

APPENDIX A

STUDY SITE INFORMATION

RED RIVER VALLEY WATER NEEDS ASSESSMENT

PHASE 1B

INSTREAM FLOW NEEDS ASSESSMENT

STUDY SITE INFORMATION

AQUATIC LIFE MAINTENANCE FLOW NEEDS ASSESSMENT

Staff from Reclamation's Technical Service Center, Denver, Colorado, conducted field work between October 21 and November 5, 1997, and June 8-11, 1998, to: (1) select study sites representative of specific portions of the Sheyenne River and the Red River of the North; (2) determine habitat types within each study site; (3) estimate the proportion of each habitat type within each study site; and, (4) place transects within the various habitat types and collect stream geometry data as well as depth and velocity information along the transects. As a result, six study sites were selected as representative of the following portions of the Sheyenne River and the Red River of the North (generally following ecoregion boundaries for North Dakota):

Sheyenne River

1. Warwick Study Site - Sheyenne River above Lake Ashtabula (near Warwick, North Dakota, Eddy County, T150N, R63W, NW1/4NW1/4 of Sec. 22). Although data were twice collected at this site, the HEC-RAS Model was unable to be calibrated utilizing the data collected. Lisbon Study Site data were used in the Warwick Study Site analysis [the Lisbon Study Site was very similar to the Warwick Site in associated instream habitat, vegetation, and channel geometry (see Appendix E for information comparing Warwick and Lisbon Study Site channel geometry)], however, ultimately, Houston Engineering, Inc. (1997) study site data were used in quantifying the relationship between available fishery habitat and flow.
2. Ft. Ransom Study Site - Sheyenne River below Lake Ashtabula (near Fort Ransom, North Dakota, Ransom County, T135N, R57W, NE1/4SW1/4 of Sec. 17).
3. Lisbon Study Site - Sheyenne River below Lake Ashtabula (near Lisbon, North Dakota, Ransom County, T135N, R57W, SW1/4SE1/4 of Sec. 12).
4. Pigeon Point Study Site - Sheyenne River through the Sandhills (at Pigeon Point Wildlife Area, North Dakota, Ransom, County, T135N, R53W, NW1/4NE1/4 of Sec. 18).
5. Norman Study Site - Sheyenne River through the Agassiz Lake Plain (near Norman, North Dakota, Cass County, T137N, R50W, SW1/4SW1/4 of Sec. 24).

Red River of the North

1. Red River Study Site - Red River of the North near Fargo (at Fargo, North Dakota, Lindenwood Park downstream of I-94 Bridge, Cass County, T139N, R48W, SW1/4SE1/4 of Sec. 18).

Written descriptions for each study site including location maps and photographs are provided below. Tables A-1 contains study site data and field notes collected during field work activities. These data were used in the instream flow analysis, Modified Habitat Preference Method evaluation.

Warwick Study Site

The Warwick Study Site is located on the Sheyenne River above Lake Ashtabula (near Warwick, North Dakota, Eddy County), adjacent to and downstream of the county highway bridge, and downstream of USGS gaging station 05056000, approximately 3.3 miles south of Warwick. The site consists of a mixture of habitat types - pool, riffle, and run habitats. The substrate varies considerably from the upstream to downstream transects (mud/silt/clay to gravel/cobble/boulders to silt/sand/mud/clay). Five transects (cross sections) were initially placed within the study site (October 23, 1997). Five additional transects were subsequently placed during a resurvey of the site on June 9, 1998. Additional data collection was also accomplished on June 9, 1998.

