

APPENDIX C
OXBOW COMPLEX ECOLOGICAL EVALUATION

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The report titled Wetland Delineation For St. Maries River Study Areas (SELKIRK ENVIRONMENTAL 1999) identified six relatively high value wetland areas within the overall, moderately valued wetland complex. This report has stated:

"Within the context of a moderately valued wetland, specific areas within the wetland complex may be considered as generally low value and others as generally high value. The low value areas are the farmed wetlands where there is relatively short-term hydrology and a broad expanse of emergent vegetation lacking shrubs or trees. Edge effect is not present and the dominant plant species are seeded pasture grasses. The high value areas would be those areas where shallow and deep emergent, and shrub and tree species inter finger, providing a maximum edge effect and diversity of habitats in a small space. The same high value may be assigned where the spectrum of hydrologic conditions from seasonally shallow to permanently deep inundation can be found in close proximity."

Five of these relatively high value areas are within the proposed permit areas. These areas, shown in Figure 2-1, are oxbow complexes that have been truncated from the main stem of the St. Maries River by typical fluvial processes. A brief description of each oxbow complex follows. See the wetland report for additional descriptions of plant communities and hydrology.

Oxbow Complex 1: This complex totals 2.8 acres. It has emergent, scrub-shrub, and open water habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne, alder, and dogwood. It has less than 20 percent tree canopy of black cottonwood, cedar, and spruce. This complex has areas that are seasonally saturated, semi-permanently inundated and saturated, and permanently inundated/saturated. Hydrologic support is from seasonal run-off, precipitation, and floodflows.

Oxbow Complex 2: This complex totals 9.4 acres. It has emergent, scrub-shrub, and open water habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne, alder, willow, and dogwood. It has less than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated, semi-permanently inundated and saturated, and permanently inundated/saturated. Hydrologic support is from seasonal run-off, precipitation, floodflows, and stream water contribution from Pierce Creek, as seasonal system.

Oxbow Complex 3: This complex totals 9.5 acres. It has emergent, scrub-shrub, forested, and open water habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne, alder, willow, and dogwood. Forested vegetation is dominated by a greater than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated, semi-permanently inundated and saturated, and permanently inundated/saturated. Hydrologic support is from seasonal run-off, precipitation, floodflows, and stream water contribution from Hatton Creek, as seasonal system.

Oxbow Complex 4: This complex totals 6.8 acres. It has emergent and scrub-shrub habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne and alder. It has less than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated and semi-permanently inundated and saturated. Hydrologic support is from seasonal run-off, precipitation, and floodflows.

Oxbow Complex 5: This complex totals 4.3 acres. It has emergent and scrub-shrub habitat components. Emergent vegetation is dominated by sedges, reed canarygrass, and meadow foxtail. Scrub-shrub vegetation is dominated by hawthorne and alder. It has less than 20 percent tree canopy of black cottonwood. This complex has areas that are seasonally saturated and semi-permanently inundated and saturated. Hydrologic support is from seasonal run-off, precipitation, and floodflows.

Although the wetland report identified these oxbow complexes as relatively high value areas, they are not irreplaceable, high value systems in absolute terms or by regulatory definition. They are not any of the following;

- Natural Heritage sites,
- candidates for natural Heritage sites,
- inter-tidal systems,
- complex forested wetlands,
- rare peat systems, or
- habitat for rare, threatened, or endangered plants or animals.

At the request of the Corps of Engineers, these five oxbow complexes have been ranked according to relative ecological value for consideration in the Oxbow Avoidance Alternative. This ranking was accomplished by utilizing the Rationale for Wetland Functional Evaluation in Appendix E of the wetland report. This rationale was modified to include the edge-effect benefits of upland pockets within a wetland complex, and is shown in Table A - Oxbow Complex Function Evaluation. In this table the complex number is recorded for each applicable functional characteristic. The number of "hits" or occurrences for each complex is then summed for low, moderate, and high value criteria.

