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7.0 TERRESTRIAL ENVIRONMENT

7.1 INTRODUCTION

The Red River Floodway and the proposed Red River Floodway Expansion Project are situated near the City of Winnipeg, parallel to the Red River in Southern Manitoba (Figure 1.1-1, Section 6.1). The components of the Project that may potentially effect or be affected by the Project are outlined in Sections 4.4 and 4.5.

7.2 ASSESSMENT APPROACH AND METHODOLOGY

7.2.1 Categories of Potential Impact

The Guidelines (Section 6.3, "Terrestrial Environment") require that "the environmental impact statement shall describe" the following terrestrial environmental components:

- vegetation (Guidelines, Section 6.3.1);
- wildlife and **wildlife habitat** (Guidelines, Section 6.3.2);
- wildlife communities (microorganisms, insects, **reptiles**, **amphibians**, birds, and mammals);
  - important representative ecological communities by key species;
  - migratory populations and seasonal habitat use by **waterbirds** and other birds;
  - wildlife populations and habitat, including critical habitat for deer and furbearers;
- species at risk (threatened and endangered plant and animal species as listed by Manitoba Endangered Species Act and the federal Species at Risk Act); and
- **Manitoba Protected Area Initiative**, including reference to the Capital Region and Natural Regions potentially affected by the Project.

7.2.2 Approach to Impact Assessment

As outlined in Chapter 2 and Section 5.2.2, the assessment approach involves evaluating the effects of the proposed expansion as compared to the baseline of the Existing Floodway and West Dyke. The Existing Floodway and West Dyke are described in sections regarding the existing environment; they also represent the baseline environment that is assessed with respect to potential effects of the Project. As outlined in Section 2.3, the significance of potential effects of the Project on the terrestrial environment are determined primarily through the assessment of the duration (short- or long-term), magnitude (small, moderate or large) and geographic extent (project site, local or region) of an effect (Figure 2.3-1). The approach assesses the nature, duration and magnitude of effects for each project component (e.g., West Dyke) and phase (pre-construction, construction, and operation) in a manner comparable to the approach outlined in Section 6.2.2.

An approach that integrates population and habitat data in obtaining scientific-based information with respect to the terrestrial environmental assessment has been used to identify the ecological components, processes and flows that are required to maintain a fully functioning ecosystem. Numerous terrestrial environmental components have been considered in the environmental impact assessment. The terrestrial environmental components identified in the Guidelines (Section 6.3) form the basis for the assessment of the Project's predicted effects and impacts on the environment. Where existing available terrestrial information did not exist or was insufficient, field studies were initiated to address information gaps/data deficiencies. These methodologies are outlined in Sections 7.3.1 and 7.4.1 for each of the terrestrial components studied. The analysis of data and information collected to assess Project effects on the terrestrial ecosystem are evaluated in conjunction with information gained through local and traditional knowledge in determining the significance of impacts.

Environmental studies undertaken prior to the final draft submission of this EIS shown on Table 7.2-1 were conducted using the standard methodologies and protocols. Some studies will be expanded and/or will occur throughout the summer and fall of 2004 due to the seasonal nature of those studies (e.g., plant surveys). These and other terrestrial environmental studies to follow the submission of the EIS are outlined in the sections regarding monitoring and follow-up (Sections 7.3.5 and 7.4.5). Additional details of methods used for various aspects of each terrestrial environmental discipline are provided in Appendices 7B and 7C.

Terrestrial environmental studies generally occurred along various locations of the West Dyke and Floodway Channel and Crossings. For the most part, detailed surveys did not occur, nor were deemed necessary to occur, at the Floodway Inlet and Outlet Structures. Information on vegetation and wildlife at or near those structures are contained within the description for the West Dyke and Floodway Channel. When appropriate, a description of terrestrial resources in or adjacent to potentially affected areas, including the Red River, are provided.

The potential effects of the Project on plants and wildlife are primarily anticipated to extend to the Floodway site and portions of the West Dyke that will be affected by the construction activities. As a result, potential Project effects on the terrestrial environment of the Red River beyond the Floodway Inlet Structure and confluence at the Outlet Structure were scoped out of the assessment discussed in this section.

The potential cumulative effects of past and current projects and activities (Section 2.2.2) was assessed in relation to the Project for each component of the terrestrial environment. The disruption of plant and wildlife habitat and communities is restricted to the Project site areas affected by construction. After construction, the habitats and communities are anticipated to recover over time. This localized effect is not anticipated to have a significant cumulative effect with any other anticipated project or activity in the region (Section 2.2). However, there is some potential that changes in summer operating regimes for the Floodway during the period of active operation may have an additive effect with those of the Project on the terrestrial environment (Section 7.3.3.4).

Table 7.2-1
Summary of Terrestrial Environment Study Methods

Discipline	Methods*	Location	Timing
Plants			
Plant Communities	Vegetation characterization using aircraft overflight observations, video imagery and still photography	Floodway ROW and West Dyke	Floodway: Sept. 19, 2003 (low flow baseline) and April 12, 2004 (Floodway in use) West Dyke: June 9, 2004
	Descriptions of plant communities along slopes, within ditches and/or channel and along uplands and/or spoil banks during field surveys	Within survey areas of the Floodway ROW and West Dyke	Fall 2003, spring and summer 2004
	Vegetation surveys using line **transect**s	Floodway Row and West Dyke	Spring, summer and fall, 2004
Wildlife			
Bird	Point count survey of breeding birds	Floodway Channel, slopes and select crossings; West Dyke	June 2004
	Reconnaissance observations during site visits	Floodway ROW	Sept/Oct 2003, April, May and June 2004
Mammal	Reconnaissance observations of mammals and mammal signs during site visits	Floodway ROW and West Dyke	Sept/Oct 2003, April, May and June 2004
Amphibian	Point count survey of frog calls	Floodway Channel and ditches of West Dyke	May/June 2004 (breeding season)
	Reconnaissance observations during site visits	Floodway Channel and West Dyke ditches	October 2003, and May/June 2004
Reptile	Reconnaissance observations during site visits	Floodway ROW	Sept/Oct 2003, and May/June 2004
Invertebrate Communities	Existing information for ecodistrict	Winnipeg Ecodistrict	Spring 2004

* Refer to Appendix 7B for detailed descriptions of methods

As indicated in Section 2.1, there are no plans for decommissioning of final disposition for the Project. As such, an evaluation of the potential effects of the final disposition on terrestrial environmental resources cannot be predicted accurately this time. It is currently anticipated that all aspects of the Project could be removed and the environment reconstructed to the pre-Project status. Prior to Project decommissioning, necessary assessments and plans will occur.

7.2.3 Geographic Boundary – Terrestrial Assessment

The Flood Study Region (Section 2.1) for the terrestrial assessment of the Floodway Project has been defined regionally as a broad area encompassing 9 ecodistricts and locally as the area of the Floodway Right-of-way (ROW) and West Dyke (Figure 7.2-1). The Flood Study Region represents the maximum geographic extent to which terrestrial effects of the Project may extend (Section 2.1). The effects of the Project on the terrestrial environment were generally not anticipated to extend beyond the Project site (the Floodway ROW and West Dyke); and therefore areas further afield (e.g., Assiniboine River) were not assessed within the regional context.

Effects of the Project on the terrestrial environment were assessed along and adjacent to the Floodway and West Dyke during various field visits. Additional information regarding the assessment of potential effects on the terrestrial environment is presented in Sections 7.3.3, 7.3.4, 7.4.3 and 7.4.4.

7.3 TERRESTRIAL VEGETATION

7.3.1 Approach and Methodology

7.3.1.1 Effects Assessment

Floodway vegetation was characterized through examination of existing information on vegetation of the study area, and by conducting focused field investigations. For the fieldwork, a series of line transects were run perpendicular to the Low Flow Channel. There were a total of 30 line transects distributed among five locations. Each line transect was stratified into three zones: the upper slope, the lower slope, and the Floodway Base. For the Floodway, a species list was compiled; and percent cover, frequency, and relative frequency were estimated (Appendix 7B-2, 7B-3 and 7B-4).

Prior to submission of this environmental assessment, all five sampling locations along the Floodway were sampled. This represents one of two rounds of plant surveys to occur in the summer and fall 2004. Summer surveys occurred in two phases, with the Floodway Channel Base having been surveyed later (early July) than the plateau and top slopes (late June). This was due to the extremely wet spring and resulting inundation of the Floodway through June.

Vegetation along the West Dyke was characterized by a visual inspection at eighteen sites distributed along the length of the Dyke. For each of the eighteen sites, a species list was compiled, and species abundance was estimated using a **DAFOR scale** (Appendix 7B, Table 7B-6).

7.3.1.2 Sources of Effects

Construction activities will have the largest effect on Existing Floodway plant communities. Vegetation along the upper and lower Channel side slopes and benches will be removed and buried during excavation. Soils (with A and B horizons) supporting vegetation on the spoil banks will be stripped and treated with herbicides prior to stockpiling for future redistribution along newly graded side slopes and benches. With the exception of willow, vegetation within the Channel Base will not be stripped or treated

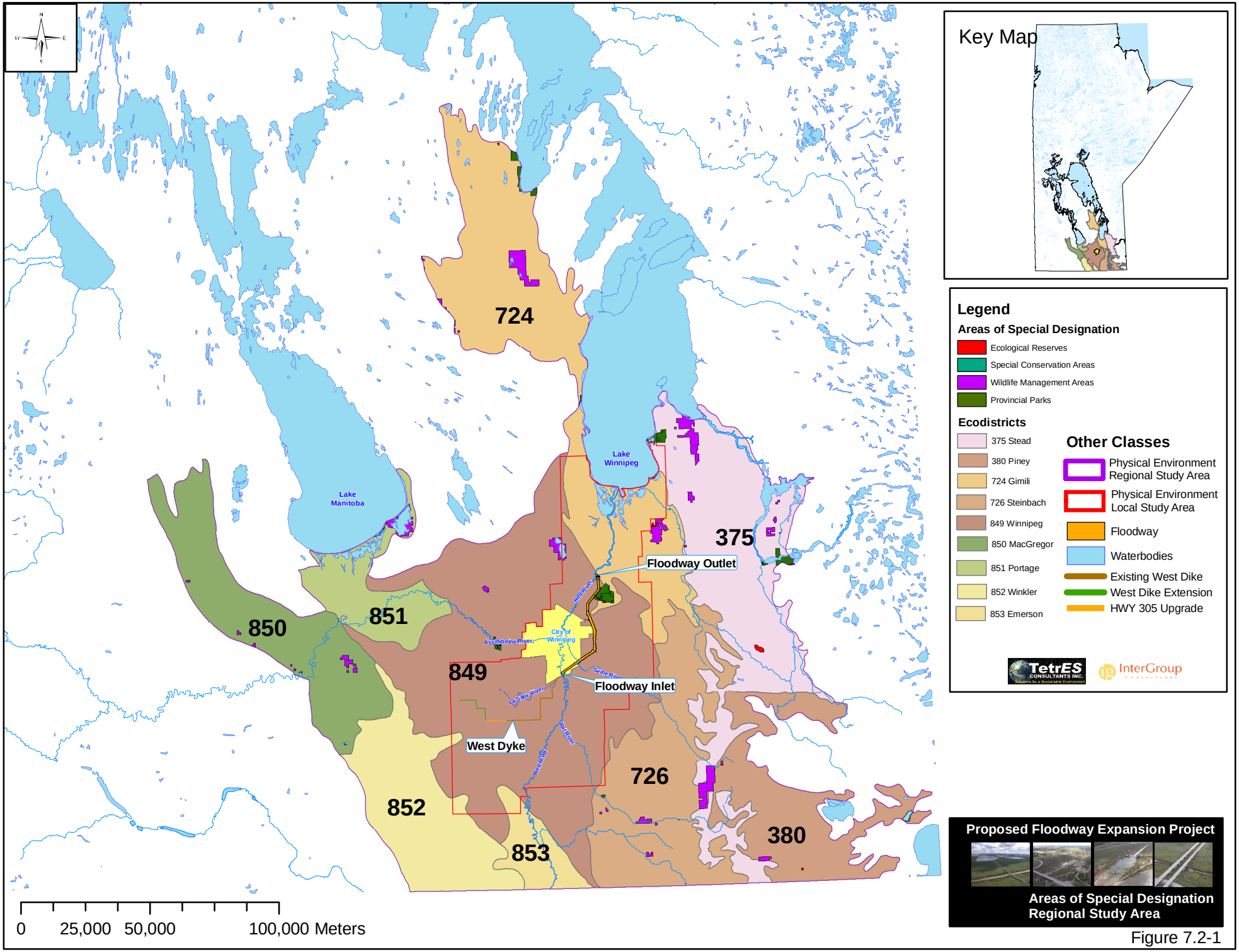

Key Map
Legend
Areas of Special Designation
Ecological Reserves
Special Conservation Areas
Wildlife Management Areas
Provincial Parks
Ecodistricts
375 Stead
380 Piney
724 Gimili
726 Steinbach
849 Winnipeg
850 MacGregor
851 Portage
852 Winkler
853 Emerson
Other Classes
Physical Environment Regional Study Area
Physical Environment Local Study Area
Floodway
Waterbodies
Existing West Dike
West Dike Extension
HWY 305 Upgrade
TetrES CONSULTANTS INC.
InterGroup
724
375
850
851
849
726
852
853
380
Lake Winnipeg
Lake Manitoba
Floodway Outlet
Floodway Inlet
West Dike
City of Winnipeg
Assiniboine River
La Salle River
Red River
Seine River
0
25,000
50,000
100,000 Meters
Proposed Floodway Expansion Project
Areas of Special Designation
Regional Study Area

Figure 7.2-1

with herbicide. The vegetation present within the Channel will be vulnerable to damage by heavy equipment operating within the area. Willows will be controlled within the Channel Base, either by herbicide treatment, mechanical clearing or prescribed burning. The revegetation plan will have a positive effect whereby more flood tolerant grassland species will replace less tolerant species presently growing along the Floodway and West Dyke.

