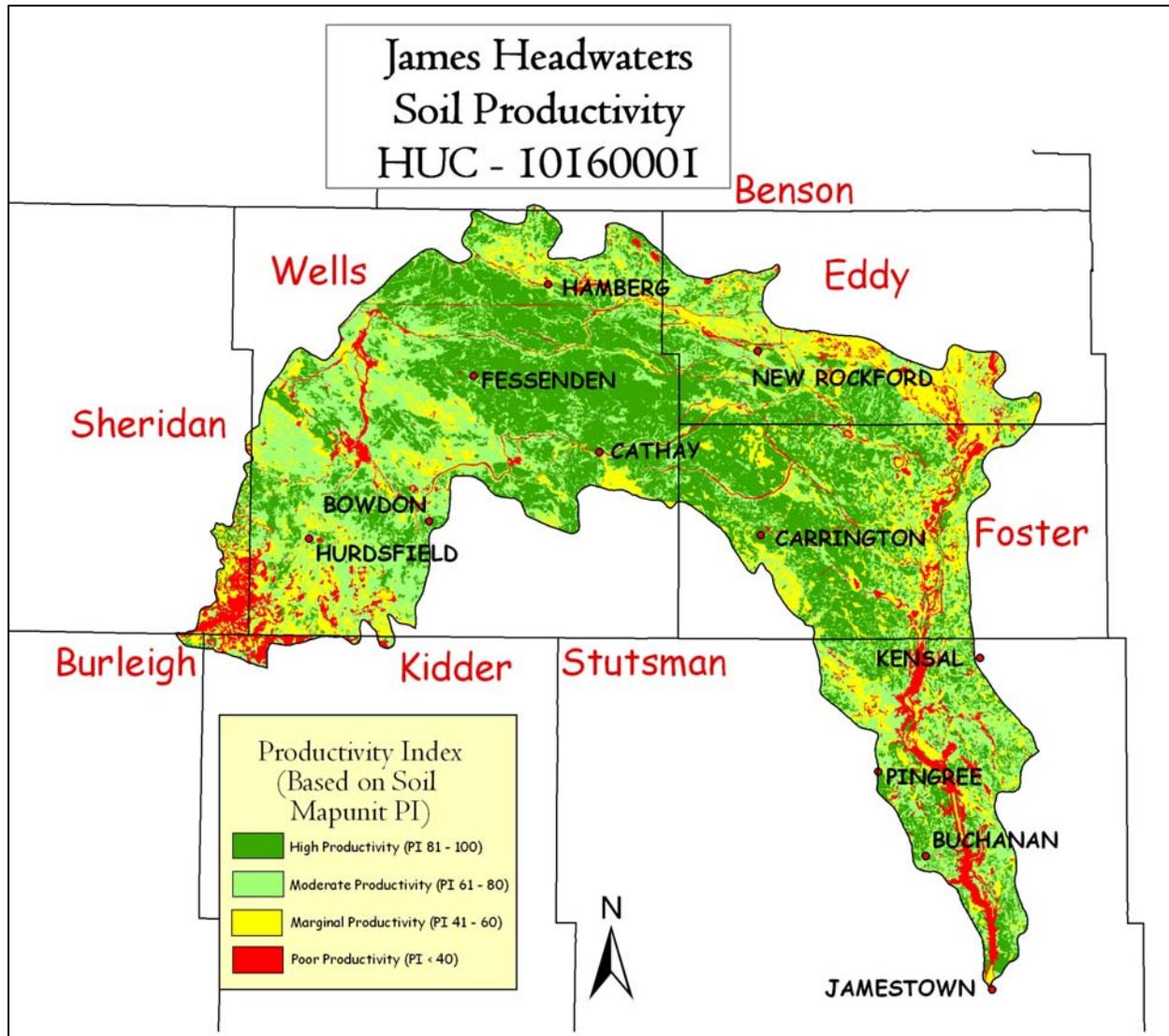
55B.1 – Central Black Glaciated

Drift Plains: The Central Black Glaciated Drift Plains are a gently rolling to undulating landscape with a thick layer of glacial till. Temporary and seasonal wetlands are numerous throughout the area. These soils are very fertile, but agricultural success is subject to annual climatic fluctuations. Most of the soils are deep, well drained

and moderately well drained, sandy to clayey and have a frigid temperature regime.

Soil Productivity ¹¹

The James Headwaters has two soil productivity regions. The James River Valley and its drainage along with the Missouri Coteau region of Sheridan and Wells Counties are marginally productive. The central part of this sub-basin is moderately to highly productive.



