

Apple 10130103

8-Digit Hydrologic Unit Profile

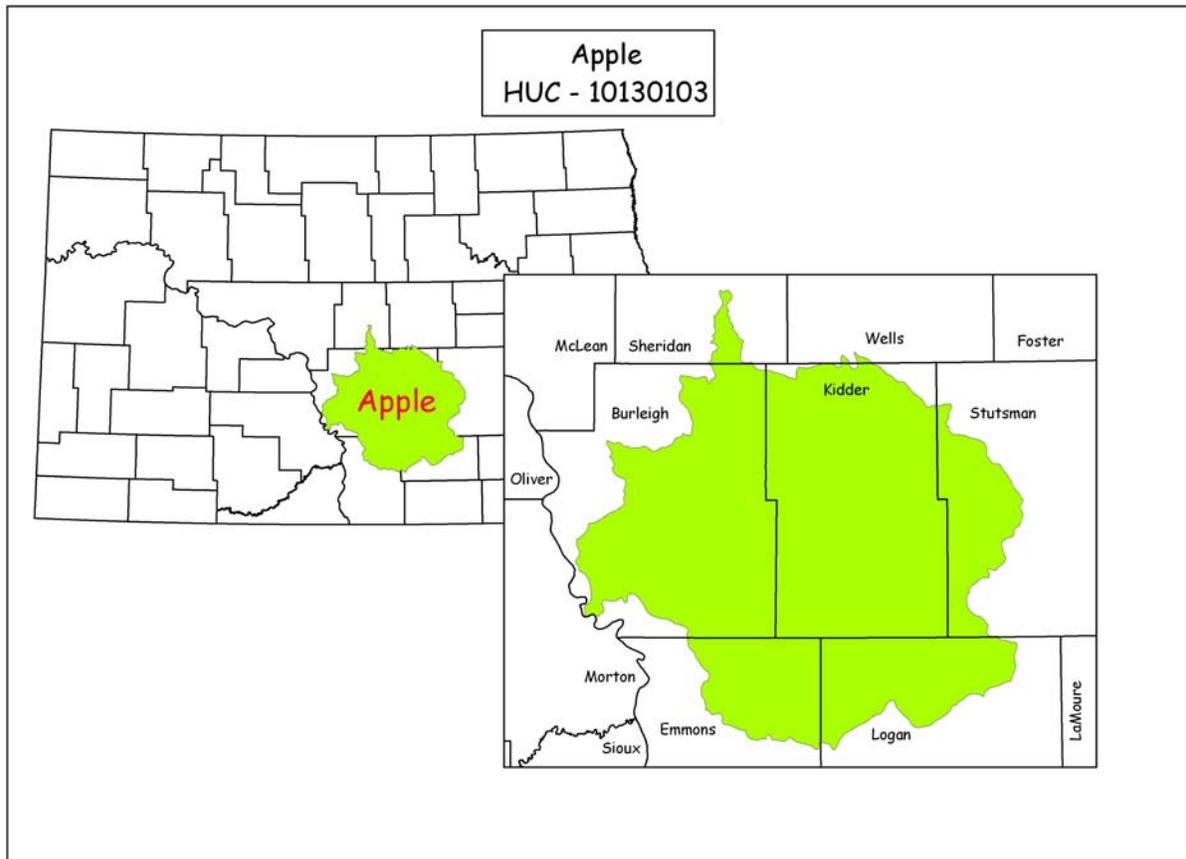
September 2008

Introduction

The Apple 8-Digit Hydrologic Unit Code (HUC) (10130103) sub-basin is approximately 2,372,200 acres covering parts of seven counties (Kidder, Burleigh, Logan, Emmons, Stutsman, Sheridan, and Wells) in the Missouri River Basin – Lake Oahe Subbasin. Of the 2,372,200 acres, Kidder County contains 37%, Burleigh 30%, Logan 12%, Emmons 10%, Stutsman 9%, Sheridan 1%, and Wells 1%.

This sub-basin encompasses commodities ranging from soybeans, spring wheat, corn, durum wheat, oats, flax seed, barley, canola, and sunflowers to beef & dairy cattle, swine, sheep, and bees.

Conservation assistance is provided by seven Natural Resources Conservation Service (NRCS) Service Centers and two Resource Conservation & Development (RC&D) Offices.