Associated with the widening of the Floodway is an increase in the amount of "wet meadow" habitat than presently exists during a period of Floodway operation. A related change will be that, for a given floodwater level, active operation of the Project will result in a smaller amount of terrestrial habitat being inundated along the slopes of the Floodway and West Dyke. In the rare event of extremely high floodwaters (1:150 to 1:700 year flood), the Expanded Floodway and West Dyke will potentially provide protection to terrestrial ecosystems in a large area of the Flood Study Region.

7.3.2 Existing Environment

The Floodway Study Region occurs within the Prairie, Boreal Plains and Boreal Shield **ecozones** of southern Manitoba. The ecozones within this study area are subdivided into 3 **ecoregions** (Lake of the Woods, Lake Manitoba Plain and Interlake Plain), which collectively contain 9 ecodistricts (Figure 7.2-1; Appendix 7C, Table 7C-1). Within these ecodistricts are areas specially designated for the purposes of wildlife management and wildlife and/or ecosystem protection, including:

- 21 Provincial Parks;
- 21 **Wildlife Management Areas** (WMA);
- 3 Important Bird Areas;
- 3 Heritage Marshes;
- 1 Special Conservation Area; and
- 1 Park Reserve.

These designated areas are distributed throughout seven of the 9 ecodistricts, with most occurring in the Gimli (14 designated areas), Stead (11 designated areas), and Winnipeg (10 designated areas) ecodistricts. Although there are many specially designated areas (most are protected under the Protected Areas Initiative) within the Gimli and Winnipeg ecodistricts, their total percentage of coverage in their associated ecodistricts (3.3% and 0.6%, respectively) is moderate to low when compared to other ecodistricts within the Floodway Regional Study Area (Appendix 7C, Table 7C-2).

The Floodway Study Region (which includes both the West Dyke and Floodway) extends north from the town of Morris to the basin of Lake Winnipeg (Figure 7.2-1, Section 2.1). Approximately three quarters of this study region is part of the Winnipeg Ecodistrict, with the remainder being part of the Gimli Ecodistrict and to a small extent, the Emerson and Winkler ecodistricts (Figure 7.2-1). It is anticipated that potential effects of the Project will likely occur locally to the West Dyke and Floodway, both of which are located within the Winnipeg Ecodistrict.

The Winnipeg Ecodistrict occurs in a transitional zone between the grassland **biome** and aspen-oak forest (Rowe 1992; Lammers and Wrigley 1984). The aspen parkland zone encompassing most of the

region is bordered by a zone of native prairie to the southwest and by deciduous forest to the north and east. Remnant strands of aspen parkland and native prairie have been highly modified by agriculture. Native vegetation, which originally consisted of aspen-oak forest and tall grass prairie and meadow grass associations, has largely been replaced by cultivated cropland.

Native woods commonly occur along stream channels and as isolated tree communities in the agricultural areas. Trembling aspen (*Populus tremuloides*) and bur oak (*Quercus macrocarpa*) are normally the dominant tree species. Common **understory** species include snowberry (*Symphoricarpos occidentalis*), red osier dogwood (*Cornus alba*), rose (*Rosa* spp.), and goldenrod (*Solidago* spp.). Balsam poplar (*Populus balsamifera*) usually occurs in moister locations. Elm (*Ulmus americana*), basswood (*Tilia Americana*), cottonwood (*Populus deltoids*), green ash (*Fraxinus pennsylvania*), and willow (*Salix* spp.) are typically confined to **alluvial** deposits and floodplains (e.g., along the Seine River).

Landscape plantings and treed shelterbelts are relatively common at farmsteads and rural residential properties throughout the study area. These are distinguished from native woods and bluffs by the incidence of such introduced species as lilacs (*Syringa vulgaris*), Manchurian elm (*Ulmus pumila*), and Colorado blue spruce (*Picea pungens*). Other non-agricultural vegetation occurs along study area drainage ditches, road allowances, and railway rights-of-way.

Grasslands in the Winnipeg vicinity are, with few exceptions, generally not representative of true native prairie. An example of true prairie can be found in the St. James Living Prairie Museum in Winnipeg. Tall grass prairie also occurs in Oak Hammock Marsh WMA and in research plots within Beaudry Park. Other sensitive and uncommon grassland sites occur along some relatively undisturbed railway rights-of-way (e.g., CNR-Harte line), where locally uncommon plant species and assemblages can be found (Tetr*ES* and DS Lea 1993).

No **rare** or endangered plants listed by **COSEWIC** (Committee on Status of Endangered Wildlife in Canada) or **MESA** (*Manitoba Endangered Species Act*) are known to occur in the study area.

Floodway Channel and Crossings

Both the Floodway and the West Dyke are previously disturbed and managed areas that support “weedy” grasslands consisting predominantly of brome and alfalfa on slopes and herbs, **semi-aquatic plants** and willows within ditches and the Channel Base. While there are anticipated to be up to 700 plant species in the Flood Study Region, only a small number of these species are expected to occur along the Floodway or West Dyke. The plant species most commonly occurring in the types of habitats that characterize the Floodway and West Dyke are provided in Appendix 7A, Table 7A-1.

The Floodway slopes are characterized by grassland communities common in the study area (Figure 7.3-1). Of the approximately 70 species of plants (Appendix 7B, Table 7B-2) found in the vegetation survey along the Floodway Channel, none were rare or endangered plant species. The Floodway slopes are dominated by smooth brome and bluegrass. Both of these species were found in over 80% of transect intervals on the Upper and Lower Floodway slopes. The mean cover for smooth brome was 13%, with a

maximum cover of 90%. The mean cover for bluegrass was 7%, with a maximum cover of 40%. Another common species was alfalfa, which was found in just under 40% of transect intervals, with peak cover of 12% and with a maximum cover of 100%.

Figure 7.3-1
Typical Grassland Community Along Floodway Slope -
Looking Towards the Channel

The mean percent of bare ground was 26%, with a maximum of 100% in the flooded area of the lower slope. Most ground was covered with a substantial layer of **thatch**, though the areas that had most recently been flooded showed a noticeable amount of bare ground (Appendix 7B, Table 7B-3).

The Floodway Base was inundated from June 13 to June 28, 2004. When the water receded, the only plants still green in the Floodway Base were willows (*Salix exigua* and *S. lutea*), and a species of herb (*Lysimachia ciliate*). A few line transect intervals on the Floodway Base on July 12, 2004 were examined. These showed that all but the above-mentioned plants had died to the roots. This was apparently related to high spring floodwaters that inundated the Low Flow Channel for several weeks during May and June 2004. By July 12, 2004, there were noticeable signs of recovery in the Floodway Base, with several species beginning to show renewed growth (Appendix 7B, Table 7B-5). Under the existing

conditions, this level of spring flooding has occurred in two out of every three years since the Floodway was constructed.

West Dyke

Much of the West Dyke runs along roadways in the R.M. of Macdonald. The plants along these roads make up a typical roadside grassland community, as illustrated in Figure 7.3-2.

Figure 7.3-2
Typical Plant Habitat and Community Structure Along the West Dyke

The R.M. of Macdonald regularly sprays their roadsides with the herbicides 24D Vanquish (Dicamba, 2,4-D) and Tordon 22K (picloram) primarily for the control of Canada thistle, leafy spurge and common milkweed. The roadsides are also mowed for hay on a regular basis (particularly Highway 305); many of the roadsides, which constitute the West Dyke, have been severely disturbed since 1997.

These factors combine to produce a grassland community that is fairly homogeneous (Figure 7.3-2). All of the sites examined were dominated by smooth brome. The other most abundant species were alfalfa,

dandelion, Canada thistle, bluegrass and clover. There were approximately 35 plant species found along the West Dyke, but no rare or endangered plant species (Appendix 7B, Table 7B-6).

7.3.3 Effects and Mitigation

7.3.3.1 Pre-Construction

Floodway Channel and Crossings

The potential effects of pre-construction are normally associated with groundwater well placement and digging of trenches along the Floodway slope. Additional geotechnical activities included drilling holes for soil sampling; these holes were approximately 125 mm wide and were backfilled immediately after sampling. Aside from test pits and trenching, a small, localized area of the Floodway slope, from the spoil bank to the Low Flow Channel, was excavated for geotechnical purposes. Although vegetation was stripped at this one site, the disturbance of geotechnical pre-construction activities on vegetation is not expected to be significant. Pre-construction activities also included spring and summer baseline studies on vegetative communities. Aside from the removal of a few **botanical** specimens during vegetation surveys, baseline studies of the terrestrial vegetation had little effect on the Floodway Channel and Crossings.

West Dyke

The effects of drilling test holes on vegetation along the West Dyke was minimal, as the size of the vegetation disturbance at each drill hole averaged the width of a solid stem auger (125 mm; KGS et. al. 2004). Aside from the removal of a few botanical specimens, baseline vegetation and wildlife community investigations conducted during the pre-construction phase had little to no effect on the West Dyke environment.

These negative effects on Floodway and West Dyke vegetation are small, site specific, short-term and therefore not significant. Most of the pre-construction effects are not discernable and will be overshadowed by construction-related effects, particularly excavation.

7.3.3.2 Construction

Floodway Channel and Crossings

The potential effects of the Floodway Project on vegetation are primarily associated with construction. The predicted construction-related effects on vegetation are mainly associated with excavation activities and the application of herbicides (e.g., Glyphosate and 2,4-D). Vegetative communities, which may contain plant species at risk (protected under MESA and/or listed under COSEWIC), and their associated organic soils, will be disrupted by excavation equipment within specified regions of the Floodway. A loss of organic soils and vegetation will occur when topsoils from existing side slopes are stripped and buried under spoil piles. Topsoil and vegetation from widened spoil banks will be treated with herbicides and stockpiled for redistribution along the newly graded side slopes. Prior to final grading, exposed subsoils may require scarification to reduce soil compaction caused by heavy excavation equipment. Preparation

of subsoils and retention of treated topsoil may enhance the establishment of seeded plant mixes, which may in turn, provide erosion control and enhance bank stability along the Floodway slopes.

The only location where a permanent loss of terrestrial plant habitat will occur is at the Floodway Outlet Structure – where the outlet dykes will be extended into the northern bank of the land at the confluence of the Floodway and Red River (Chapter 4). Clearing and widening the land on the northern shores downstream of the Floodway Outlet will also represent a permanent conversion of a small amount of land (approximately 1 ha) to semi-aquatic habitat that, depending on the timing and amount of water releases through the Floodway, will be inundated **ephemerally**.

Although the vegetation communities will experience a temporary disruption during the construction phase, any negative effects will be mitigated through the immediate implementation of the Environmental Protection Plan (EPP) and revegetation program following each phase of expansion. Potential impacts on adjacent lands will be minimized by keeping construction equipment to the Project site areas. Potential effects of contingency events, such as oil spills on aquatic plants and off-site plant communities and habitat, will be minimized through careful siting of marshalling yards and refueling areas.

Considering implementation of these mitigative measures, construction-related effects are likely be small to moderate, short-term, site-specific, negative, and not significant.

West Dyke

Construction-related effects on vegetation along the West Dyke are similar to those described for the Floodway ROW. Most of the surface vegetation and soil along the approximately 60 km of the Dyke will be temporarily removed during construction. Weed District personnel from the R.M. of Macdonald will be consulted regarding the construction and revegetation phases of the West Dyke. The West Dyke will be reseeded after construction, most likely with smooth brome. The R.M. currently maintains roadside vegetation and regularly sprays with Vanquish and Tordon 22K. The potential effects will be mitigated through implementation of the EPP and vegetation management plan.

Considering implementation of the aforementioned mitigation measures for the Floodway Channel and Crossings, the construction-related negative effects are expected to be small, short-term, site-specific, and not significant.

7.3.3.3 Operation – Inactive

Floodway Channel and Crossings

Following the completion of the Floodway Project, it is anticipated that the Floodway Channel will support a newly established vegetative community composed of a mixture of native plants, including more flood-tolerant species. The effects of the inactive operation of the Floodway would therefore be positive, due to the presence of an enhanced diversity of vegetative communities native to Manitoba. Optimization of potential or positive benefits of this establishment of grassland plants will be facilitated through implementation of the EPP and revegetation plan. The success of the revegetation program will be

monitored, and additional mitigative measures (e.g., reseeding) will be implemented, if necessary. Mitigative steps to minimize potential negative effects, such as erosion and **runnel** formation along the slopes and excessive unlimited access across newly established plant communities, will also be identified as a component of ongoing site monitoring. For example, access management initiatives could possibly be identified as a mitigative step, where required, if follow-up monitoring reveals the need for further action at some sites.

Considering mitigation, the potential effects of the Project on vegetation within the Floodway are predicted to be small to moderate, long-term, site-specific and have a positive effect that is not significant.