Common Land Unit

The entire sub-basin has the common land unit digitized by Farm Services Agency (FSA).

Resource Concerns

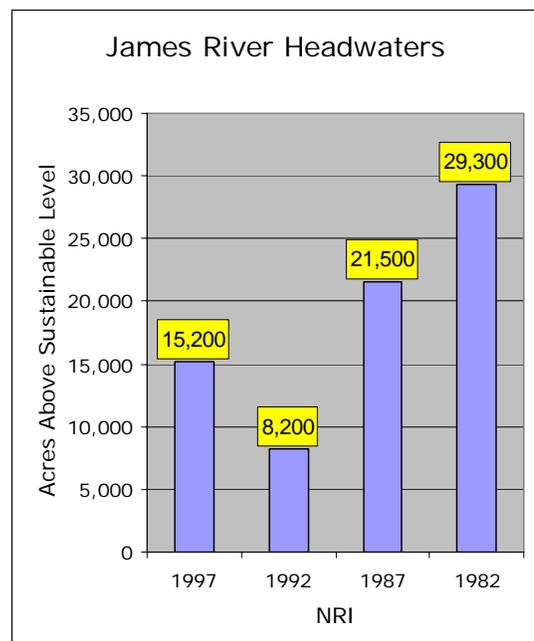
One of the goals of NRCS is to look at an area to help quantify the types and amounts of resources that may be of concern. This helps to identify priority areas for the types and amounts of assistance to be given to a particular watershed.

The following table shows the different projects, plans, studies, and assessments conducted within the sub-basin.

Watershed Projects, Plans, Studies and Assessments			
NRCS Watershed Projects		NRCS Watershed Plans, Studies & Assessments	
Name	Status	Name	Status
None	NA	None	NA
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 1	Streams - 6	NPS BMP Team	Ongoing
EPA 319 Watershed Projects			
Name		Status	
Rocky Run Watershed		Ongoing - Complete in 2007	
Kelly Creek Watershed		Complete	
James River Headwaters Watershed		2007 Start	

Soil

- The HEL cropland acreage experiencing erosion rates above sustainable levels decreased to 15,200 acres in 1997, as compared to 29,300 acres in 1982.
- Water erosion (above sustainable level) on cropland decreased to 11,800 acres in 1997, as compared to 19,200 acres in 1982.
- NRI estimates indicate there was a 59 percent reduction from 1987 to 1997 in the amount of Highly Erodible Land (HEL) being farmed.
- Conservation practices that can be used to address these water quality issues include grazing management, erosion control, nutrient and ag waste management, and riparian buffers.