*Produced by
the Natural
Resources
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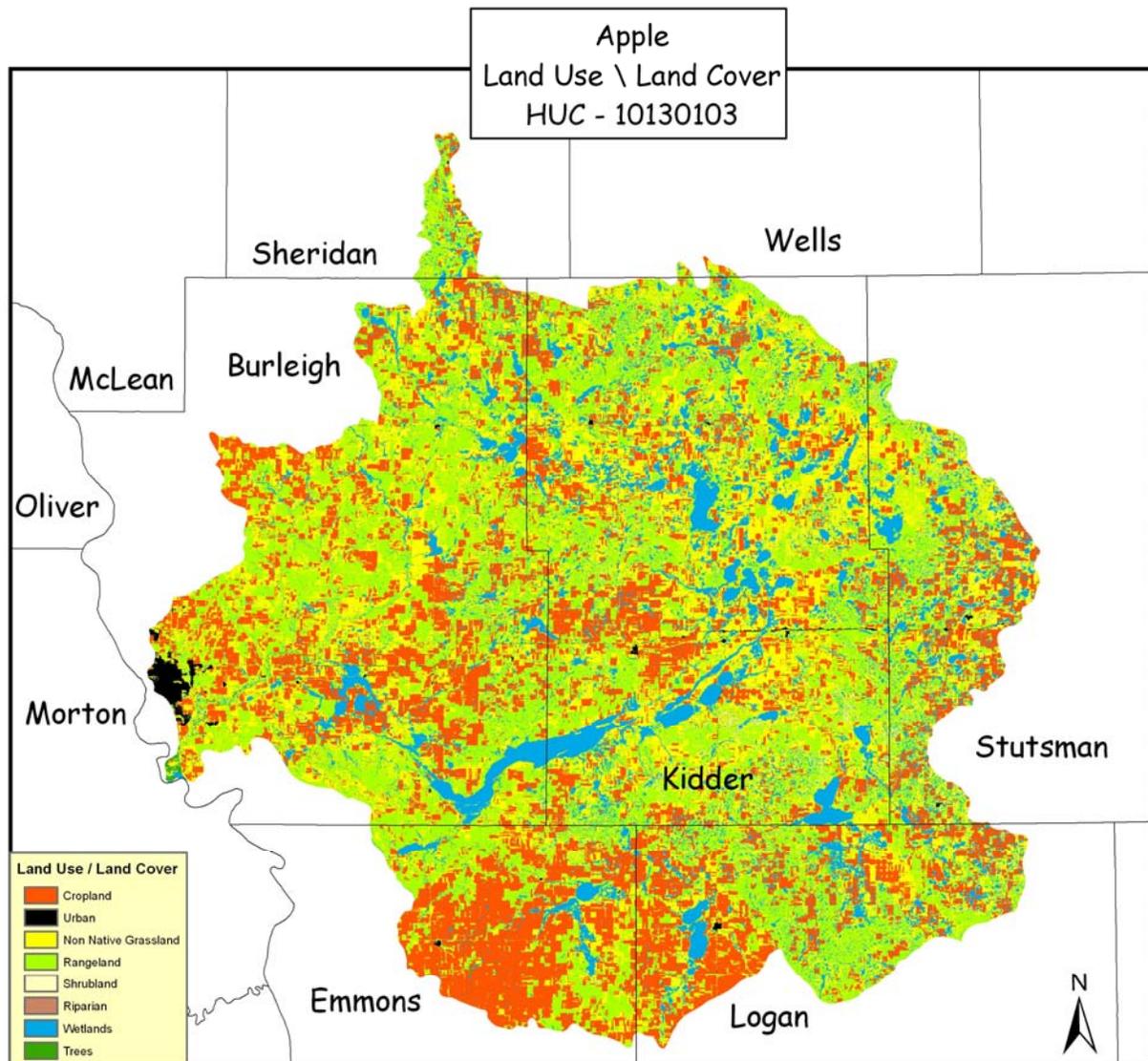
Physical Description

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

Land Use/ Land Cover (National Resources Inventory [NRI])¹	Acres	Percent of HUC
Forestland	6,100	1%
Cropland	600,200	25%
Conservation Reserve Program (CRP) Land ^{2 a}	245,900	10%
Tame Grass/Hayland	241,100	10%
Pastureland	89,600	4%
Rangeland	906,900	38%
Urban/Farmstead/ Transportation Land	169,200	7%
Water/Wetlands	73,200	3%
Federal Lands	40,000	2%
North Dakota HUC Totals ^b	2,372,200	100%
<i>a: Estimate from Farm Service Agency records and include CRP/CREP. b: Totals may not add due to rounding and small unknown acreages.</i>		
Irrigated Land <i>(Farm Services Agency)³</i>	18,926	<1%