West Dyke

The vegetation along the West Dyke will be maintained as it has been prior to expansion, through cutting (haying) and regular weed treatment by the R.M. of Macdonald. Roadsides will continue to be sprayed regularly with 24D Vanquish (Diacamba, 24-D) and Tordon 22K (Picloram) primarily for the control of Canada thistle, leafy spurge and common milkweed. Both spraying and haying will assist in the survival of the stable brome/alfalfa grassland, an important factor in erosion control during periods of active operation.

Much of the roadsides constituting the West Dyke have been severely disturbed since 1997. The expansion of the West Dyke is not anticipated to alter the vegetative communities along the roadsides; continued active haying (especially along many parts of Highway 305) during inactive operation is expected. The success of the revegetation program will be monitored along the West Dyke.

Operation-inactive effects to vegetation communities along the West Dyke are expected to be small, long-term, site-specific, and positive.

With respect to the scope of potential projects or activities that may occur independent of the Project (Section 2.2), a change in the use of plants and wildlife habitats along or adjacent to the Floodway or West Dyke, is an effect that has the potential to work in combination with the Project. For example, if ATV usage along the Floodway occurs to a greater extent in the future, then the effects on plants and wildlife would potentially increase. The potential for such effects, expected to be insignificant, will be minimized through application of Best Practice measures in the operation and maintenance of the Floodway and West Dyke and through the implementation of additional mitigation measures that may be identified through ongoing monitoring.

7.3.3.4 Operation – Active

Floodway Channel and Crossings

Potential operational effects on vegetation include flooding, which occurs with high frequency under the existing conditions. In the rare event of floodwaters that reach the capacity level of the Floodway and Dyke (1:700 year flood), the Project would provide extra flood protection to terrestrial ecosystems in the

Winnipeg area and north of the West Dyke. During periods of high Red River water flows, the Floodway Channel vegetation on the upper slopes is at a lower risk of inundation with the Project. However, the period of inundation in the Low Flow Channel may not change substantially with the Project and may last for days or weeks, similar to the existing conditions without the Project. Overall, the amount of terrestrial habitat inundated within and outside the Floodway Channel following Project completion will be less, for a given floodwater level, than for the Existing Floodway (Section 7.3.1.2).

Without mitigation, the disturbance of active floodwaters on most terrestrial vegetation would potentially result in the die-off of many plants intolerant to short-term inundation; this will likely occur to an extent similar to existing conditions. A revegetation plan will be implemented using plant species, either tolerant of prolonged periods of inundation (during both spring and summer), and/or capable of rapid regrowth following periods of flooding (Section 4.3.5). The Project should therefore effectively reduce the extent of plant die-off in flood-exposed zones of the Floodway, and create a more water-resistant and resilient plant community along the Channel that also provides improved erosion control and wildlife habitat. Revegetation success/failure will be monitored to ensure the establishment of a vegetative plant cover.

Considering implementation of the revegetation plan, operation-active effects to vegetation communities are small, short-term, site-specific, positive, and therefore not significant.

West Dyke

In the event that floodwaters reach the West Dyke, vegetation communities may be inundated for days or weeks as they have been under existing conditions, e.g., in 1997. Raising the **freeboard level** of the West Dyke will result in less terrestrial habitat being inundated for a given floodwater level. Instead of being dispersed over a larger area, the dykes may result in a deeper and smaller impoundment during high floodwater events. To further mitigate the potential loss of vegetation during periods of inundation and through wave erosion, appropriate flood-tolerant, deep-rooting vegetation will be established as outlined in the revegetation program (Section 4.3.5). **No significant effects are expected**.

No cumulative effects on vegetation are anticipated to be associated with the active operation of the Floodway or West Dyke. In the event of extremely high floodwaters that overtop the maximum operation-capacity of the West Dyke, the Project will provide additional flood protection that will limit the effects on plant and wildlife habitat over a potentially large area. Changes to the summer operation of the Floodway could result in plants along the Floodway Channel being inundated more frequently. While this could increase the amount of plant die-off, the effects will be less with such an operational change than they would have been without the Project. The operation of the Floodway will continue under current rules. MFEA will conduct the appropriate environmental studies if it proposes any changes in operation. The effects of the Project are not significant. There will be follow-up consideration of this issue in the event of a change in summer operations (Section 7.3.5).

7.3.4 Residual Effects and Significance

The residual effects of the Project are expected to be not significant. The potential negative residual effects are expected to primarily involve the short-term disruption of plant communities and

habitats along the Existing Floodway and West Dyke during construction. These effects will be effectively minimized through implementation of the EPP and Best Practices outlined in the EIS. The extension of the Floodway Outlet Channel further into the banks of the Red River represents a small, permanent loss of additional terrestrial plant habitat (Table 7.3-1).

As outlined in Table 7.3-1, the revegetation program will have an overall, long-term positive effect by increasing plant species diversity and by replacing existing plants along the Floodway Channel with more flood-tolerant species. The Project will also have benefits associated with increasing the amount of "wet meadow" habitat in the Floodway Channel while reducing the potential extent of inundation of terrestrial plant habitat for a given floodwater level.

7.3.5 Monitoring and Follow-Up

Monitoring of weeds after construction is required. Weedy species may appear within two years after reseeding, and is forecasted to be an ongoing concern for at least four years after successful reseeding of the West Dyke and Floodway slopes. Monitoring and controlling weedy species is a current issue for the Floodway and West Dyke and should not change substantially with the Project.

Ongoing vegetation monitoring along the Floodway will include two components:

1. An analysis of the success of the initial seeding – to occur in the first two years following implementation of the revegetation plan, with additional follow-up monitoring to occur approximately every third year thereafter.

2. An ongoing examination of the Floodway for non-native weedy species – to occur on a bi-annual basis after implementation of the vegetation program that includes an adaptive approach to weed management that considers any input received from local residents.

The first component, that of evaluating the success of the revegetation program, should include formal vegetation survey methods. An efficient approach recommended for these surveys is to estimate frequency using line transects situated randomly along the Floodway. This will provide a basis for determining areas that require reseeding. This will direct the implementation of mitigation measures, if required.

Table 7.3-1
Summary of Residual Effects and Significance on Vegetation Effects

Description Of Effect	Mitigation	Residual Effects And Significance
CONSTRUCTION - EXCAVATION ACTIVITIES		
Disruption of vegetative communities within the Floodway from excavation activities	Immediate implementation of a revegetation program to re-establish habitats following each stage of Project construction	Small, short-term, site-specific negative effect[(a)] **Not Significant**
Loss of organic soils (to be buried) will remove plant habitat. The extension of the Floodway Structure will represent a loss of a small amount of terrestrial plant habitat.	To be minimized through keeping all activities to the Project site. Re-spreading of organics over the excavation area will occur following construction, with potential erosion-related loss of soil minimized through implementation of erosion control methods outlined in Chapter 4.	Moderate, short-term, negative effect **Not Significant**
Subsoil compaction (topsoil has been removed) from heavy excavating equipment.	Soil preparation: scarification of subsoil and spreading of stockpiled organic layer prior to reseeding	Small, short-term, site-specific negative effect **Not Significant**
Potential loss of provincially rare, threatened or endangered plant species is not expected	Follow-up monitoring will be required to further ensure no species at risk are present. Mitigation measures, if required, may include relocating plants to other suitable habitats.	Small to moderate, site-specific, short-term negative effect **Not significant**
OPERATION – INACTIVE		
Potential establishment of vegetative community (native preferable on selective basis) through revegetation program may result in enhanced diversity of vegetative communities; restoration of lost native species from topsoil salvaging	Rehabilitation and revegetation will occur and will be assessed through post-construction monitoring.	Small to moderate, long-term, site-specific positive effect **Not significant**
OPERATION – ACTIVE		
Inundation of vegetation communities during high Red River water flows (floodwaters) resulting in disruption and potential destruction of some plants intolerant to short-term inundation	Reseeding vegetation communities using flood tolerant species and/or species capable of rapid re-growth along the base of the Floodway will reduce plant die-off over existing conditions. Amount of wet meadow will increase with the Project, and the amount of terrestrial habitat inundated will be reduced. Revegetation success (or failure) will be monitored and additional mitigation measures, if needed, will be identified.	Small, short-term, site-specific positive effect **Not Significant**

[(a)] Effects are negative until plant communities become re-established: refer to "operation – inactive" assessment

If in the future more frequent summer operations for the Floodway are proposed, initial consideration will be given to the potential effects that such changes would have on the vegetation along the Floodway Channel. This evaluation could recommend changes in the planned operations or the implementation of additional mitigative measures with respect to plants and their habitat.

The second component can be carried out by reconnaissance-level surveys of the Floodway on a regular basis and by examining the vegetation for invasive weedy species. This will require a weed control team familiar with **noxious vegetation**. Once identified, problem areas could then be spot-sprayed and reseeded as necessary.

Vegetation monitoring on the West Dyke will be coordinated or contracted in consultation with Macdonald Weed District personnel. They currently provide this service in the R.M. of Macdonald and have all the equipment and expertise necessary to handle any required monitoring and mitigation.

7.4 WILDLIFE, WILDLIFE HABITAT AND COMMUNITIES

7.4.1 Approach and Methodology

7.4.1.1 Effects Assessment

Field investigations during fall 2003 spring and summer of 2004 produced baseline data on wildlife communities and habitats existing within the Floodway ROW. This data, along with subsequent literature, assisted in assessing the effects that an Expanded Floodway would have on existing wildlife habitats and communities. These potential effects are presented for each phase of Floodway Expansion (pre-construction, construction, and operation - inactive and active).

7.4.1.2 Sources of Effect

Wildlife communities throughout the Floodway and West Dyke may be disturbed during various phases of the Floodway development. This is the primary negative effect on wildlife that is associated with the Project, i.e., would not have otherwise occurred in the existing environment. Key disturbances include temporary disruption of vegetative communities, through clearing and grubbing activities associated with excavation, during the construction phase. Removal of ground cover creates a reduction in available foraging habitat for some wildlife and escape and/or nesting cover for others. Other construction effects include noise disturbance from excavation equipment and roosting and/or nesting site disturbance at bridges.

Operation-inactive effects of the Project are generally positive and are associated with the establishment of a native grassland community along the Floodway Channel Slopes and, potentially, within areas of the upland spoil banks. For many species of wildlife including invertebrates, a diverse grassland ecosystem may have positive effects by offering more diverse foraging, breeding and cover habitats.

Inundation of wildlife habitat and wildlife communities within the Floodway and, to a much less frequent extent, alongside the West Dyke currently occurs under Existing Floodway operations. Inundation of

terrestrial habitat will still occur, with the Project, during active operation of the Floodway; however, the extent of this inundation, depending upon water levels, will be less with the Project. Inundation of the expanded Floodway Channel by floodwaters may thereby have positive effects on wildlife habitat through increasing the expanse and quality of terrestrial foraging habitat. Potential negative effects on wildlife cause by inundation, such as through the destruction of nesting, burrowing and denning habitat, will be reduced with the Project. The Project will also involve expansion of the Floodway Base, which will become "wet meadow" habitat during Floodway operation and will potentially provide additional and enhanced foraging habitat for **waterfowl** and some waterbirds. The amount of aquatic habitat available to semi-aquatic wildlife species will increase, but the depth of inundation (for a specific floodwater level) will be less with the Expanded Floodway Channel.

7.4.2 Existing Environment

Certain ecodistricts (Figure 7.2-1), or specially designated areas within these ecodistricts, are recognized for their provision of suitable habitat for a variety of wildlife species. These areas, together with rural and urban landscapes, provide a mosaic of habitats that may support a diversity of wildlife species. For example, it is estimated that over 250 species of birds, 62 mammal species and 17 amphibian/reptile species may occur within the Regional Study Area (Appendix 7A, Tables 7A-2, 7A-3 and 7A-4). There are also over 1,000 species of terrestrial insect and over 1,000 species of other invertebrates and micro-organisms.

A number of waterfowl species, namely ducks, presently occur within the Floodway and West Dyke study areas. The Floodway Channel is generally more likely to support waterfowl in years when water is present in the Channel throughout the spring, summer and fall seasons. On April 26, 2004, the Minister of Water Stewardship terminated an agreement, held between Ducks Unlimited and Manitoba Conservation, that outlined how the outlet culvert gates would be operated in a manner that would promote waterfowl habitat (Section 6.4.2). This involved closing the conduit gates in May/June after spring runoff to create a backwater impoundment that may provide more, better quality habitat for waterfowl breeding and foraging. The impoundment was apparently not used extensively by waterbirds during the period of its operation. Prior to termination of the agreement, there was consultation with the Wildlife and Fisheries branches of Manitoba Conservation to ensure there was mutual agreement amongst the parties involved with respect to best practices for managing fish and wildlife. Don Sexton (*pers. comm.* 2004) indicated that the continued operation of the culvert gates could not be justified from a waterfowl production perspective.

Dabbling ducks (e.g., Mallard and Blue-winged Teal) were occasionally noted foraging within the ditches of the West Dyke during spring **breeding bird surveys**. They may have been nesting in the area. Although nesting habitat is limited along much of the West Dyke (due to extensive cultivation), waterfowl may be utilizing the grassy slopes for breeding purposes.

Water levels within the Floodway are an important factor in determining waterbird usage of the Low Flow Channel. Fall investigations revealed **shorebird** use in areas with exposed mud and sandbars. Water levels were low at this time, providing foraging opportunities for shorebirds such as yellowlegs. Shorebirds (e.g., Spotted Sandpipers) occurred in the mudflats on the downstream side of the Floodway

Outlet Structure. They were also observed foraging along portions of the Floodway Channel upstream of the outlet. Spring bird surveys of the West Dyke revealed that these sites were commonly use by Killdeer, and there was one occurrence of Upland Sandpiper.