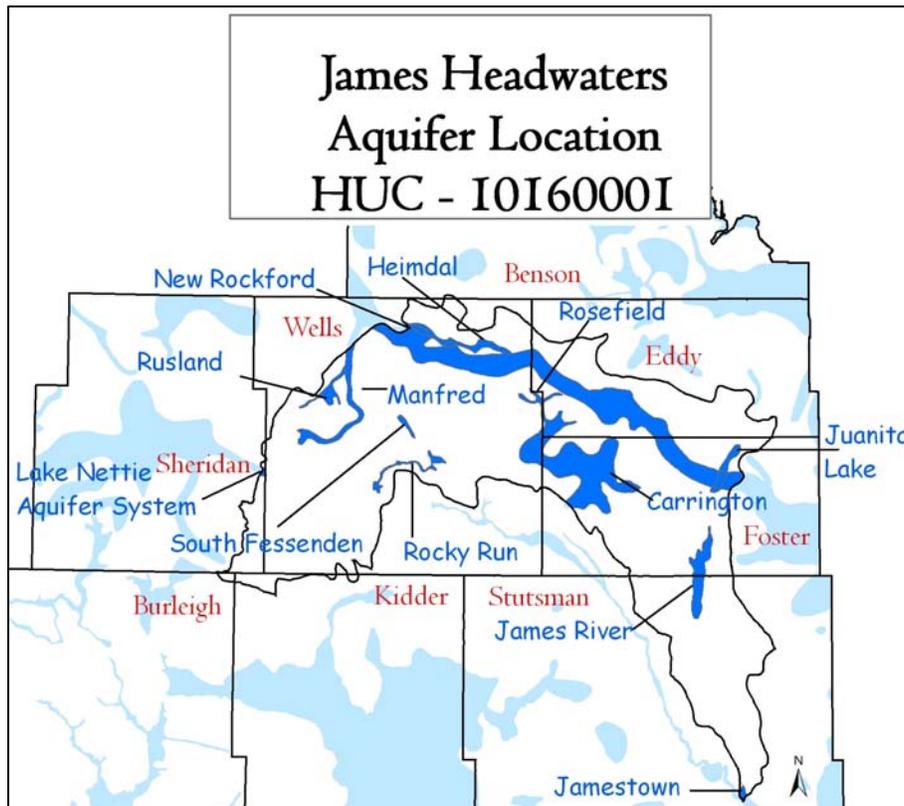
Resource Concerns - Continued

Soil - Continued

- Sandy soils and irrigated soils still require conservation practices to control excessive soil erosion.
- Soil erosion from conventional tillage operations is still a major concern on all soils.
- Soil health, especially compaction on silty and clayey soils and organic matter on sandy soils is a concern.
- Soil erosion and low organic matter remain resource concerns.
- Windbreak plantings, reduced tillage, and nutrient management systems are still needed.
- Controlling erosion not only sustains the long-term productivity of the land, but also affects the amount of soil, pesticides, fertilizer, and other organic material that move into the basin waters.
- Grassed waterways are still needed to help reduce ephemeral gully erosion.
- Sediment accumulation is reducing storage capacities in the Jamestown Reservoir.
- Cropping systems are needed to help reduce salinity and alkalinity on some soils.
- Stream bank failure and slumping are resource concerns along watercourses leading into the James River.

Water

- **Aquifers**¹² - There are 12 glacial drift aquifers (Spiritwood, Rosefield, Carrington, Juanita Lake, James River, Jamestown, Heimdal, South Fessenden, Rocky Run, Manfred, Lake Nettie Aquifer System, and Rusland) underlying the James River Headwaters sub-basin.



Resource Concerns – Continued

- **Wellhead Protection Areas¹³** – there are ten protection areas located in the sub-basin. They are designated to protect the municipal water supply for the cities of Kensal, Jamestown, Carrington, New Rockford, Cathay, Bowdon, and Fessenden. They also provide the water supply for rural water systems.
- Four of the stream sections on the 303(d) listed in hydrologic unit code 10160001 are listed for total fecal coliform; one for biological indicators, and another for dissolved oxygen.
- The Jamestown reservoir is listed as a TMDL for nutrients and eutrophication.
- Conservation practices that can be used to address these water quality issues include grazing management, erosion control, nutrient and pest management, as well as, ag waste management, and riparian buffers.
- The James River has water quality impacts from sedimentation and siltation.
- Leaching of nitrogen into the groundwater is a concern on high water table sands.
- Lack of adequate riparian buffer width and health are impacting water quality and stream health.
- Water conservation and water quality (potential for pesticide contamination) are concerns for irrigated cropland.
- Water erosion is a severe hazard on gently sloping and steeper soils. The hazard is greatest when the soil is bare during spring planting.
- Sheet and rill erosion due to improper residue management, poor crop rotations, overgrazing, and excess tillage is a concern.
- Urban and ag runoff are a concern for excessive nutrients and organics from surface water.
- Excessive runoff, due to tilling is becoming a major concern.

Air

- Soil blowing is a severe hazard on the course textured and moderately textured soils.
- Nearly all soils can be damaged by soil blowing if they are bare.
- Visibility is reduced during winter months from blowing snow.
- Increased wind speeds are due to tree/shelterbelt removal.

Plants

- Major concerns are with controlling invasive weeds and maintaining good pasture condition.
- Direct seeding of corn and soybeans has been successful in some locations.
- Conventional tillage systems are still utilized, especially with potatoes, corn, dry beans, and canola.
- Noxious weeds and poor range condition are reducing productivity for livestock and wildlife.



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Resource Concerns - Continued

Plants - Continued

- Season long grazing is a concern on or near water courses.
- The private, non-industrial forestland is associated with small woodlots or rural home sites which are not actively managed for timber production.
- Approximately 3,000 acres of native forestland occupy the James River and its tributaries.
- Native species not being replaced after land disturbances take place is a major concern.

Animals

- Lack of tall grasses is a concern for the limiting number of prairie chickens and pheasants.
- Inadequate shelter due to shelterbelts dying and being taken out without being replaced.
- Animals that are threatened and endangered can be seen in the following table of threatened and endangered species.