Physical Description – Continued

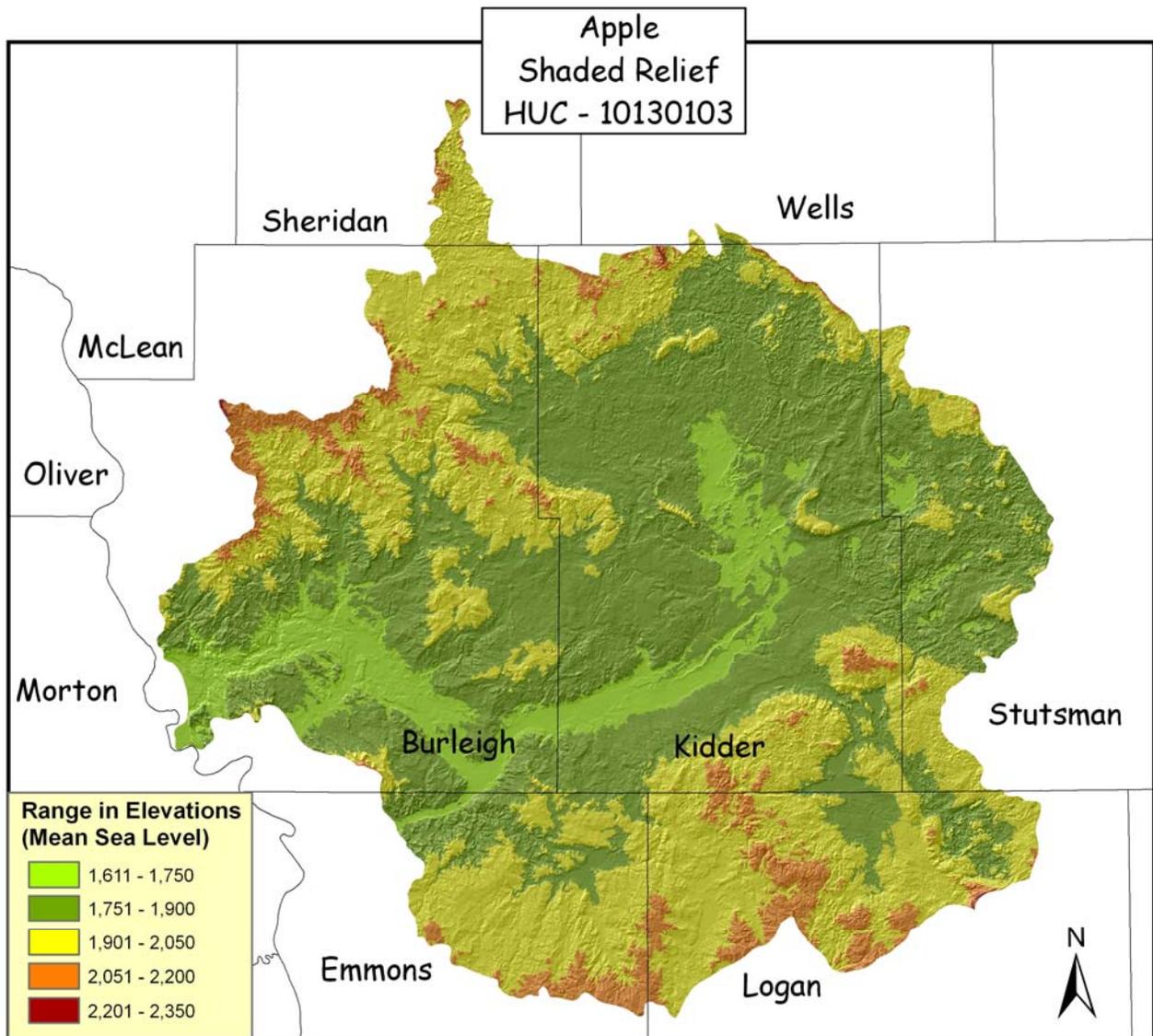
Land Use/Land Cover Map



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

Physical Description – Continued

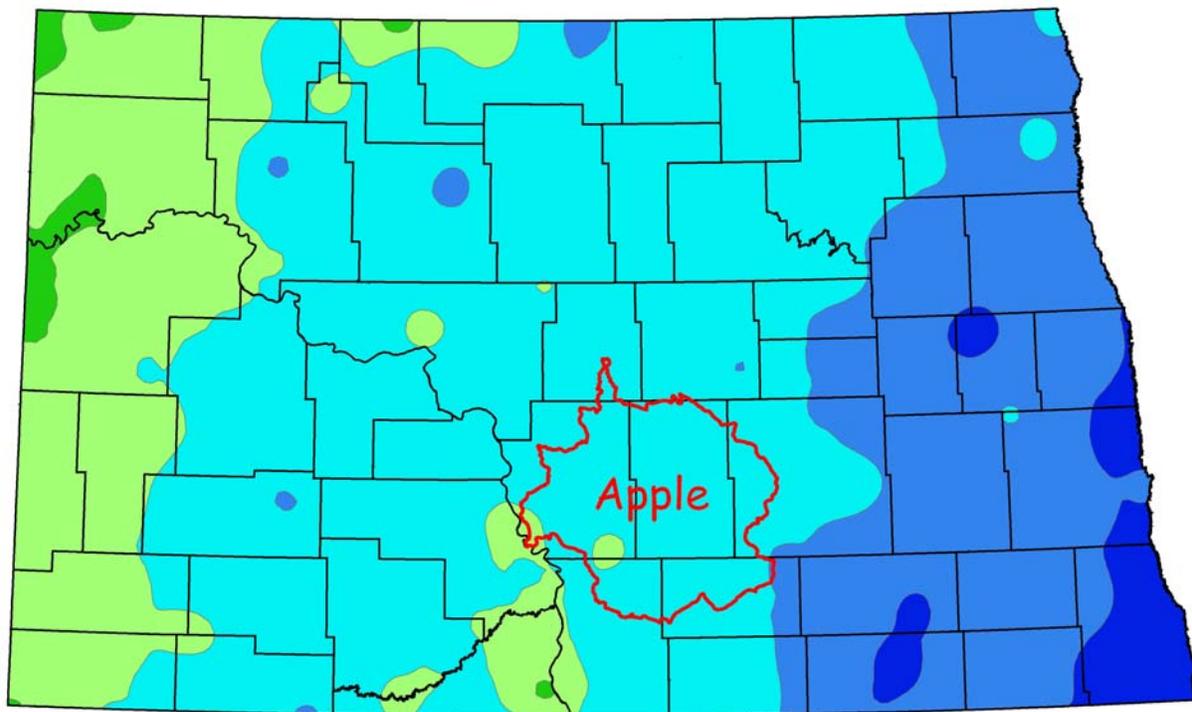
The sub-basin is part of the Missouri Region – Missouri-Oahe Sub-Region. All drainage patterns flow towards Hay Creek, downstream to its confluence with Apple Creek before making its way into the Missouri River, which flows south into the Mississippi before it makes its way into the Gulf of Mexico. The 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)