There are other waterbodies in the Winnipeg region other than the Floodway and alongside the West Dyke that are used far more extensively by waterbirds and shorebirds for staging and **loafing** during migration, particularly during the fall. Within the Flood Study Region including Netley Marsh, are waterbodies known to support large populations of migratory waterbirds, retention ponds in the City boundaries, sewage lagoons (e.g., Birds Hill), and reservoirs such as Fort Whyte and the Deacon Reservoir (Tetr*ES* 1992; Bruce *pers. comm.* 2004; Toews *pers. comm.* 2004). These wetlands within the study area usually have lower bird abundance during the spring and summer (breeding season) for such wildlife as waterfowl, gulls, grebes, herons, shorebirds and blackbirds.

Among the most productive and sensitive wildlife habitats in the study area are river bottom forests, which normally maintain high biodiversity and typically support larger wildlife populations. In addition to riparian forests, other sites in the study area provide wildlife habitat having high wildlife productivity. Nesting habitat for Loggerhead Shrike, an endangered bird species occurs within the Flood Study Region. Some forest communities in the study area, particularly some native woods in the region composed of trembling aspen, support large populations of white-tailed deer and a diverse array of wildlife species - particularly around Birds Hill Park and Beaudry Park (Shoesmith and Koonz 1977).

A variety of mammals have been noted utilizing the Floodway during spring, summer and fall fieldwork (Appendix 7C, Table 7C-5). White-tailed deer forage within the alfalfa/brome haylands along the spoil banks and side slopes, as well as within the willow and herbaceous plant mix covering areas of the Channel Base. Small mammals, including jackrabbits, are attracted to the grassy slopes and herbaceous Channel Base, which in turn attract predators such as coyotes and red fox. Agricultural lands and roadway ditches and rights-of-way typically harbour Richardson ground squirrel, thirteen-lined ground squirrel, white-tailed jack rabbit, and some ground-nesting bird species.

The Floodway also provides habitat for beaver moving up from the Red River and/or Seine River. Evidence of beaver activity, although limited, occurs throughout various parts of the Floodway Channel. Beaver (likely originating from the La Salle River) and white-tailed deer were also noted along the West Dyke. The grassy slopes of the West Dyke will provide suitable habitat for small mammalian predators such as coyote and fox and scavengers such as skunk and raccoon.

There is currently no evidence to suggest that the Floodway or West Dyke provide unique or unusual habitat for terrestrial invertebrates or microorganisms. The information available on these organisms is not site-specific unless it is associated with research studies, insect trapping around the City of Winnipeg, or unless it is associated with a known location of a rare or unique invertebrate species or assemblage.

Amphibian habitat within the local study area (the Floodway ROW and West Dyke) occurs predominantly within the Floodway Channel and along ditches of the West Dyke. These habitats support a number of amphibian species, including wood frogs, boreal chorus frogs, leopard frogs and American/Canadian

toads. Three of these four amphibian species call from the ditches near the West Dyke. Amphibian surveys in the spring of 2004 indicated these species occurred at various calling densities throughout the local study area in April and May and appeared to be breeding (Appendix 7C, Figures 7C.3-1, 7C.3-2 and 7C.3-3).

Amphibians were noted calling from the waters of the Low Flow Channel and amongst bank and emergent vegetation. Throughout the entire spring of 2004, the Low Flow Channel and various locations along the West Dyke ditch contained a level of water suitable for breeding amphibians. The best frog habitat occurs in the southern section of the Floodway that was surveyed (Appendix 7C, Figures 7C.3-1, 7C.3-2 and 7C.3-3); this may be due to the presence of emergent aquatic vegetation in that area (eggs are typically attached to aquatic vegetation) and to the formation of isolated ponds (reduces probability of predation of eggs and tadpoles by fish). Although frogs were calling at the other crossing sites, emergent or submergent vegetation was rare or did not occur. If breeding frogs occur along the entire length of the Floodway Channel, egg masses at sites devoid of aquatic vegetation would have to be attached to the channel bank/overhang.

Although water levels were variable during fall surveys along the Floodway Channel, surveys revealed various species of frogs within the pooled areas of the Low Flow Channel (Appendix 7C, Table 7C-5). The presence of wood frogs and leopard frogs (3 wood and 10 leopard frogs in a 100 m area sampled near the Floodway Inlet) in the Floodway Low Flow Channel in late September suggests that they may have completed their fall migration, which for leopard frogs typically begins in August (Preston 1982), and may be over-wintering nearby. While wood frogs typically hibernate under leaf litter, logs and stones, leopard frogs hibernate on the bottom of lakes, deep ponds, rivers and creeks (Preston 1982). As such, there is a potential that leopard frogs may be hibernating in the substrate of the Floodway Channel.

The habitats located within the Floodway and West Dyke are not expected to support a large number or diversity of reptile species (Appendix 7A, Table 7A-4). Lack of cover (emergent vegetation) and of wooded basking structures (dead trees) within the study area limits the occurrence of turtle species, while a lack of cover and suitable hibernacula may limit the occurrence of snakes.

The Existing Floodway is typically active in two out of three springs, and in some years, occasionally in the summer and fall. Under the current conditions, the Low Flow Channel and lower slopes of the Floodway provide poor nesting habitat for birds and burrowing habitat for small mammals.

By comparison, active use of the West Dyke to hold back floodwaters occurs very infrequently (e.g., 1997 flood). The West Dyke has been shown to have low wildlife biodiversity and abundance (Appendix 7C), likely due to the limited habitat availability and quality – it is a narrow strip of land that provides approximately 2 to 20 m of terrestrial habitat from the plateau of the Dyke to the adjacent ditch. The Dyke also experiences fragmentation effects associated with the actively used road that extends along the top face of the Dyke.

7.4.3 Effects and Mitigation

This section outlines the potential effects of the Project components on birds, mammals, and other wildlife, i.e., invertebrates, amphibians and reptiles.

7.4.3.1 Pre-Construction

Floodway Channel and Crossings

Pre-construction activities along the Floodway Channel and at bridge and utility crossings primarily included geotechnical investigations of soil and bank stability. Associated activities included excavation and leveling of soil over an area that extends from the spoil bank to the Low Flow Channel. Effects of these pre-construction activities on wildlife and wildlife communities are expected to be minimal, as drilling and excavation were within small localized areas of the Floodway. The area of vegetation disturbed by augers was small, averaging the width of a solid stem auger (125 mm; KGS 2004). Holes drilled were backfilled with auger cuttings (soils) upon removal of soil samples and caused minimal disturbance to the surrounding environment. Temporary avoidance of the drilling areas by wildlife may have occurred. The potential disturbance of wildlife related to the presence of field crews was small, short-term and incremental to the normal recreational use of the Floodway. However, these effects would be site-specific, short-term in duration and overshadowed by the construction-related effects associated with clearing and excavation.

Pre-construction-related effects to the terrestrial environment of the Floodway Channel and Crossings are expected to be small, short-term, site-specific, negative and not significant.

West Dyke

Similar activities conducted along the Floodway Channel and Crossings were conducted along the West Dyke during the pre-construction phase. Dyke and ditch soils were tested as was bank stabilization along the length of the Dyke; these small test holes were backfilled (Section 7.3.3.1).

Noise from drilling and soil sampling may cause a temporary avoidance in wildlife habitation in the immediate drilling area. This effect would be very small, short-term and incremental to the existing noise levels associated with the road. It would also be site-specific and have little effect on the terrestrial environment, including wildlife. The presence of field crews conducting surveys along the Dyke will have a very small effect on wildlife habitat that would be incremental to the existing effects associated with the presence of people and vehicular traffic along the Dyke.

Pre-construction-related effects to the West Dyke terrestrial environment are expected to be negligible, short-term, site-specific, and negative that are not significant.

7.4.3.2 Construction

Floodway Channel and Crossings

Birds

Potential construction-related effects on waterfowl include the loss of breeding/nesting, foraging, cover and staging habitat cover. This habitat will be removed during the initial excavation steps of clearing and grubbing. Lost habitat will include the upland grass cover, but more importantly, the wetland vegetation cover (e.g., cattails, sedges) present within areas of the Low Flow Channel. To the extent possible, vegetation within the Channel will remain intact, thereby providing some cover for waterfowl. At sites where vegetation is disturbed, alternate areas along and adjacent the Floodway areas may provide appropriate habitat for waterfowl during construction.

Construction-related effects on other waterbirds are also associated with the disruption of foraging and nesting habitat by excavation activity. Primary food sources such as fish, amphibians and invertebrates, as well as some nesting habitat for ground nesting waterbirds, may be disturbed during construction. The present quality and amount of this waterbird habitat is limited. The temporary loss of foraging and nesting habitat is expected to be offset by the availability of adjacent waterbird habitat and the immediate implementation of a revegetation program.

Minimizing the disturbance to waterbird nests and habitat will also occur through the planned sequencing of Floodway construction. Excavation is to be scheduled segment by segment (totalling 4 segments) over a period of 4 years, thereby reducing the amount of disrupted vegetation at any one time. This mitigative measure assures a partially vegetated Floodway ROW during the entire phase of construction and results in the potential availability of alternate habitat for waterfowl and other species. The potential negative effects on nesting waterfowl and other waterbirds will be minimized or avoided through the additional mitigative step of clearing and grubbing in the September to April period in the year prior to excavation. This will effectively minimize the potential disturbance to nesting birds that will otherwise occur if clearing and grubbing proceed in the period of peak nesting/brood rearing (i.e., May, June, July). Additional mitigation includes implementation of the revegetation plan for the Floodway Channel: native grassland plant species may, over time, lead to the restoration of habitat for waterfowl.

Construction-related effects to waterfowl and other waterbirds are expected to be moderate, short-term, site-specific, negative, and not significant.

The potential Project effects on **raptors** are mainly associated with short-term, noise-related disturbances. The noise may cause a site-specific disruption in the use of adjacent habitat by raptors. The associated excavation may affect raptors' prey species to the extent that the sites do not provide suitable foraging habitat. The potential for disrupting raptor nest sites is small.

The negative construction-related effects on raptors are expected to be small, short-term, and site-specific, and therefore not significant.

Potential construction-related effects on **passerines** (songbirds) are related to excavation activities and removal or adjustment of bridges. Excavation activities will result in the temporary disruption of breeding and foraging habitat through the removal of vegetation communities. This disruption of habitat is mitigated through the planned sequencing of Floodway construction over a 4-year period. This would effectively reduce the amount of disrupted vegetation at any one time. Clearing and grubbing in the September to April period prior to excavation will avoid the potential for disturbance of passerine nests. If excavation otherwise occurred in the breeding season and vegetation was left intact until the excavation period, bird nests and actively breeding passerines would be disturbed during the late April to July breeding and brooding period; in this event, there may not be opportunity for re-nesting elsewhere in that year.

The availability of a partially vegetated Floodway ROW during the entire phase of construction may off-set the disruption of passerines utilizing the Floodway. Immediate revegetation of the excavated regions with native grassland plant species may also, over time, lead to the restoration of passerine habitat.

The removal or adjustment of bridges may temporarily disrupt species (e.g., Rock Pigeons and swallows) that utilize these areas as roosting/nesting sites. Alternate roosting/nesting sites are available on other structures.

Considering implementation of these mitigative measures, excavation-related effects to passerines are expected to be moderate, long-term, site-specific, and not significant. Construction-related effects associated with the adjustment of bridges on passerines are expected to be small, short-term, site-specific with negative effects and therefore not significant.

Mammals

Potential construction-related effects on white-tailed deer are primarily associated with the temporary disruption of habitat by excavation equipment. Specific construction-related effects to white-tailed deer include the clearing of vegetative communities utilized for forage, shelter, escape cover and breeding purposes. Although alternate habitat for white-tailed deer exists adjacent to the Floodway area, the potential construction effects may be minimized by the immediate implementation of a revegetation program.

The potential effects of equipment noise disturbance on white-tailed deer include a temporary site-specific avoidance response. Since white-tailed deer are generally more active at night, there may only be a moderate disruption to their regular activities, as excavation efforts will primarily occur during daylight hours. Since this species is considered highly adaptable and opportunistic, adjacent lands could be used during periods of excavation.

Construction-related noise effects to white-tailed deer are expected to be small, short-term, site-specific with neutral effects and not significant. Excavation effects on white-tailed deer

are expected to be moderate, short-term, site-specific with negative effects that are not significant.

Potential construction-related effects on furbearers are mainly associated with the temporary disruption of habitat, but also include noise disturbance from excavation equipment. Specific construction-related effects to furbearers include the clearing of vegetative communities utilized for hunting, shelter, and breeding purposes. Although alternate habitat for furbearers exists adjacent to the Floodway area, the potential construction-related effects may be minimized by the immediate implementation of a revegetation program and by clearing and grubbing in the September to April period in the year prior to excavation.

The potential effects from noise disturbance include temporary site-specific avoidance response by wildlife. Certain species that are more active at night (e.g., raccoon, skunk, fox) may experience less disruption to their regular activities, as excavation efforts will primarily occur during daylight hours. Lands adjacent to the Floodway could serve as alternate forage, hunting and breeding sites.

Considering implementation of these mitigative measures, construction noise-related effects to furbearers are expected to be small, short-term, site-specific, with negative effects that are not significant. Excavation-related construction effects to furbearers are expected to be moderate to large, short-term, site-specific that are not significant.