- Transect A - run/pool habitat (most downstream transect)
- Transect B - run/pool habitat
- Transect C - run/pool habitat (discharge measurement transect on June 9, 1998)
- Transect 1 - run habitat (discharge measurement transect on October 23, 1997)
- Transect 2 - base of riffle habitat
- Transect 2a - head of riffle habitat
- Transect 3 - pool habitat
- Transect 4 - middle of riffle habitat
- Transect 4a - head of riffle habitat
- Transect 5 - pool habitat (most upstream transect)

Ft. Ransom Study Site

The Ft. Ransom Study Site is located on the Sheyenne River below Lake Ashtabula (near Fort Ransom, North Dakota, Ransom County), adjacent to and immediately upstream of a county bridge, and downstream of Ft. Ransom approximately 3 miles. The substrate is relatively uniform throughout this study reach, consisting primarily of sand, gravel, and cobble. Six transects (cross sections) were placed within the study site (November 3, 1997).

- Transect 1 - riffle/run habitat (discharge measurement transect on November 3, 1997)(most downstream transect)
- Transect 2 - run habitat
- Transect 3 - run/pool habitat
- Transect 4 - run/pool habitat
- Transect 5 - run/pool habitat
- Transect 6 - run/pool habitat (most upstream transect)

Lisbon Study Site

The Lisbon Study Site is located on the Sheyenne River below Lake Ashtabula (between Fort Ransom, and Lisbon, North Dakota, Ransom County), adjacent to and immediately downstream of an abandoned railroad embankment, approximately 5 miles upstream of Lisbon. The substrate varies considerably from the upstream to downstream transects (mud/silt/clay with boulders to sand/rock/mud/clay with gravels and cobble). Five transects (cross sections) were placed within the study site (October 24, 1997).

Transect 1 - riffle/run habitat (discharge measurement transect on October 24, 1997)
(most downstream transect)

Transect 2 - run/pool habitat

Transect 3 - pool habitat

Transect 4 - pool habitat

Transect 5 - pool habitat (most upstream transect)

Pigeon Point Study Site

The Pigeon Point Study Site is located on the Sheyenne River below Lake Ashtabula through the Sandhills at the Pigeon Point Wildlife Area (between Lisbon and Kindred, North Dakota, County), upstream of the county bridge (Larson Bridge), approximately 15 miles upstream of Kindred. The substrate is relatively uniform throughout this study reach, consisting primarily of sand, gravel, mud/clay and submerged structures (downed trees). Five transects (cross sections) were placed within the study site (October 31, 1997).

Transect 1 - run habitat (discharge measurement transect on October 31, 1997)
(most downstream transect)

Transect 2 - run habitat

Transect 3 - run habitat

Transect 4 - run habitat

Transect 5 - run habitat (most upstream transect)

Norman Study Site

The Norman Study Site is located on the Sheyenne River below Lake Ashtabula through the Agassiz Lake Plain (between Kindred and Norman, North Dakota, Cass County), adjacent and upstream and downstream of the county bridge immediately west of Norman. The substrate varies considerably from the upstream to downstream transects (sand/gravel/mud/clay to gravel/cobble/rock/boulders to sand/gravel/mud/clay). Five transects (cross sections) were placed within the study site (October 19-30, 1997).

Transect 1 - run/pool habitat (discharge measurement transect on October 30, 1997)
(most downstream transect)

- Transect 2 - pool habitat
- Transect 3 - run/riffle habitat
- Transect 4 - run/riffle habitat
- Transect 5 - pool habitat (most upstream transect)

Red River Study Site

The Red River Study Site is located at Fargo, North Dakota, just downstream of the Interstate 94 bridge across the Red River of the North (Lindenwood Park downstream of the Interstate 94 bridge, Cass County). The substrate is relatively uniform throughout this study reach, consisting primarily of sand, gravel, mud/clay with a few submerged structures (downed trees and concrete slabs/large boulders). Seven transects (cross sections) were placed within the study site (October 27-28, 1997).

- Transect 1 - pool habitat (discharge measurement transect on October 28, 1997)
(most downstream transect)
- Transect 2 - pool habitat
- Transect 3 - pool habitat
- Transect 4 - pool habitat
- Transect 5 - pool habitat
- Transect 6 - pool habitat
- Transect 7 - pool habitat (most upstream transect)

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