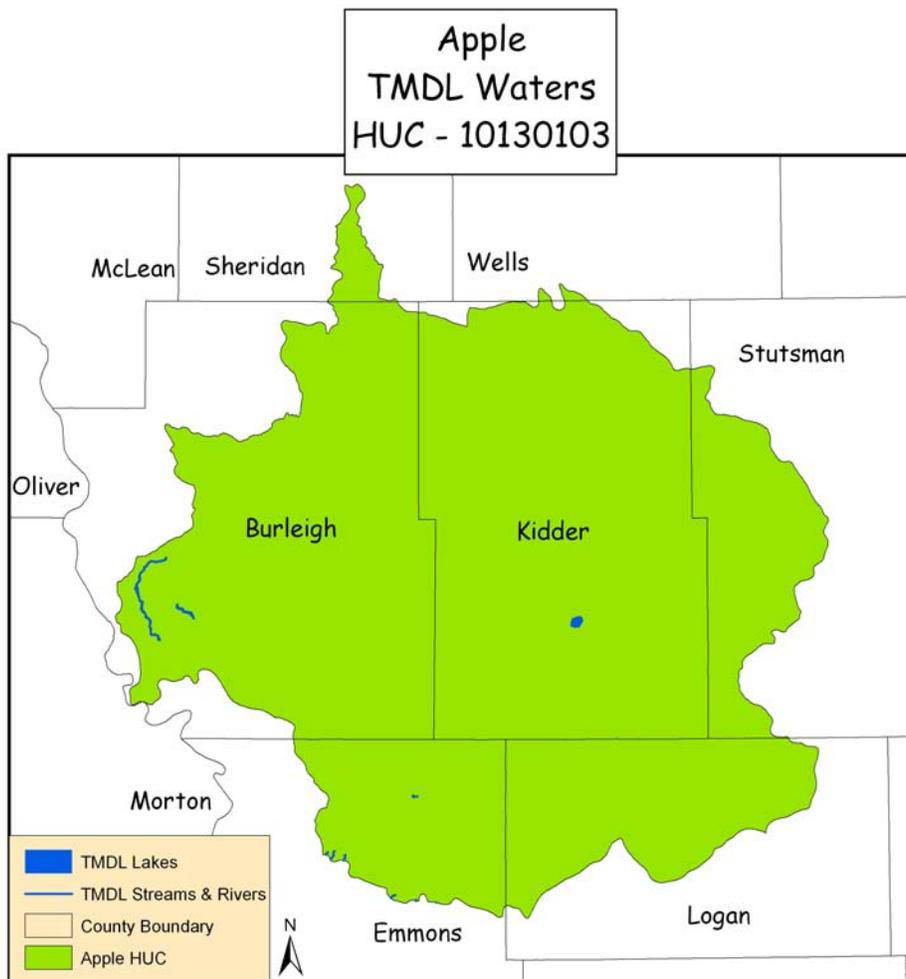
Apple
Average Annual Precipitation
HUC - 10130103



Physical Description – Continued

The North Dakota Department of Health (NDDH) 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 with a water quality limitation. A map showing the Total Maximum Daily Load (TMDL) waters within the watershed follows the table. TMDL is the amount of a particular pollutant a stream, lake, estuary, or other waterbody can "handle" without violating State water quality standards.

		Units	Apple Sub-basin ⁶	Apple Impaired Water Quality (303d) ⁷	Percent Impaired* 10130103
Water Quality Data <i>*Percent of Total Miles and acres in HUC</i>	Total – Major Water Bodies	No.	15	3	20.0
	Rivers/Streams	Miles	980.05	15.78	1.6%
	Lakes/Reservoirs	Acres	18,851.5	875.2	10.4%



Physical Description – Continued

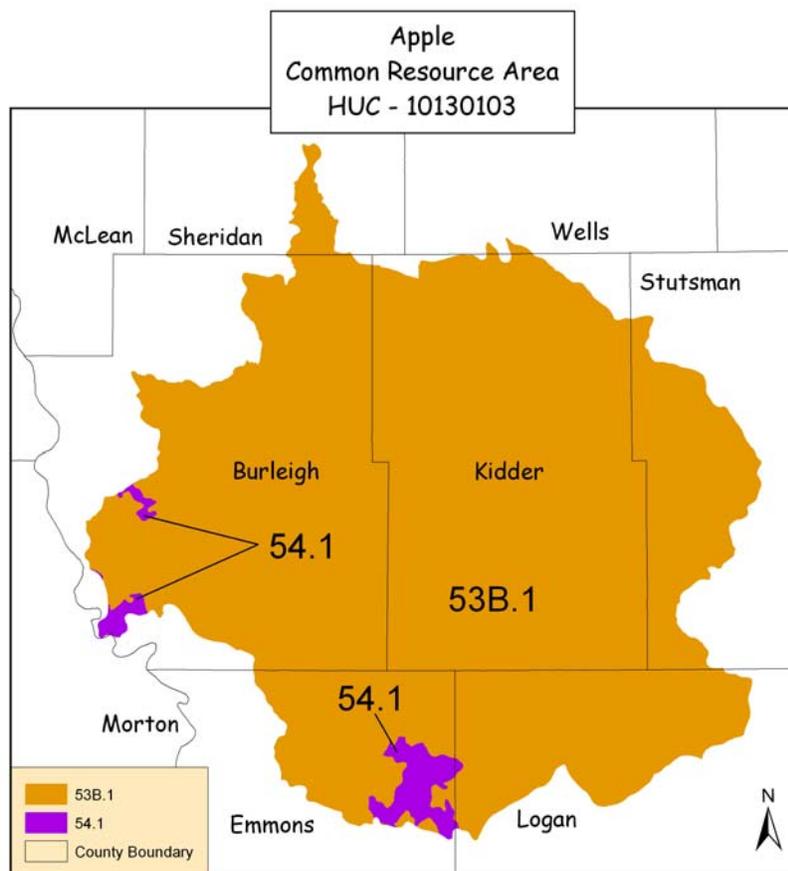
The following two tables show feeding operations, permitted operations, and livestock numbers. The first table lists the number of animal feeding operations and animals as tracked by NDDH. The second table shows livestock numbers for all cattle, beef cows, dairy cows, hogs and pigs, and sheep and lambs. 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	17	28	3	3	51
Number of Animals	1,784	16,491	525	11	18,811
Number of State Permitted Operations					39