Potential construction-related effects on small mammals are primarily associated with the temporary loss of habitat caused by excavation activity. Floodway Expansion will result in the removal of forage and escape cover for many small mammals inhabiting the Floodway, including undesirable burrowing mammals. Although the presence of burrowing mammals is not encouraged within the Floodway (they reduce the stability of the banks and therefore bank resistance to erosion), mitigation for the disruption of small mammal habitat will likely include species that burrow.

Temporary disruption of small mammal habitat will be mitigated through the planned sequencing of Floodway construction. Sectionalized excavation of the Floodway Channel over a 4-year period that reduces the amount of disrupted vegetation at any one time will assure a partially vegetated Floodway ROW during the entire phase of construction, and will result in the availability of alternate habitat for small mammals. The mitigative step of clearing and grubbing in the September to April period prior to excavation will potentially affect burrowing animals who may be disturbed during the period of hibernation. This may reduce the number of burrowing animals on the Floodway and West Dyke until immigration to the site occurs – expected to occur within the first 3 to 5 years following Project construction. There remains some question regarding the precise change in the biodiversity of small mammals immediately after construction, and the rates of immigration to the newly formed Floodway site. The plan for immediate revegetation of the Floodway Channel with native plants is expected to lead to the restoration of habitat for small mammals within the short-term.

Considering implementation of these mitigative measures, construction-related impacts to small mammals are expected to be small to moderate, short-term, site-specific effects and therefore not significant.

Other Wildlife

Potential construction–related effects on terrestrial invertebrates are associated with excavation activities. A diversity of invertebrates (subterranean and terrestrial) may be affected by excavation activities during the construction phase. None of these potentially affected areas are known or suspected to have invertebrate species or habitat that are uncommon or rare in the region. An immediate re-establishment of vegetative communities following each stage of Floodway construction will help mitigate the temporary disruption of invertebrate habitats.

Construction-related impacts to terrestrial invertebrates are expected to be small, short-term, site-specific, with negative effects that are not significant.

Potential construction-related effects on amphibians are associated with excavation activities. Another source of effect will be the potential degradation of breeding and over-wintering habitat through the placement of riprap material in the Floodway Channel. There is also potential for mortality through collisions with construction vehicles. Amphibians present in the Floodway for a portion of their life history may experience interference with breeding calls and/or breeding behaviour due to noise from excavation equipment during periods of construction. The largest potential effect is likely associated with disruption of habitat by excavation activity and with a potential reduction of species populations.

One species of amphibian noted within the Floodway during fall fieldwork was the northern leopard frog, a species deemed of special concern by COSEWIC (2004). Species of special concern are those particularly sensitive to human activities or natural events but are not endangered or threatened (COSEWIC 2004). Mitigating the effects of these disruptions to amphibians may be possible by restricting construction activities to occur outside of the peak breeding month(s) (May/June) to the extent feasible. A prompt revegetation program following excavation activities should the include establishment of plant species (terrestrial and aquatic) favorable for supporting amphibians. Follow-up monitoring will help to determine whether there is a need to alter construction or maintenance plans to minimize impacts on amphibian habitat, particularly for leopard frogs (Sections 7.4.5 and 7.5.5).

Considering implementation of the mitigative measures, excavation-related impacts to amphibians are expected to be small, short-term, site-specific with negative effects that are not significant.

Potential construction-related effects on reptiles inhabiting the Floodway area are primarily associated with excavation activities. Some reptiles may experience a reduction in availability of prey (small mammals, amphibians, insects) due to disruption of foraging habitat. Removal of vegetative cover during excavation activities may also increase the vulnerability of snakes and turtles to predation. It is likely that turtles are not common within the Floodway region given the lack of appropriate nesting habitat and

loafing structures along the channel and floodway slopes. Mitigative measures are not proposed for reptiles given the availability of suitable adjacent, alternate habitats.

Construction-related impacts to reptiles are expected to be small, short-term, site-specific with negative effects that are not significant.

West Dyke

Birds and Mammals

Potential construction-related effects on birds and mammals include the disruption of breeding, foraging and cover habitats (to varying degrees) along the West Dyke. Excavation activities will strip existing vegetation from most of the Dyke (may include both slopes and ditches in some areas), thereby reducing the availability of habitat for most wildlife species that previously used the habitat. The final phase of construction will involve implementing a revegetation plan to restore pre-construction vegetative communities (predominantly brome and alfalfa mix) along some areas of the West Dyke following final grading and seeding. At some sites, rip-rapping slopes (Acres/UMA 2004) will reduce the availability of wildlife habitat. During construction, adjacent habitat will be available to birds, mammals and other wildlife species within the vicinity of the Dyke.

Construction activities may increase habitat for some wildlife species such as waterfowl, amphibians, raptors and passerines if ditches are dug deeper in pre-selected areas (e.g., near the Parkland Mews Peregrin Falcon Breeding Program; Acres/UMA 2004). Construction activities will be scheduled for the autumn the impact to Parkland Mews' Peregrine Falcon Breeding Program. Deeper ditches (Acres/UMA 2004) may create semi-permanent wetlands that are more attractive to waterfowl and other wildlife species, thereby enhancing foraging habitat for raptors within this local area of the West Dyke.

Construction-related impacts on bird and mammal communities along the West Dyke are expected to be small to moderate, short-term, site-specific, negative effects that are not significant.

Other Wildlife

Potential construction-related effects on other wildlife (amphibians, reptiles and invertebrates) include the disruption of breeding, foraging and cover habitats (to varying degrees) along the West Dyke. The temporary removal of existing vegetation from most of the Dyke during excavation activities will reduce habitat availability for most wildlife species. While most of this habitat will be restored through the revegetation program, sites that are rip-rapped will likely support a much lower abundance and diversity of species.

During construction, adjacent habitat will be available to amphibian, reptile and invertebrate species within the vicinity of the Dyke. For amphibians such as the boreal chorus and wood frogs, the disruption of breeding habitat may potentially have a short-term but moderate to large effect on local frog densities

(Appendix 7C, Table 7C-3). Expanding and deepening ditches will occur in a manner whereby frogs will not be hindered from entering and exiting the waterbodies (e.g., the gradual reshaping of ditch slopes). Plants and organic substrate will be permitted to re-establish in ditches and adjacent waterbodies, thereby permitting the habitat to return to pre-construction conditions.

Other potential effects on amphibians include increased mortality from construction vehicles and equipment and noise-related disruption of courtship activities. These effects are small and incremental to the existing environmental conditions, i.e., road traffic along the West Dyke.

Construction-related impacts to amphibian, reptile and invertebrate communities along the West Dyke are expected to be small, short-term, site-specific with negative effects that are not significant.

7.4.3.3 Operation – Inactive

Floodway Channel and Crossings

Birds

Potential operation-inactive effects on waterfowl include enhanced nesting cover and foraging habitat but also potential loss of habitat structure. Enhanced diversity of vegetative communities (native grasses) may provide more suitable nesting cover and foraging habitat for waterfowl. A reduction in vegetative structure may result if willows are removed form the Floodway Channel Base. Potential effects on nesting birds, including waterfowl, will be minimized through the vegetation management program, namely by clearing the willows in the September to April period, i.e., outside the breeding bird nesting season. To partly mitigate the loss of willow from the channel base, a select number of willow or alternate shrub species may be allowed to re-establish along some of the Floodway spoil bank sites.

Considering that the past operation of the Floodway Outlet Structure to facilitate the creation of a backwater impoundment was terminated prior to the waterfowl breeding season in 2004, this “change” is not a component of the existing environment that will be affected by the Project. While the conduits at the outlet structure will not be closed in May/June with the Project, experience from past operations of the Floodway indicate that waterfowl and other birds did not use the impounded area extensively.

Operation-inactive impacts to waterfowl in terms of enhanced vegetative communities are small to moderate, long-term, site-specific with a positive effect that is not significant. Operation-inactive impacts to waterfowl in terms of loss of habitat structure (willows) is small, long-term, site specific with a negative effect that is not significant.

Potential operation-inactive effects on other waterbirds and shorebirds are primarily associated with the widening of the Floodway Channel will increase the amount of potential available wetted habitat. This may benefit waterbirds through providing improved local habitat for loafing, roosting and potentially for foraging. The potential expansion of mudflat habitat on the downstream side of the Floodway Outlet may have benefits to shorebirds by providing more and enhanced foraging and loafing habitat.

Few waterbirds other than ducks may nest amongst the vegetation in the Floodway. However, there remains a small potential that the removal of shrubby growth and a sustained maintenance program, whereby willow growth is discouraged, may remove or further degrade the quantity and quality of some marginal waterbird habitat. These effects can be mitigated through the establishment of grassland plant species as part of the revegetation program. These species may include aquatic plants that in turn, may provide enhanced foraging habitat (i.e., through a potential increase in prey species) for various waterbirds.

Operation-inactive impacts to waterbirds and shorebirds are expected to be small to moderate, long-term, site-specific, positive effects that are not significant.

Potential operation-inactive effects on birds of prey (raptors) are associated with the establishment of a more diverse vegetative community along the Floodway Channel and slopes. Native grasses may provide more suitable nesting cover for ground nesting species such as the Northern Harrier.

Operation-inactive impacts to birds of prey (raptors) are expected to be small to moderate, long-term, site-specific with positive effects and therefore not significant.

Potential operation-inactive effects on passerines (songbirds) are related to the establishment of vegetation cover through the revegetation program. The enhanced diversity and structure of vegetation communities within the Floodway potentially provides better nesting cover and foraging habitat for passerines. The revegetation program also includes the removal of willow from the Channel Base, a potential loss of habitat structure in the form of woody vegetation. The potential negative effects on passerines will be minimized through clearing willows and other shrubs in the August to April period.

Operation (inactive)-related impacts (enhanced diversity of vegetation communities) to passerines are expected to be small, long-term, site-specific with positive effects and therefore not significant. The potential effects to passerines related to the loss of willow are expected to be small, long-term, site-specific, negative effects and not significant.

Mammals

Potential operation-inactive effects on white-tailed deer are primarily associated with the establishment of grassland communities through the revegetation program and the vegetation management program that will include the removal of willows and their ongoing maintenance. The enhancement of vegetative community diversity may provide a more variable food source (e.g., grasses and forbs) for species such as white-tailed deer. The potential loss of willow from the Floodway may reduce the availability of some low-quality habitat structure (cover) and food sources (e.g. shrub leaves and stems) for white-tailed deer.

Enhanced diversity of food sources through the establishment of native grass communities may have a small, long-term and site-specific positive effect that is not significant. Reduction of willow forage/structure in the channel may cause a small, short-term, site-specific negative effect that is not significant.

Potential operation-inactive effects on furbearers are primarily associated with the establishment of native grass communities through the revegetation program and the potential removal of willow. The enhancement of vegetative community diversity may increase prey species diversity and densities (e.g., small mammals and nesting waterfowl) for species such as fox.

The loss of willow from the Floodway may reduce the availability of low-quality woody habitat structure for furbearers and furbearer prey. This loss may be partly mitigated through permitting shrubs to re-grow along the Floodway spoil banks.

Enhanced diversity of food sources through the establishment of grassland communities may have a small, long-term and site-specific positive effect that is not significant. However, the reduction of willow structure for furbearers may have a small, long-term, site-specific negative effect that is not significant.

Potential operation inactive effects on small mammals (which would include medium sized species such as skunks, porcupine, raccoon and rabbit) are primarily associated with the establishment of a vegetative community (e.g., native grasses) and the removal of willow from the Channel Base. Enhanced diversity of grassland communities may provide a more variable food source for small mammals, potentially increasing small mammal diversity and densities. Removal of willow from the Channel Base may result in some loss of habitat structure for small mammals.

Operation-inactive impacts to small mammals (revegetation with native grasses) are expected to be moderate, long-term, site-specific positive effect and not-significant. Operation-inactive impacts to small mammals (loss of willows) are expected to be small, long-term, site-specific negative effect that is not significant.

Other Wildlife

Potential operation-inactive effects on terrestrial invertebrates are associated with the establishment of native plant species through the revegetation program. Enhanced diversity of vegetation communities within the Floodway may increase the invertebrate abundance and diversity by providing more suitable breeding, foraging and cover habitat.

Potential operation-inactive effects on amphibians are associated with the establishment of native plant species through the revegetation program. An increase in plant diversity, both terrestrial and aquatic, may provide enhanced foraging and breeding habitat for amphibians (i.e., through potential increases in prey species and emergent aquatic plant growth). The expansion of the wetlands in the Floodway

Channel will be a positive effect that will be offset by the potentially reduced rates of growth of semi-aquatic plants following the establishment of a more cobbly bottom.

Operation-inactive impacts to terrestrial invertebrates and amphibians are expected to be small to moderate, long-term, site-specific, with positive effects that are not significant.

Potential operation-inactive effects on reptiles are associated with the establishment of native plant species through the revegetation program. Enhanced diversity of vegetative communities may provide a more diverse prey base for certain reptiles.

Operation-inactive impacts to reptiles are expected to be small to moderate, long-term, site-specific, with positive effects that are not significant.

West Dyke

Inactive operation of the West Dyke is anticipated to have both positive and negative effects on bird and mammal communities. Positive effects include the enhancement of wildlife habitat through the deepening of ditches along a portion of the West Dyke. Deepening of ditches may create semi-permanent wetlands attractive to waterfowl and potential predators such as raptors, coyote and fox. This type of wetland, with associated wetland vegetation (e.g., cattails, sedges), may also support some species of passerines (e.g., Red-winged Blackbird), amphibians and invertebrates. By managing the ditches so that semi-aquatic vegetation is encouraged and organic substrate is permitted to build up in a manner similar to ditch maintenance prior to construction, the productivity of this habitat for wildlife may increase and may approach pre-construction levels of abundance and diversity after a few years of operation.