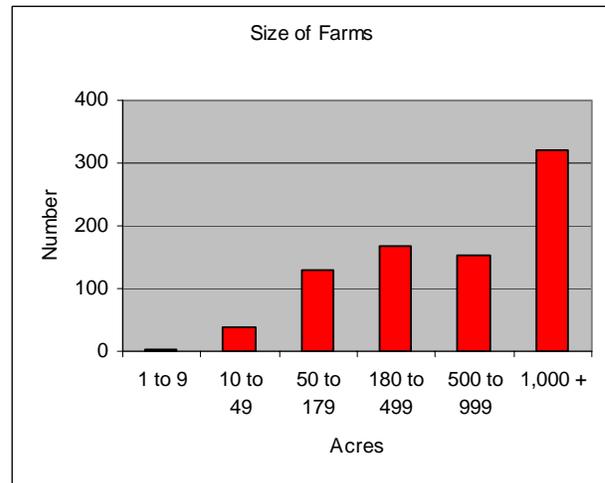
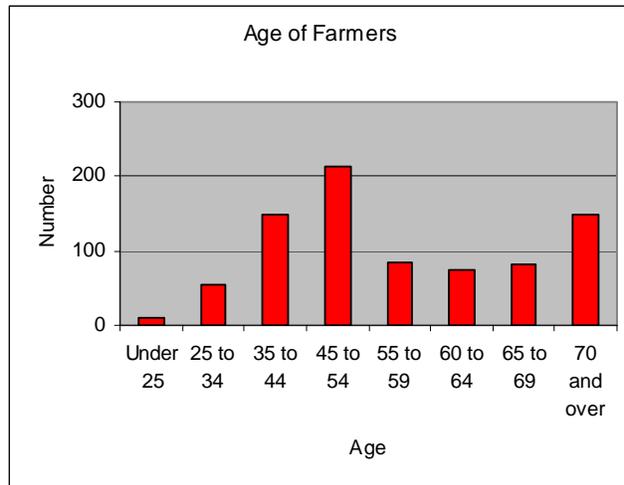
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	None	None
Birds	Bald Eagle Piping Plover	Whooping Crane	None
Fish	None	None	None
Invertebrates	None	None	Dakota Skipper
Plants	None	None	None
Critical Habitat – Piping Plover			

Census and Social Data¹⁴

Number of Farms: 813

Number of Operators:

- Average Age: 55
- Full-Time Operators: 70%
- Part-Time Operators: 30%



Limited Resource and Beginning Farmer

Approximately 6 percent of the operators are minority producers. Limited Resource Farmers are also estimated at 6 percent. Although rather low percentages, these facts point to the potential need for special technical assistance targeted to reach people who (1) may lack experience with government farm programs, (2) have good stewardship intentions but lack management skills, and (3) lack the time to visit an NRCS field office and seek assistance.

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References

- ¹ USDA-NRCS, NRI data.
- ² USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
- ³ USDA-Farm Services Agency, Common Land Unit GIS data layer, 2005.
- ⁴ USDI-US Geologic Services, ND GAP analysis data, 2005.
- ⁵ USDA-NRCS, Natural Resources Planning Staff, 30 meter Relief Data GIS data layer, 2002.
- ⁶ ND Department of Health, Environmental Health Section, Water Quality Division, National Hydrography GIS layers, June 2006.
- ⁷ ND Department of Health, Environmental Health Section, Water Quality Division, List of Section 303(d) TMDL Waters for the Red River Basin in North Dakota, 2006.
- ⁸ ND Department of Health, Environmental Health Section, Water Quality Division, Animal Feeding Operations Program data, 2006.
- ⁹ 2002 Census of Agriculture, North Dakota, State and County Data Volume 1, Geographic Area Series Part 34, U.S. Department of Agriculture, National Agricultural Statistics Service, June 2004. (county data was prorated to HUC by the percent of a HUC in a county)
- ¹⁰ USDA-NRCS, Natural Resources Planning Staff, Common Resource Area GIS data layer, 2004.
- ¹¹ USDA-NRCS, Natural Resources Planning Staff, Soils Productivity GIS data layer, 2006.
- ¹² ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
- ¹³ ND Department of Health, Environmental Health Section, Water Quality Division, Source Water Protection Program data, 2003.
- ¹⁴ 2002 Census of Agriculture, North Dakota, State and County Data Volume 1, Geographic Area Series Part 34, U.S. Department of Agriculture, National Agricultural Statistics Service, June 2004. (County data was prorated to HUC by the percent of a HUC in a County)