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
Apple Sub-basin	164,500	85,600	2,600	700	7,700
Apple Sub-basin as a percent of North Dakota	8.8%	8.7%	7.5%	0.5%	6.8%

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 Apple sub-basin with the descriptions below.



53B.1 - Central Dark Brown Glaciated Plains:

The Central Dark Brown Glaciated Plains are nearly level to rolling with steeper areas along rivers. Land use is a mosaic of cropland and rangeland. Soil textures are dominantly loamy in glacial till, sandy in outwash areas, and clayey in lacustrine areas. Most soils are moderately deep or deep, well drained or moderately well drained, and have a frigid temperature regime.

54.1 - Rolling Soft Shale Plain:

The Rolling Soft Shale Plain is a semiarid rolling plain with soils formed from shale, siltstone, and sandstone. Native grasses cover areas of steep or broken topography while cultivated and forage crops dominate other parts of the landscape. Most soils are moderately deep and deep, well drained and moderately

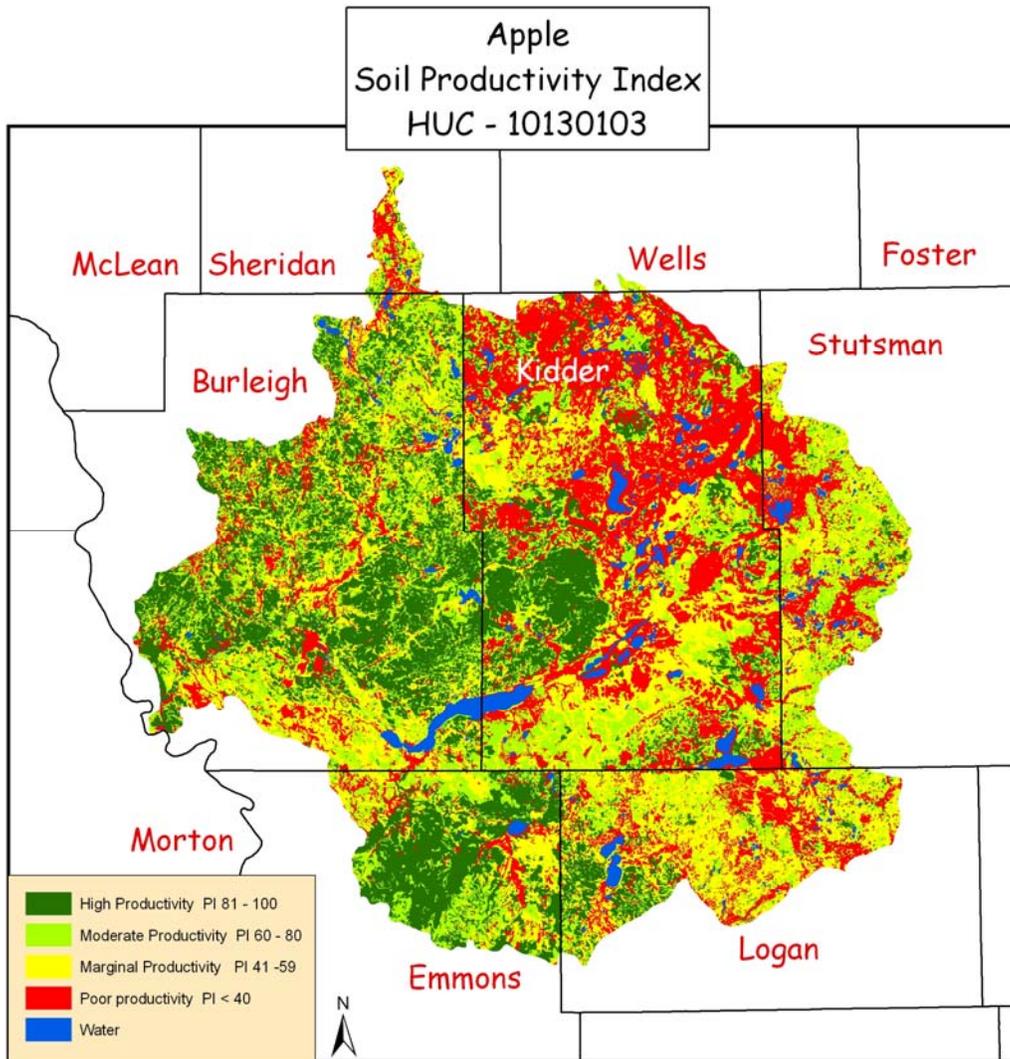
well drained, loamy and clayey and have a frigid temperature regime. The area was largely unaffected by glaciation and retains a moderately dissected stream drainage pattern.

Soil Productivity¹¹

The Apple sub-basin has two distinct sub-basins. With exception to the Long Lake drainage system, the western and northern area of the sub-basin has soils that range from marginal to high in productivity index (PI). There are areas within the western half, although small in size, that have marginal to poor PIs. The remainder of the sub-basin including the Long Lake drainage and the Apple Creek flood plain has soils with a marginal to poor PI.