Waterfowl nesting along the grassy dyke may also increase with the enhanced available nesting habitat along the West Dyke. Reduced habitat availability and quality will occur along portions of the dyke slopes that are rip-rapped. This may have negative effects on birds (waterfowl and passerines such as Savannah Sparrows and Clay-coloured Sparrows), small mammals (e.g., rabbits, mice, ground squirrels), reptiles (e.g., snakes), and amphibians that would otherwise have utilized the marginal grassland habitat. The extent of this disturbance is likely small and site-specific, having little effect on wildlife communities. This effect will be mitigated by allowing willows and other shrubs to grow in the crevices of the riprap, to the extent feasible given the vegetation management program, to enhance this wildlife habitat. Adjacent habitat will remain available to species utilizing these marginal areas.

It is not anticipated that the risk of wildlife-vehicle collision will change substantially following construction. The largest potential for wildlife-vehicle collisions will be related to amphibians and, to a much lesser extent, birds and small mammals. Within a few years after construction, the ditches will become wetlands that sustain populations of frogs and other species that may approach their pre-construction abundance and distribution. The main source of potential effect will be from the development of a new road that separates the breeding, summering and over-wintering habitat – this is

not the case for the West Dyke, which serves as an existing road, and the levels and type of collisions are not expected to change as a result of the Project.

Operation-inactive effects to wildlife communities along the West Dyke are expected to be small, site-specific and neutral overall, i.e., not significant.

There does not appear to be any potential for other projects or activities (e.g., recreation along the Floodway and West Dyke) to cause a significant cumulative effect with the Project (Section 7.3.3.3). The potential for cumulative effects will be minimized through application of Best Practices in the operation and maintenance of the Floodway and West Dyke and through implementation of additional mitigative measures if the results of ongoing monitoring deem it necessary.

7.4.3.4 Operation – Active

Floodway Channel and Crossings

Birds

Potential operation-active effects on waterfowl are primarily associated with the inundation of waterfowl breeding and foraging habitat. This inundation of vegetation communities is generally seasonal, periodic and temporary. Many species will re-nest if early nests are destroyed. Due to the widening of the Floodway, the extent of terrestrial habitat that will be inundated with a given flood elevation would be less after Floodway construction. As well, the amount to which semi-aquatic vegetation is overtopped by a given floodwater height will be less with the Project; the chance of die-off of plants in the Floodway Base would be less with the Project as will the chance of die-off of plants in the Floodway base. As a result, it is predicted that the terrestrial wildlife habitat will recover more quickly after most flood events.

Potential operation-active effects on other waterbirds are associated with the inundation of habitat by floodwaters. This occurs under the existing conditions. The inundation of a smaller amount of shoreline habitat with the Project may have an associated increase in foraging and nesting habitat for some waterbirds and shorebirds. The increased width of the Floodway Base will, under floodwater levels, have an associated increase in loafing and foraging habitat for some waterbirds such as cormorants, pelicans, and gulls. The increase in foraging and loading habitat for some species will have a positive effect. Inundation of the terrestrial habitat will occur at the same frequency but will occur over a smaller terrestrial area and thereby have less of a negative effect other than without the Project.

Operation-active impacts to waterfowl and other waterbirds are small, short-term, site-specific with positive effects that are not significant. Potential effects are anticipated to be neutral for raptors, and not significant overall.

Potential operation-active effects on birds of prey (raptors) are primarily associated with the inundation of a small amount of foraging/hunting habitat by floodwaters with the Project. Lands adjacent to the Floodway ROW may provide suitable foraging/hunting and nesting habitat for birds of prey during any

seasonal, periodic and temporary flooding events. Furthermore, some species, like the Northern Harrier, initiate nesting following the period in which the Floodway would most likely be used.

There is the potential for flooding of small mammal burrows that may lead to a short-term increase in predation success and/or decrease in long-term prey availability. Breeding habitat for ground nesting species (e.g., Northern Harrier) may also be temporarily inundated by floodwaters. The extent and duration of this effect is expected to be less with than without the Project.

Operation (active)–related impacts to birds of prey (raptors) are expected to be small, short-term, site-specific positive/negative effects that are not significant.

Potential operation-active effects on passerines are related to habitat inundation from floodwaters. The active use of the Floodway will result in the inundation of breeding and/or foraging habitat under existing conditions and with the Project. This effect is generally seasonal, periodic and temporary. Many species will re-nest if early nests are destroyed. Generally, the timing of Floodway use in the spring occurs prior to most passerine nest initiations. Due to the widening of the Floodway, the extent of terrestrial habitat that would be inundated with a given elevation of floodway will be less after Floodway construction.

Operation-active effects on songbirds are small, short-term, site-specific, positive and not significant.

Mammals

Potential operation-active effects on white-tailed deer are predominantly associated with the inundation of forage vegetation by Red River floodwaters. Alternate habitat on higher slopes and in adjacent areas is available. Generally, inundation is seasonal, periodic and temporary. The extent and duration of this inundation will be less with the Project.

Potential operation-active effects on furbearers are primarily associated with the inundation of hunting/foraging habitat by floodwaters. Alternate habitat on higher slopes and in adjacent areas is available. Generally, inundation is seasonal, periodic and temporary. The extent and duration of this inundation will be less with the Project.

Potential operation-active effects on small mammals are primarily associated with the inundation of habitat (burrows, forage and cover), as occurs under the existing conditions. This inundation of vegetation communities is generally seasonal, periodic, temporary, and of a lesser duration and extent with the Project.

Operation-active impacts to white-tailed deer, furbearers, and small mammals are expected to be small, short-term, site-specific neutral effect that is not significant.

Other Wildlife

Potential operation-active effects on terrestrial invertebrates are associated with the inundation of invertebrate habitat by floodwaters, as occurs under existing conditions. Generally, inundation is seasonal, periodic, temporary and of a lesser duration and extent with the Project.

Potential operation-active effects on amphibians are associated with the inundation of breeding habitat by high-flow floodwaters, as occurs under existing conditions. The relative amount of eggs, and to a much lesser extent, tadpoles that would be displaced and potentially destroyed by floodwaters in the event that high water occurs in the May to July period should not change substantially with the Project.

Potential operation-active effects on reptiles are associated with the inundation of reptile habitat (foraging and possibly limited nesting habitat) by floodwaters, as occurs under existing conditions. Alternate foraging and nesting habitat is available for reptiles in areas adjacent to the Floodway.

Operation-active impacts to invertebrates, amphibians and reptiles are small, short-term, site-specific with positive effects that are not significant.

West Dyke

Potential operation-active effects on wildlife utilizing the West Dyke include protection of slope, ditch and upland habitat from inundation of floodwaters during a 1 in 700 year flood. Therefore, the Project will have positive effects on wildlife and wildlife habitat in the event of a flood that would otherwise have exceeded the capacity of the Floodway Channel. In the event of very high floodwaters, a larger surface area of land will not be flooded. This Project will therefore protect existing wildlife habitat, and avoid the inundation of bird nests, mammal burrows, deer forage and other wildlife use areas.

Operation-active effects of the Project on wildlife in the area of the West Dyke are anticipated to be moderate, large, long-term, local with positive effects that are very infrequent and therefore, not significant.

Future Projects

The primary source of potential negative cumulative effects is associated with any changes in the summer operating regime of the Floodway that may occur independently from the Project in the future. Any change in summer operation will be evaluated for its potential to affect wildlife. If the changes in proposed summer operations involve an increase in the inundation of terrestrial habitat, particularly during the breeding bird season of May to mid-July, then the extent of the potential negative effect and the opportunity for mitigation will be evaluated at that future date.

7.4.4 Residual Effects and Significance

The residual effects of the Project on terrestrial wildlife are expected to be insignificant, as outlined in Table 7.4-1. The potential residual effects associated with wildlife or their habitat are expected to be

minimized and in some cases avoided through implementation of the outlined mitigation measures and implementation of the Best Practices outlined in the EIS and to be followed in the EPP. The results of monitoring outlined in Section 7.4.5 will facilitate a determination of the accuracy of the conclusions outlined in the EIS with respect to the wildlife assessment and whether additional mitigative steps are required.

7.4.5 Monitoring and Follow-Up

Monitoring for wildlife in 2004 occurred along about two-thirds of the Floodway and the West Dyke. Due to the unusual weather during May (windy, cold and high amount of snow and rain), the breeding bird migration season was late in 2004. Many of the birds present along the Floodway and West Dyke by June 1 were singing on breeding territories (e.g., grassland birds such as meadowlarks, sparrows, etc.), but some migrant species had not yet returned and were not on breeding territories (e.g., Yellow Warblers, Least Flycatchers and vireos). With the large amounts of rain in the spring, most of the vegetation (including shrubs in the base of the Floodway Channel) was flooded during the period that would normally fall within the breeding season. This presently occurs in about two out of three years. Breeding bird surveys along the Floodway in 2004 had to be delayed until late June, when water levels in the Low Flow Channel went back to levels more typical of a dryer spring; Yellow Warblers and Least Flycatchers, for example, are typically expected to nest in the willows adjacent to the Low Flow Channel, but not when most of the vegetation is under water.

Necessary environment-caused delays in the timing of surveys still permitted sufficient information to assess the potential effects of the Project. However, there remains the potential that species abundance and distribution were not “typical” in 2004. The survey methods proposed for 2005 would be similar to the methods followed in 2004 (Appendix 7C), with emphasis placed on surveying sites not previously investigated; this will involve using transects and reconnaissance, with some replication of survey sites from 2004 to determine whether the annual variation in wildlife populations will alter the conclusions of the EIS regarding predictions and effects or required mitigation measures.

If in the future, a change is proposed to the summer operating regime of the Floodway, an evaluation of the potential effects of this change on wildlife will occur. Potential opportunities for enhancing proposed summer operating plans will consider the minimization of potential negative effects on wildlife and the feasibility of other mitigation measures.

7.5 SPECIES AT RISK

7.5.1 Approach and Methodology

7.5.1.1 Effects Assessment

Field investigations outlined in Section 7.4.1.1 and detailed in Appendix 7B and 7C were the primary source of site-specific information on the potential presence of terrestrial plant and wildlife species along the Floodway, West Dyke and adjacent areas. Existing biophysical information pertaining to the

Floodway and West Dyke and surrounding areas (e.g., Tetr*ES* and DS Lea 1993; Manitoba Conservation Data Centre Data) was reviewed, and incorporated into the analysis along with pertinent results of conversations with local landowners, resource users and wildlife biologists.

Table 7.4-1
Summary of Residual Effects and Significance on Wildlife Effects

Description Of Effect	Mitigation	Residual Effects And Significance
CONSTRUCTION - EXCAVATION ACTIVITIES		
Waterfowl [(a)]		
Loss of breeding, foraging and staging habitat cover (including channel wetland vegetation, e.g., cattails, sedges)	Potential effects minimized through clearing and grubbing in the September to April period in the year prior to excavation	Moderate, short-term, site-specific negative effect **Not significant**
Other Waterbirds[(a)]		
Disruption of foraging habitat (primarily food sources such as fish, amphibians and invertebrates)	None. Alternate, adjacent habitat available (creeks and rivers)	Small, short-term, site-specific negative effect **Not significant**
Disruption of nesting habitat for some ground-nesting species	Potential effects minimized through clearing and grubbing in the September to April period in the year prior to excavation. Immediate implementation of revegetation program to re-establish habitats following each stage of Floodway Expansion construction	
Raptors		
Noise from equipment may reduce hunting effectiveness and/or may cause avoidance of floodway by raptors	None. Adjacent suitable habitat will be available for hunting following revegetation	Small, short-term, site-specific effect **Not significant**
Short-term, localized decrease in prey species densities (small mammals, reptiles) through disruption of habitat within Floodway	Immediate reestablishment of vegetation communities through reseeding program	
Disruption of nesting habitat for some ground-nesting raptor species (e.g. Northern Harrier)	Clear and grub in the September to April period of the year prior to excavation activities. Immediate implementation of revegetation program to re-establish habitats following each stage of Floodway Expansion construction	
Passerines		
Loss of breeding and/or foraging habitat	Clear and grub in the September to April period of the year prior to excavation activities	Moderate, short-term site-specific uncertain effect **Not significant**
Potential disruption of nesting/roosting sites on bridge structures (e.g., Rock Pigeons, swallows)	None. Alternate nesting/roosting habitat available on other structures (i.e., bridges)	Small, short-term, site-specific negative effect **Not significant**
White-tailed Deer		
Noise may illicit temporary and local avoidance behaviour in deer	Excavating equipment operated only during daylight hours, when deer are least active. Deer are more apt to forage at night, coinciding with a period of equipment inactivity, and least disturbance. Deer are typically highly adaptable/opportunistic species that adapt to noise without mitigation needed.	Small, short-term, site-specific neutral effect. **Not Significant**
Loss of forage vegetation.	None. Highly adaptable/opportunistic species	Moderate, short-term, site-specific negative effect **Not significant**