Table B - Summary of Occurrences for Oxbow Complexes shows the number of low, moderate, and high occurrences for each oxbow complex. The ranking is based on a simple sum of the occurrences, weighting is not used. The highest ranked complexes are those with the greatest number of high value occurrences, i.e., Complex 2 is rated first because it has the most (7) high occurrences. Where the number of high occurrences tie (complexes 4 and 5), moderate occurrences are used as a 'tiebreaker'.

Table A - Oxbow Complex Function Evaluation

| | Criteria for Lower Value | Complex Occurrence | Criteria for Moderate Value | Complex Occurrence | Criteria for Higher Value | Complex Occurrence |
|----------------------------------|-------------------------------------|--------------------|--------------------------------------|--------------------|---|--------------------|
| Hydrologic Support | isolated depression | | open drainage system | 1-2-3-4-5 | open tidal system | |
| | temporary saturation or inundation | 1-2-3-4-5 | seasonally flooded | 1-2-3-4-5 | permanent saturation | 1-2-3-4-5 |
| | 2 sources of hydrologic support | | semi-permanently flooded | 1-2-3-4-5 | permanent inundation | 1-2-3 |
| | | | 3 sources of hydrologic support | 1-4-5 | 4 or more sources of hydrologic support | 2-3 |
| Storm / Flood Abatement | in remote settings | | in rural settings | 1-2-3-4-5 | in urban settings | |
| | < 10 % woody vegetation | | 10 - 30 % woody vegetation | 1-2-3-4-5 | > 30 % woody vegetation | |
| Groundwater Exchange | isolated depressions | | seasonally flooded open system | 1-2-3-4-5 | permanently flooded system | 1-2-3 |
| | temporarily saturated or inundated | 1-2-3-4-5 | permanent shallow inundation | 1-2-3 | deep inundation | |
| | impermeable substrate | | semipermeable substrate | 1-2-3-4-5 | permeable substrate | 1-2-3-4-5 |
| Water Quality Improvement | intermittently flooded wetland | 1-2-3-4-5 | lakes | | estuary or perennial stream | |
| | < 50 % vegetation density | | 50 - 80 % vegetation density | 1-2-3-4-5 | > 80 % vegetation density | |
| | no proximity to non-point discharge | | downstream from non-point discharge | 1-2-3-4-5 | downstream from municipal point discharge | |
| | retains < 25 % of overland runoff | 1-2-3-4-5 | retains 25 - 50 % of overland runoff | | retains > 50 % of overland flow | |
| Natural Biologic Support | emergent improved pasture | 1-2-3-4-5 | shrub / forested swamp | 1-2-3-4-5 | marsh or bog | |
| | isolated system | | upper tidal marsh | | intertidal marshes | |
| | associated with ephemeral streams | 2-3 | associated with intermittent stream | | associated with permanent stream | 1-2-3-4-5 |
| | low plant community diversity | | moderate plant community diversity | 1-2-3-4-5 | high plant community diversity | |
| | low edge effect | | high edge effect among wetlands | 1-2-3-4-5 | high edge effect among wetlands & uplands | |
| Support | special habitat features lacking | 1-2-3-4-5 | special habitat features present | | complex special habitat features present | |
| | <10% and >50% upland pockets | 5 | 30% to 50% upland pockets | 1-3-4 | 10% to 30% upland pockets | 2 |
| | no unique species | 1-2-3-4-5 | unique species potentially present | | unique species present | |
| | no water dependent species | | water dependent species potential | 1-2-3-4-5 | water dependent species present | |

| Complex | Lower Occurrence | Moderate Occurrence | Higher Occurrence | Value Rank |
|---------|------------------|---------------------|-------------------|------------|
| 1 | 7 | 16 | 5 | 3 |
| 2 | 8 | 14 | 7 | 1 |
| 3 | 8 | 15 | 6 | 2 |
| 4 | 7 | 15 | 3 | 4 |
| 5 | 8 | 14 | 3 | 5 |
| Totals | 38 | 74 | 24 | |