The term "Productivity Index" used in this document reflects soil properties and the inherent production capacity of the soil to produce spring wheat.

Due to the differences in mapping conventions between Burleigh and Kidder Counties, the soil productivity map shows abrupt differences at the counties boundary. This situation will be addressed in a soil survey update. The above narrative correctly describes soil productivity.



Common Land Unit

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

Resource Concerns

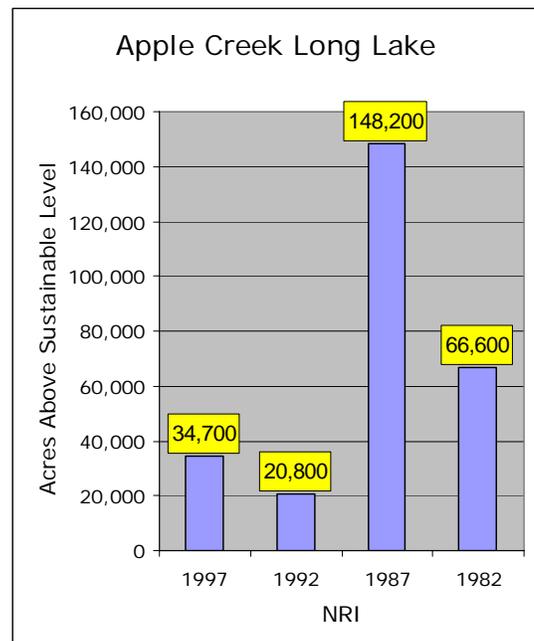
One of the goals of NRCS is to help quantify the types and amounts of resources that may be of concern in an area. This helps identify priority areas for the types and amounts of assistance given to a particular watershed.

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
McDowell Dam Watershed	Complete	NA	NA
NDDH TMDLs		Soil Conservation District Assessments and Studies	
Number Listed		Name	Status
Lakes/Reservoirs - 2	Streams - 1	NA	NA
EPA 319 Watershed Projects			
Name		Status	
XX		XX	

Soil

- NRI estimates indicate there was a 38 percent reduction from 1987 to 1997 in the amount of Highly Erodible Land (HEL) being farmed (264,500 to 163,300).
- The HEL cropland acreage experiencing erosion rates above sustainable levels decreased to 34,700 acres in 1997, as compared to 138,700 acres in 1987.
- NRI estimates indicate that 34,700 acres of the sub-basin agricultural lands has wind erosion rates above a sustainable level in 1997.
- 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's waters.
- Sandy soils and irrigated soils still require conservation practices to control excessive soil erosion.



Resource Concerns – Continued

Soil (continued)

- With the assistance of NRCS programs, many farmers and ranchers have applied conservation practices to reduce the effects of wind erosion. From 1987 to 1997, the average wind erosion rate reduced from 8.8 tons/acre/year to 3.4 tons/acre/year on all cultivated cropland. The average water erosion rate reduced from 2.4 tons/acre/year to 1.5 tons/acre/year on cultivated cropland.
- Soil health, especially compaction on silty and clayey soils and organic matter on sandy soils.
- Soil erosion and low organic matter remain resource concerns.
- Windbreak plantings, reduced tillage systems, and improved cropping systems are still needed.