Description Of Effect	Mitigation	Residual Effects And Significance
Furbearers		
Temporary avoidance of site-specific areas due to noise from excavating equipment	None. Excavation occurs during daylight hours, when many furbearers are least active (e.g. skunk, fox, raccoon, mink)	Small, short-term, site-specific negative effect **Not significant**
Loss of hunting/foraging (habitat by excavation equipment)	Clear and grub in the September to April period of the year prior to excavation activities	Moderate to large, short-term, site-specific effect **Not significant**
Small Mammals		
Loss of habitat (burrows, forage, cover)	Clear and grub in the September to April period of the year prior to excavation activities.	Small to moderate, short-term, site-specific effect **Not significant**
Invertebrates		
Disruption of soil and vegetated habitats.	Immediate reestablishment of vegetation communities through reseeding program following each stage of Floodway Expansion construction.	Small, short-term, site-specific negative effect **Not significant**
Amphibians		
Disruption of habitat within channel. Potential reduction in amphibian populations (e.g. Northern Leopard Frog (b)	Re-establishment of plant species favourable for supporting frog species (aquatic and terrestrial species) in select areas	Small, short-term, site-specific negative effect **Not significant**
Disruption of breeding behaviour (calling in frogs) due to noise from excavation equipment	None	
Reptiles		
Reduction in food availability (e.g., small mammals, insects) due to disruption of foraging habitat	None. Alternate, adjacent foraging sites available	Small, short-term, site-specific negative effect. **Not significant**
Increased vulnerability to predation through disruption of vegetation cover	Availability of alternate habitat adjacent to floodway site will be restored, with a grassland habitat facilitated through implementation of the revegetation plan.	
Limited disruption of potential turtle nesting habitat within channel is expected. Low probability of turtles nesting within Floodway due to minimal appropriate nesting habitat	None	
Rare and Endangered Species		
There are presently no identified rare or endangered wildlife species potentially affected by the Project.	Mitigation measures, if required, will be identified following follow-up monitoring.	Current information suggests that there would be no effect. **Not significant**
OPERATION – INACTIVE		
Establishment of native plant species & wildlife cover through revegetation program		
Birds		
Enhanced diversity of vegetative communities, including aquatic plant communities, provides improved: foraging habitat for waterfowl and other waterbirds (i.e., through potential increases in prey species); nesting cover (for ground-nesting species such as Northern Harrier), and foraging habitat (i.e., through potential increases in prey species) for raptors and passerines.	Positive overall effect: Immediate implementation of revegetation program to re-establish habitats following each stage of Floodway construction will maximize benefits and minimize negative effects to wildlife and habitat. Minimize Floodway maintenance and time the clearing of woody vegetation to occur between September to April. Herbicide application, if needed, will occur after the breeding and brooding season in the late July to	Small to moderate long-term, site-specific positive effect **Not significant**

Description Of Effect	Mitigation	Residual Effects And Significance
	April timeframe. Application will be conducted by a certified agent and be no closer than 30m from the Floodway Channel or waterbody other than a ditch. Planting willow cuttings into areas that are where feasible, such as the Red River downstream of the Floodway Outlet, will further stabilize banks and provide wildlife habitat.	
Mammals		
Enhanced diversity of vegetative communities, both terrestrial and aquatic, provides better foraging habitat, i.e., through potential increases in prey species abundance and diversity.	Positive effect overall: Potential negative effects will be minimized through revegetation program and maintenance program, and timing herbicide application, if needed, to the August to April period. Planting willow cuttings into areas where feasible, auch as the Red River downstream of the Floodway Outlet, will further stabilize banks and provide wildlife habitat.	Small to moderate, long-term, site-specific positive effect **Not significant**
Invertebrates		
Enhanced diversity of vegetative communities result in increased diversity and a potential increase in invertebrate abundance by providing better cover, breeding and foraging habitat.	Positive effect overall: Potential negative effects will be minimized through revegetation program and maintenance program, timing herbicide application, if needed, to the August to April period.	Small to moderate, long-term, site-specific positive effect **Not significant**
Amphibians		
Enhanced diversity of vegetative communities, including aquatic plant communities, provides better foraging and breeding habitat (i.e., through potential increases in prey species and increased emergent aquatic plant growth).	Positive effect overall: Potential effects will be minimized through revegetation program and maintenance program, timing herbicide application, if needed, to the August to April period.	Moderate, long-term, site-specific positive effect **Not significant**
Reptiles		
Enhanced diversity of vegetative communities provides better foraging habitat (i.e., through increases in prey species).	Positive effect overall: Potential effects will be minimized through revegetation program and maintenance program, timing herbicide application, if needed, to the August to April period.	Small to moderate, long-term, site-specific positive effect **Not significant**
Rare and Endangered Species		
There are presently no identified rare or endangered wildlife species affected by the Project.	Mitigation measures, if required, will be identified following follow-up monitoring.	Current information suggests that there would be no effect **Not significant**
Possible loss of habitat structure		
Birds, Mammals and Other Wildlife		
The removal of willows and other shrubby growth and the maintenance program of minimizing/avoiding shrub growth will remove habitat of higher quality for some bird species. The loss of backwater ponding upstream of the Floodway Outlet will occur.	None: Potential negative effects: will be offset by revegetation program that increases the diversity and resilience of wildlife habitat. Mudflats downstream of Floodway Outlet will increase and provide more shorebird foraging habitat.	Small, long-term, site-specific negative effect **Not significant**

Description Of Effect	Mitigation	Residual Effects And Significance
Rare and Endangered Species		
There are presently no identified rare or endangered wildlife species affected by the Project.	Mitigation measures, if required, will be identified following follow-up monitoring.	Current information suggests that there would be no effect **Not significant**
OPERATION - ACTIVE		
Waterfowl		
Inundation of breeding/foraging habitat will be less with the Project.	None: inundation is generally seasonal, periodic, temporary and effect a smaller amount of nesting habitat. Many species will re-nest if early nests are destroyed.	Small, short-term, site-specific positive effect **Not significant**
Other Waterbirds		
Inundation of shoreline habitat that previously would have resulted in reduction of foraging habitat for shorebirds will affect a smaller amount of terrestrial habitat.	None: Positive Project Effect - alternate, adjacent habitat available (creeks and rivers).	Small, short-term, site-specific positive effect **Not significant**
Increase in water levels, thereby increasing foraging habitat for cormorants and pelicans.	None: positive effect	
Inundation of nesting habitat	None: Inundation generally seasonal, periodic and temporary. Many species will re-nest if early nest is destroyed.	
Raptors		
Flooding of fewer small mammal burrows may increase long-term prey availability. Inundation of breeding habitat for ground-nesting species (e.g. Northern Harrier) may occur less frequently with the Project.	None: inundation generally seasonal, periodic, temporary, and affect a smaller amount of foraging and nesting habitat. Many species will re-nest if early nest is destroyed. (Note: timing of Floodway use most often occurs prior to Northern Harrier nest initiation).	Small, short-term, site-specific neutral effect **Not significant**
Passerines		
Inundation of breeding and/or foraging habitat will occur over a smaller amount of terrestrial habitat with the Project.	None: Inundation generally seasonal, periodic, temporary, and affect a smaller amount of habitat. Many species will re-nest if early nests are destroyed. (Note: timing of floodway use most often occurs prior to most passerine nest initiations).	Small, short-term, site-specific positive effect **Not significant**
Mammals		
Inundation of forage vegetation by Red River floodwaters will occur over a smaller amount of terrestrial habitat with the Project.	None: Alternate forage available on higher Floodway slopes and surrounding areas. Inundation generally seasonal, periodic and temporary, and involves a smaller amount of terrestrial habitat.	Small, short-term, site-specific positive effect **Not significant**
Other Wildlife		
Inundation of invertebrate habitat and amphibian breeding habitat by high floodwater levels will occur less frequently. Inundation of a smaller amount of reptile habitat (foraging and possibly limited nesting habitat) by floodwaters with the Project.	None: Inundation is generally seasonal, periodic, temporary, and affects a smaller amount of terrestrial habitat with the Project. Alternate adjacent areas are available.	Small, short-term, site-specific neutral effect **Not significant**

Description Of Effect	Mitigation	Residual Effects And Significance
Rare and Endangered Species		
There are presently no identified rare or endangered wildlife species affected by the Project.	Mitigation measures, if required, will be identified following follow-up monitoring.	Current information suggests that there would be no effect **Not significant**

[a] For the purpose of this assessment, waterfowl are ducks and geese. All other waterbirds (e.g., loons, cormorants, grebes, and terns) are classed as other waterbirds.
[b] Northern Leopard Frog is listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as a "Species of Special Concern": this species was observed along the floodway in early October 2003 and may breed in the Floodway in spring

7.5.1.2 Sources of Effect

The potential for an effect on plant and wildlife species at risk will be contingent on both the presence of a rare species at or near the Project sites during a portion of their life history and the manner to which the habitat is used by the species. The potential Project effect would be considered large if COSEWIC- or MESA-listed plant species or habitats are affected; potential measures such as the total avoidance of developing a site having rare species (e.g., plants) or habitat (e.g., nests) would be evaluated in conjunction with an assessment of the appropriateness of other mitigative measures (e.g., relocation of rare plants or communities to other suitable sites). Since disturbance of COSEWIC or MESA-listed species is not permitable, the effect would also be considered large if the nests, or important/unique habitat for COSEWIC- or MESA-listed birds, mammals or other wildlife are to be permanently disturbed. Other mitigative measures, such as relocation of rare plants to other suitable areas, would then be considered to fully mitigate potential effects of the Project.

The potential effects on species at risk are currently anticipated to be small and not significant. Mitigation measures will be implemented to avoid affecting the species or their habitat if future monitoring reveals the potential for a currently unanticipated impact on Species at Risk. The potential effects examined are similar to those for other terrestrial plants and wildlife (Section 7.4.1.2), and include:

- removal of vegetation along the upper and lower channel side-slopes and benches;
- implementation of a revegetation plan that may preclude the re-establishment of rare plant species or unique habitat used by rare wildlife species;
- temporary disruption of vegetative communities during the construction phase;
- removal of ground cover that creates a reduction in available forage/hunting/scavenging habitat for some rare or endangered wildlife species and escape and/or nesting cover for others; and
- noise disturbance from excavation equipment.

The assessment approach considers any adverse effect on Federally or Provincially-listed wildlife species to be a significant effect. Since the Project is not anticipated to have any adverse effects on listed species, no cumulative effects are currently anticipated from the other projects or activities.

7.5.2 Existing Environment

Of the more than 325 species of birds, mammals, amphibians and reptiles known or suspected to occur in the Flood Study Region, 13 are considered "species at risk" and may occur (breeding or migrating through) within the Regional Study Area (Table 7.5-1; COSEWIC 2003; Manitoba Conservation 2003). A number of species not designated as "species at risk" but considered rare in Manitoba are known to reside within these ecodistricts (Appendix 7A, Tables 7A-5, 7A-7 to 7A-14). Only a few are protected as species at risk under the *Manitoba Endangered Species Act* (MESA) and/or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; Table 7.5-1).

The grassland habitats characterizing the Floodway and West Dyke have the potential to support a variety of wildlife (Appendix 7A, Tables 7A-2, 7A-3 and 7A-4), including plant and animal species that lack protected status within Legislation but are considered rare provincially or of concern to Manitoba Conservation. Several plants and animals that occur within the Winnipeg Ecodistrict are considered provincially rare in Manitoba (Figure 7.2-1; Appendix 7A, Table 7A-5). Some are considered to be species at risk and have designated, legal protection under the *Species at Risk Act* (SARA) and/or the *Manitoba Endangered Species Act* (MESA; Appendix 7, Table 7A-5).

Although species at risk occur within the Winnipeg Ecodistrict, none of the plants listed in Table 7.5-1 were found during the initial surveys along the Floodway and West Dyke in July 2004. Follow-up surveys will assist in revealing the presence of rare, endangered or unique plants or habitats (Section 7.3.5).