Table B - Summary of Occurrences for Oxbow Complexes

| Complex | Low Occurrence | Moderate Occurrence | High Occurrence | Value Rank |
|---------|----------------|---------------------|-----------------|------------|
| 1 | 7 | 16 | 5 | 3 |
| 2 | 8 | 14 | 7 | 1 |
| 3 | 8 | 15 | 6 | 2 |
| 4 | 7 | 15 | 3 | 4 |
| 5 | 8 | 14 | 3 | 5 |
| Totals | 38 | 74 | 24 | |

The value rank of each oxbow complex is used as one criteria in the assessment of oxbow avoidance. Table 2-1 lists this ranking as well as other oxbow complex characteristics and criteria for avoidance evaluation.

Table C. Oxbow Complex With Buffer Data

| Data Item | OxCom 1 | OxCom 2 | OxCom 3 | OxCom 4 | OxCom 5 |
|----------------------------------|----------------|-----------------|-----------------|-----------------|----------------|
| Oxbow Complex | | | | | |
| PEM1E | | 1.70 ac | 2.30 ac | | 0.90 ac |
| PEM1F | | 2.00 ac | 2.20 ac | | 1.80 ac |
| PEM1H | | | 2.20 ac | | |
| PSS1E | 1.60 ac | 4.30 ac | 0.80 ac | 4.40 ac | 0.40 ac |
| PSS1F | 0.30 ac | 0.70 ac | | 1.10 ac | |
| PFO1E | | | 0.45 ac | | |
| POWH | 0.20 ac | 0.30 ac | | | |
| Total Wetland in Complex | 2.10 ac | 9.00 ac | 7.95 ac | 5.50 ac | 3.10 ac |
| Dry Meadow | | 0.40 ac | 1.55 ac | 0.80 ac | 0.65 ac |
| Shrub/Cottonwood | | | | 0.50 ac | 0.55 ac |
| Deciduous Forest | | | | | |
| Coniferous Forest | 0.70 ac | | | | |
| Total Upland in Complex | 0.70 ac | 0.40 ac | 1.55 ac | 1.30 ac | 1.20 ac |
| Total Oxbow Complex | 2.80 ac | 9.40 ac | 9.50 ac | 6.80 ac | 4.30 ac |
| Buffer Area | | | | | |
| PEM1E | 0.15 ac | 5.0 ac | 0.90 ac | 0.40 ac | 0.20 ac |
| PEM1F | | | | | |
| PEM1H | | | | | |
| PSS1E | 1.30 ac | 0.90 ac | | 0.30 ac | 0.10 ac |
| PSS1F | 0.05 ac | | | | |
| PFO1E | | | 0.05 ac | | |
| POWH | | | | | |
| Total Wetland in Buffer | 1.50 ac | 5.90 ac | 0.95 ac | 0.70 ac | 0.30 ac |
| Dry Meadow | 2.30 ac | 5.30 ac | 6.95 ac | 4.00 ac | 3.00 ac |
| Shrub/Cottonwood | | | | | 0.40 ac |
| Deciduous Forest | | | | | |
| Coniferous Forest | | | | | |
| Total Upland in Buffer | 2.30 ac | 5.30 ac | 6.95 ac | 4.00 ac | 3.40 ac |
| Total Buffer | 3.80 ac | 11.20 ac | 7.90 ac | 4.70 ac | 3.70 ac |
| Total Wetlands | 3.60 ac | 14.90 ac | 8.90 ac | 6.20 ac | 3.40 ac |
| Total Uplands | 3.00 ac | 5.70 ac | 8.50 ac | 5.30 ac | 4.60 ac |
| Total Complex with Buffer | 6.60 ac | 20.60 ac | 17.40 ac | 11.50 ac | 8.00 ac |