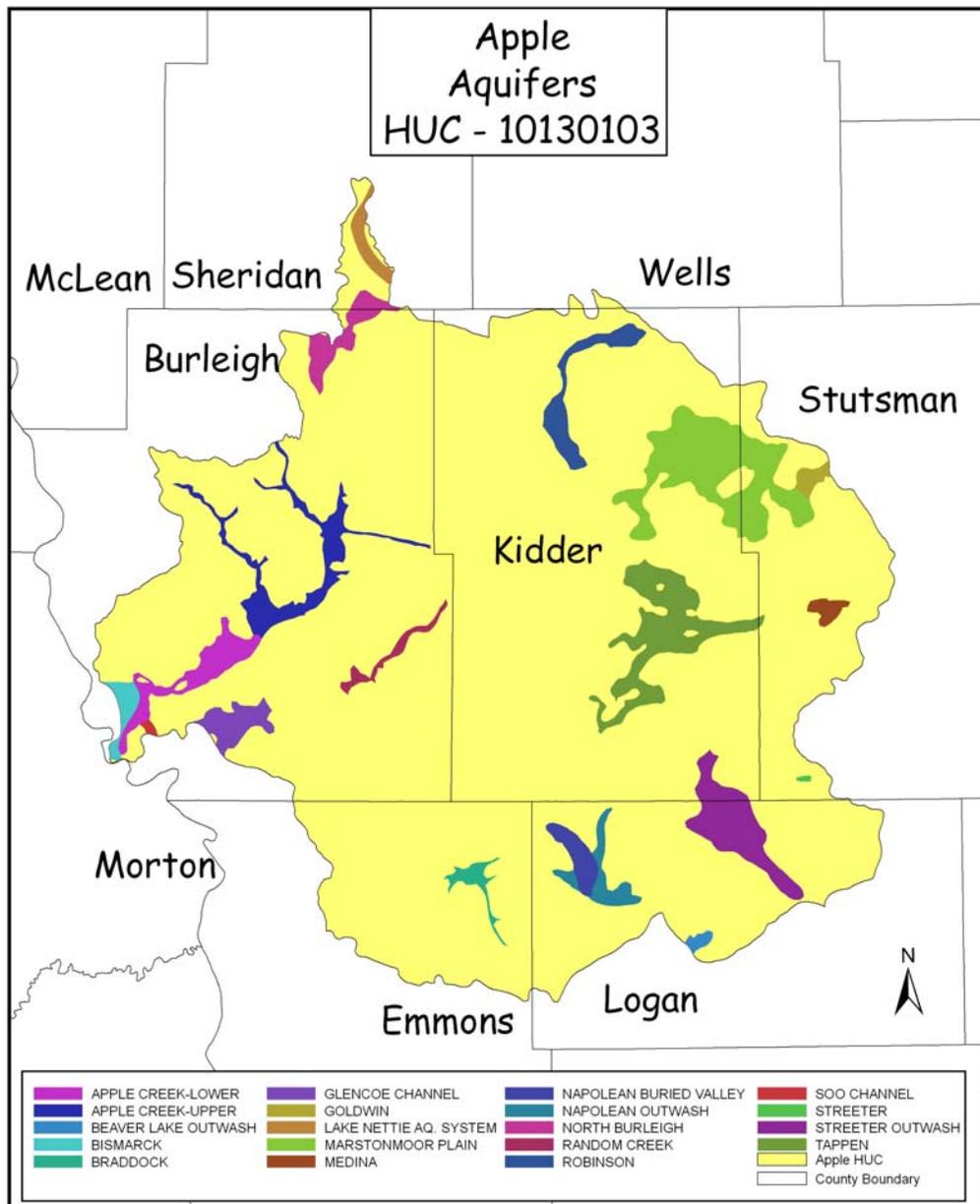
Water

- Lack of adequate riparian buffer width and health are impacting water quality and stream health.
- Spring flooding occurs nearly every year affecting transportation infrastructure and crop seeding dates.
- Summer flooding does occasionally occur and impacts crop production.
- Water conservation and water quality (potential for pesticide contamination) are issues on irrigated cropland.
- 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.
- The 303(d) list shows two waterbodies located within hydrologic unit code 10130103 being impaired because of dissolved oxygen and eutrophication. Other impairments listed include biological indicators.
- The Hay Creek has water quality impacts from sedimentation and siltation.
- **Wellhead Protection Areas**¹² – There are ten protection areas located in the sub-basin. They are designated to protect the municipal water supply for the cities of Lincoln, Wing, Tuttle, Robinson, Steele, Medina, Streeter, Napoleon, Hazelton, and Braddock.

Resource Concerns – Continued

Water (continued)

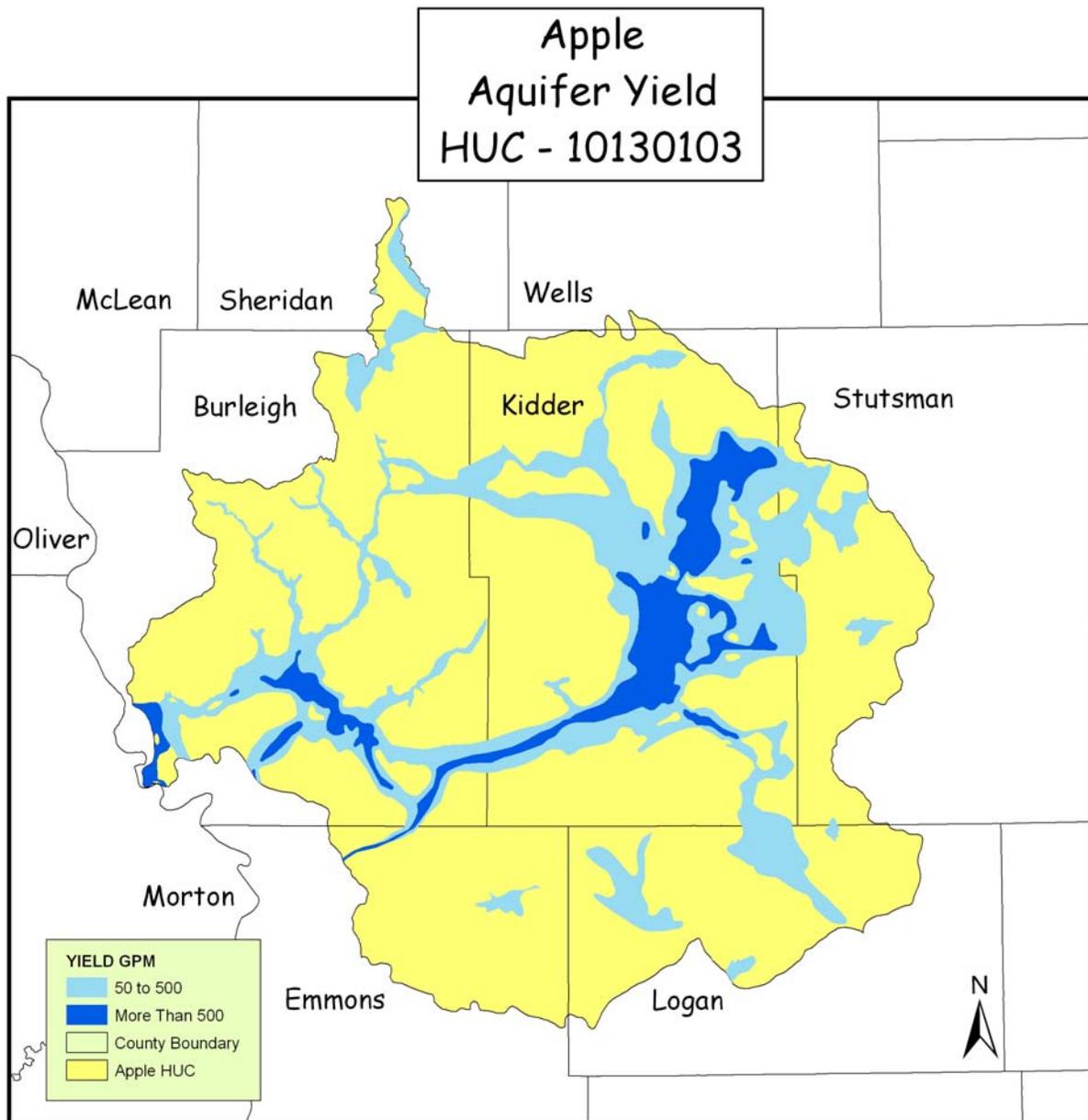
- Aquifers¹³** - There are nineteen glacial drift aquifers (Apple Creek Lower, Apple Creek Upper, North Burleigh, Lake Nettie Aquifer System, Robinson, Marstonmoor Plain, Medina, Napoleon Outwash, Beaver Lake Outwash, Braddock, Glencoe Channel, Goldwin, Random Creek, Soo Channel, Tappen, Streeter, Streeter Outwash, Napoleon Buried Valley, and Bismarck) underlying the Apple sub-basin. The communities of Lincoln, Wing, Tuttle, Robinson, Steele, Medina, Streeter, Napoleon, Hazelton, and Braddock use the aquifers as their main source of water.