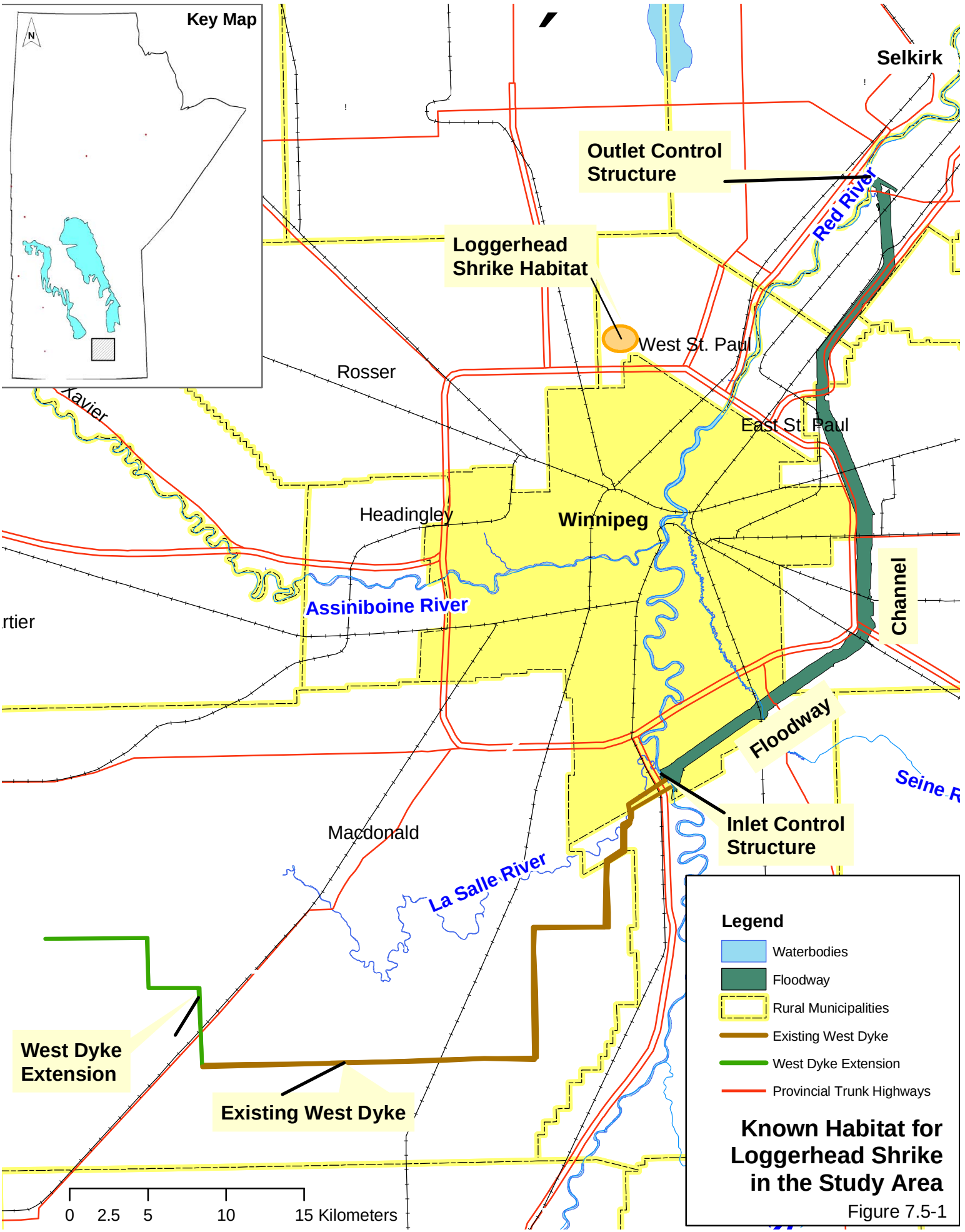
There have been no recorded instances of any of the COSEWIC-listed wildlife species nesting or permanently residing on or near the Floodway or West Dyke. Species that have moderate potential to occur as transient species include: Ferriguous Hawk, Peregrine Falcon and Baird's Sparrow.

The most significant habitat near the Project site are shelter belts and isolated trees that contain nesting pairs of the endangered Loggerhead Shrike (Figure 7.5-1). In 1992, seven pairs of Loggerhead Shrikes were observed nesting in shelterbelts near the Perimeter Highway (PTH 101) and Pipeline Road (PR 409; Tetr*ES* and DS Lea 1993). This habitat in the general area of Pipeline Road and Moore Avenue (PR 220) had been used for nesting since at least 1985. This location is approximately 15 km from the closest Project site location at the Floodway. The most important and sensitive wildlife habitat used by breeding loggerhead shrikes is grassland, particularly ones heavily-grazed or moved, that contain shrubs and trees suitable for nesting and for hunting perches (Telfer 1990; De Smet 1992). It is a site-tenacious bird that occupies a breeding territory encompassing a radius of approximately 400 m around nest sites (Brooks and Temple 1990). Most Loggerhead Shrike nests recorded in Manitoba are in willows, from 1.7 m to 3.1 m off the ground (De Smet and Conrad 1990). The nest found along the Dorsey-Forbes Transmission Line in 1992 was approximately 4.5 m up a 6.5 m high maple tree (Tetr*ES* and ND LEA 1993).

Table 7.5-1
COSEWIC and MESA-Listed Species at Risk Potentially Inhabiting the Regional Study Area

Species	Scientific Name	Status*	Reference**
Plant			
Great Plains Ladies'-Tresses	*Spiranthes magnicamporum*	E	MESA
Small White Lady's Slipper	*Cypripedium candidum*	E	MESA;COSEWIC
Western Prairie Fringed Orchid	*Platanthera praeclara*	E	MESA;COSEWIC
Western Silvery Aster	*Aster sericeus*	TH	MESA;COSEWIC
Western Spiderwort	*Tradescantia occidentalis*	TH	MESA;COSEWIC
Riddell's Goldenrod	*Solidago riddellii*	TH/SC	MESA;COSEWIC
Culvers-root	*Veronicastrum virginicum*	TH	MESA
Hairy Prairie Clover	*Dalea villosa var. villosa*	TH	COSEWIC
Smooth Goosefoot	*Chenopodium subglabrum*	SC	COSEWIC
Bird			
Least Bittern	*Ixobrychus exilis*	TH	COSEWIC
Ferriginous Hawk	*Buteo regalis*	TH	MESA;COSEWIC
Peregrine Falcon	*Falco peregrinus*	E	MESA;COSEWIC
Greater-Prairie Chicken	*Tympanuchus cupido*	Ext	MESA
Yellow Rail	*Coturnicops noveboracensis*	SC	COSEWIC
Piping Plover	*Charadrius melodus*	E	MESA;COSEWIC
Short-eared Owl	*Asio flammeus*	SC	COSEWIC
Red-headed Woodpecker	*Melanerpes erthrocephalus*	SC	COSEWIC
Sprague's Pipit	*Anthus spragueii*	TH	COSEWIC
Loggerhead Shrike	*Lanius ludovicianus*	E	MESA;COSEWIC
Baird's Sparrow	*Ammodramus bairdii*	E	MESA
Burrowing Owl	*Athene cunicularia*	E	MESA;COSEWIC
Mammal			
Mule Deer	*Odocoileus hemionus*	TH	MESA
Grey Fox	*Urocyon cinereoargenteus*	TH	COSEWIC
Insect			
Uncus Skipper	*Hesperia uncas*	E	MESA
Dakota Skipper	*Hesperia dacotae*	TH	MESA
Ottoe Skipper	*Hesperia Ottoe*	TH	MESA
Amphibian/Reptile			
Northern Leopard Frog	*Rana pipiens*	SC	COSEWIC

* E= Endangered; TH= Threatened; SC= Special Concern; Ext = Extirpated
** MESA = Manitoba Endangered Species Act; COSEWIC = Committee on the Status of Endangered Wildlife in Canada


Key Map
N
Selkirk
Outlet Control Structure
Red River
Loggerhead Shrike Habitat
West St. Paul
Rosser
Xavier
East St. Paul
Headingley
Winnipeg
Assiniboine River
rtier
Channel
Floodway
Seine R
Inlet Control Structure
Macdonald
La Salle River
West Dyke Extension
Existing West Dyke
0 2.5 5 10 15 Kilometers
Legend
Waterbodies
Floodway
Rural Municipalities
Existing West Dyke
West Dyke Extension
Provincial Trunk Highways
Known Habitat for Loggerhead Shrike in the Study Area
Figure 7.5-1

The eastern population of the Loggerhead Shrike, listed as "endangered" by COSEWIC and MESA, breeds in habitat characterized by open grasslands with scattered shrubs and trees, preferably having wires on which to perch and thorny bushes such as hawthorn on which to impale its prey (Godfrey 1986). Reconnaissance field studies along the length of the Floodway during October 2003 indicated that potential Loggerhead Shrike habitat exists at a hydro transmission tower crossing approximately 900 metres north of the Highway 59 North bridge, particularly on the east side of the Floodway. Hawthorn bushes (a favoured plant species of shrikes) were common at this site, unlike other areas along the Floodway Right-of-way. There have been no known prior sightings of Loggerhead Shrikes along the Floodway or West Dyke.

The other known or suspected habitat for a rare or endangered species is that which supports the leopard frogs observed along the Floodway Channel and the West Dyke. This habitat is outlined in Section 7.4.2 and described in more detail in Appendix 7C.

7.5.3 Effects and Mitigation

7.5.3.1 Pre-Construction

There are not expected to be any pre-construction effects on species at risk.

7.5.3.2 Construction

There are not expected to be effects on plant or wildlife species at risk from the activities associated with construction. To further test this prediction, to the extent feasible, this conclusion will be reassessed after interpreting the results of monitoring and follow-up. The Project will comply with the *Rare and Endangered Species Act* and the *Species at Risk Act*. This requires evidence that the species and/or its habitat will not be disrupted or destroyed. Ongoing monitoring to further confirm the presence/absence of species at risk along the length of the Floodway and West Dyke will occur prior to construction (Section 7.5.5). If a species at risk is present, it would need to be demonstrated that the species and its habitat will not be affected by the Project and that sufficient protection is afforded, or appropriate mitigation measures established, to avoid or minimize impacts of the development to the extent feasible. Construction activities along the West Dyke will be scheduled for autumn to minimize impact to the Parkland Mews' Peregrine Falcon Breeding Program (Acres/UMA and Section 4.11). Other mitigation measures, if required, will be identified and implemented at that time.

7.5.3.3 Operation – Inactive

There are currently no effects on plant or wildlife species at risk from the activities associated with operation during periods when the Floodway is not in active use. Considering the current level of uncertainty, this conclusion will be reassessed after interpreting the results of monitoring and follow-up. If a species at risk is present, appropriate mitigation measures will be implemented at that time.

7.5.3.4 Operation – Active

There are currently no effects on plant or wildlife species at risk from the activities associated with the active operation of the Floodway or West Dyke. Upgrades to the Floodway and West Dyke will help to minimize the amount of flooding in the local area. As such, the Project upgrades will afford protection to

plants and wildlife (including species at risk, if present in the local area) from flooding. This will be a positive effect of the Floodway. If monitoring reveals that a species at risk is present along the Floodway or West Dyke, mitigation measures will be identified and implemented to avoid or minimize impacts of the pending floodwaters.

7.5.4 Residual Effects and Significance

No species at risk or their habitat were encountered during site investigations in 2004 or during other information collection procedures, and no residual effects on wildlife are currently expected. The potential effects, given current information and considering mitigation and monitoring follow-up, are deemed to be not significant (Table 7.4-1). Due to the requirement of zero tolerance for effects on species at risk, any potential uncertainty associated with this conclusion will be dealt with through the monitoring outlined in Section 7.5.5 and, if required, by developing and implementing additional mitigative measures.

7.5.5 Monitoring and Follow-Up

The surveys conducted in 2004 covered approximately two-thirds of the Floodway and West Dyke. These surveys occurred in a year having "atypical weather," late wildlife breeding, and an active Floodway with high spring/summer water levels (Section 7.4.5). As such, it is recommended that a follow-up survey occur along the Floodway and West Dyke prior to the onset of clearing and grubbing activities to ensure that there are no rare or endangered species using the Floodway or West Dyke, i.e., as concluded based on the observations in 2004. The methods will essentially entail conducting reconnaissance along the length of the Floodway and West Dyke. The procedures will also involve acquiring opportunistic data on:

- leopard frogs along the Floodway, particularly during the period of peak courtship at sites not investigated in 2004; and
- the Floodway crossing by PTH 59 to confirm that potential loggerhead shrike habitat near that site does not contain any breeding pairs in 2005.

If any rare or endangered species or habitat are located, then an adaptive management approach will be taken whereby the construction activities will be postponed for the area in question until the mitigative measures, where necessary, have been developed and implemented in consultation with Manitoba Conservation.

7.6 MANITOBA PROTECTED AREA INITIATIVE

7.6.1 Approach and Methodology

7.6.1.1 Effects Assessment

The potential effects of the Project on protected areas were assessed based on the location of Protected Areas relative to the Floodway ROW and West Dyke. Since the effects of the Project are generally site-specific, effects on local areas adjacent to the Floodway and West Dyke are not anticipated.

7.6.1.2 Sources of Effect

The protected areas and areas of special interest lie outside the area that is expected to be affected by the Project. There are no anticipated effects on protected areas associated with this Project directly (project footprint) or indirectly (an increase in recreation or other activities in protected areas in the Project region).

7.6.2 Existing Environment

Within the regional study area, there exists at minimum 50 protected areas (Figure 7.2-1) encompassing approximately 724 km^2 (Appendix 7C, Table 7C-1). These protected areas include existing areas, potentially protected areas (such as park reserves) and Areas of Special Interest (ASI). Select areas containing representative landscape features not adequately captured in existing protected areas have been designated as ASIs. Boundaries of ASIs are flexible and can be changed through government-lead consultations (Manitoba Conservation 2004).

Protected Areas are:

> *…free from logging, mining or the development of oil, petroleum, natural gas or hydro-electric power or other activities that significantly and adversely affect habitat* (Manitoba Conservation 2004).

Recreational activities such as hunting are permitted in some of these areas.

Generally, protected areas can be described as:

- Provincial Parks (can either have complete or partial protection);
- Wildlife Management Areas (WMA);
- Important Bird Areas (IBA);
- Heritage Marshes (HM);
- Special Conservation Areas (SCA); and
- Private Lands (Nature Conservancy land stewardship programs).

Although various protected areas such as provincial parks occur at or near the Floodway ROW (e.g. Duff Roblin PP, Lockport PP), the protected area closest to the Floodway containing the greatest diversity of wildlife is Birds Hill Provincial Park. The entire western park boundary parallels the Floodway ROW at a distance of less than one km. Beaudry Provincial Park, with its riverbottom forest, occurs northwest of the West Dyke at a distance of approximately 20 km.

7.6.3 Effects and Mitigation

The Project is not expected to affect Manitoba Protected Areas. Changes to the Floodway and West Dyke will not have a linkage to resources within parks and protected areas, and no cumulative or residual effects are expected.

7.6.4 Residual Effects and Significance

There are not expected to be any residual effects of the Project on the Manitoba's Protected Areas. No monitoring or follow-up is required with respect to the Manitoba Protected Area Initiative.