Resource Concerns – Continued

Water (continued)

- **Aquifers–Surficial** – The map below is a summary of the major glacial-drift aquifers and their potential Gallon Per Minute (GPM) yield as described in the county ground water reports. These aquifers are considered to have the greatest potential for yielding significant quantities of water for municipal, industrial, and agricultural purposes.



Resource Concerns – Continued

Air

- Visibility is reduced during winter months from blowing snow.
- Increased wind speeds due to tree/shelterbelt removal.

Plants

- Major concerns are 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 and dry beans.
- Crops produced in the watershed are wheat, corn, sunflowers, barley, and oats. Other crops include alfalfa, soybeans, potatoes, flax, and canola.
- Noxious weeds and poor range condition reduce productivity for livestock and wildlife.
- Season long grazing on or near water courses are a concern.
- The private, non-industrial forestland is associated with small woodlots or rural home sites and riparian areas that are lined with trees which are not actively managed for timber production.

Animals

- Animals that are threatened and endangered can be seen in the following table of threatened and endangered species.

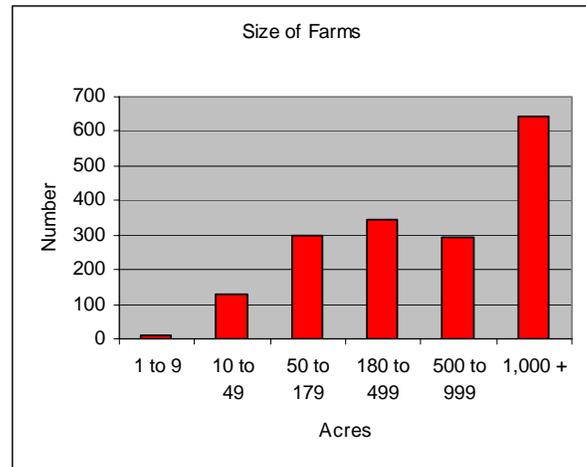
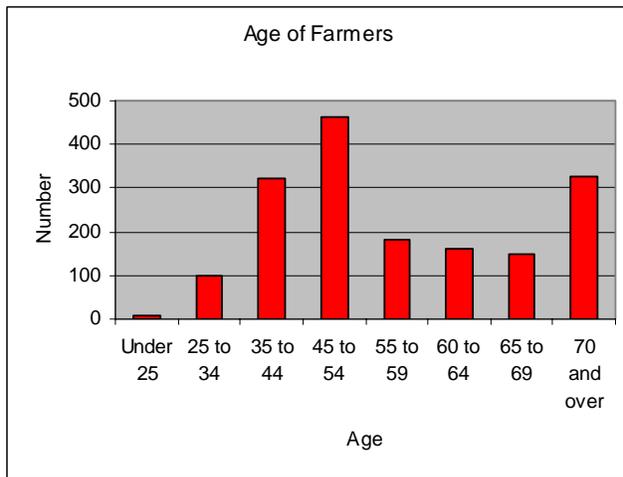
Federally Listed Threatened And Endangered Species			
Species Category	Threatened	Endangered	Candidate
Mammals	None	None	None
Birds	Piping Plover	Interior Least Tern Whopping Crane	None
Fish	None	Pallid Sturgeon	None
Invertebrates	None	None	Dakota Skipper
Plants	None	None	None
Critical Habitat – Piping Plover			

Census and Social Data¹⁴

Number of Farms: 1,718

Number of Operators:

- Average Age: 55
- Full-Time Operators: 64%
- Part-Time Operators: 36%



Limited Resource and Beginning Farmer

Approximately 4.3 percent of the operators are minority producers. Limited Resource Farmers are estimated at 11.2 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, Source Water Protection Program data, 2003.
- ¹³ ND Department of Health, Environmental Health Section, Water Quality Division, Ambient Ground Water Monitoring Program data, 1997.
- 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.)