Interpretation Guide Linking Soil and Natural Resource Information to GVI Site Types in the Foothills Parkland Natural Subregion

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The Grassland Vegetation Inventory (GVI) uses a system with 32 site types classified into three Primary Classes: 22 site types in the Native/Natural Primary Class, two site types in the Water Primary Class, and eight in the Anthropogenic Primary Class.

A unique interpretation guide has been developed for each Natural Subregion in the GVI project area. Each interpretation guide identifies key properties and distinguishing features for the 22 Native-Natural and two water-related site types. Representative examples are also provided for the eight Anthropogenic site types.

For each Natural Subregion, the 24 site types in the Native/Natural and Water Primary Classes are divided into four groups based on their main defining features of landscape, soil features, type of wetland, soil textural groupings. Each guide contains the following information for each of the 24 site types:

- Definition
- Representative example
- Usual landscape position
- Common association with other GVI site types
- Differentiation from the most similar site type(s)
- Correlation with Soil Landscape Models
- Native vegetation
- Expression on colour infrared photography
- Examples in the GVI project area, for Dominant, Co-dominant and Significant occurrences. The examples are located in the area north of Longview, Alberta and most are focused in the Calgary region.
- Example(s) of non-typical occurrence.

This Foothills Parkland interpretation guide applies to the following GVI imagery.

Year	Area
2006	ADS40 Imagery S of Calgary
2007	DATEM Imagery N of Calgary

Site Types Defined Mainly by Landscape

Badlands/Bedrock (BdL)

Definition: Nearly barren or barren lands with exposures of softrock, hardrock or surficial geologic materials. Includes steep valley walls.

Representative example: Exposed sandstone outcrops in Big Hill Springs Prov. Pk.

Usual landscape position: Moderate to steep coulee or valley sides; also eroded bedrock plains.

Common association with other GVI site types: TB, Li and Ov.

Differentiation from the most similar site type(s): TB is characterized by fewer rock exposures and less bare soil and hence has more vegetative cover.

Correlation with Soil Landscape Models: Applies to all inclined to steeply sloping landscapes with greater than 10% bedrock exposures of softrock or hardrock. Slopes generally range from 30% to 60% (in isolated cases 15% to 100%). Includes I4h and I5 landscape models from AGRASID 3.0.

Native vegetation: Very limited cover due to high proportion of bare soil.

Expression on colour infrared photography: highly reflective, with most geologic formations appearing white or very light grey. Linear bands may also occur due to the continuity of exposed strata over distances. May be associated with some shrub or tree cover; mainly on north-facing slopes.

Examples in GVI Area:

- **Dominant** (≥65%): Exposed bedrock on the walls of the Highwood River banks at Longview, with significant TB.
- **Co-Dominant** (two or three site types each cover 30 to 60%): BdL and TB are co-dominant along the Sheep River valley between Turner Valley and Okotoks, where depth to bedrock and vegetative cover are variable.
- **Significant** (one to three sites types, each of 10 to 30%): Ridge crests in the northern Porcupine Hills, with bedrock surrounded by dominant TB.

Example(s) of non-typical occurrences: 1) The Big Rock west of Okotoks, which is a huge glacial erratic; and **2)**There are more areas of hard bedrock (sandstone) exposures than softrock exposures in the Foothills Parkland Natural Subregion. The Foothills Parkland is more represented by hard bedrock compared with other Natural Subregions in the Grassland Natural Region.

Overflow (Ov)

Definition: Areas that receive additional moisture from overland flow or increased snow catch. Typically occurs in valleys on gentle inclines, or on terraces subject to infrequent flooding.

Representative example: Apron deposits in the Priddis Ck. valley at Highway 22X southwest of Calgary.

Usual landscape position: Occurs mainly in coulees or valley settings as fan or apron deposits.

Common association with other GVI site types: Lo, BlO, SL, TB, BdL, and Lotic types

Differentiation from the most similar site types: Loamy (Lo) does not receive additional moisture inputs; Lotic types occur on slightly lower to lower slope positions and have greater available soil moisture.

Correlation with Soil Landscape Models: Applies to non-saline Chernozemic (soils with A, B and C horizons) and/or Regosolic soils (soils that lack a B horizon >5 cm thick, and may lack an A horizon) on landscapes that are low-relief inclines in valley or basinal settings. Overflow sites are usually fan or apron deposits, where upslope streams enter lowland areas and experience a marked decrease in gradient. Slopes generally range from 2% to 9% (in isolated cases from 0.5% to 15%). Overflow occurs only on lower slope positions or adjacent to stream(s), and the percentage of eligible overflow ranges from 10% to 50% per SLM. Overflow includes I3l and I4l landscape models from AGRASID 3.0 and may occur with IUl and IUh landscape models.

Native vegetation: Variable herbaceous cover and often with some shrub cover; mainly willows.

Expression on colour infrared photography: Generally a uniform dull pinkish tone.

Examples in GVI area:

- **Dominant** (≥65%): Non-wetland landscapes in Nose and Big Hill Springs valley bottoms in Twp 26-R 2 & 3 W5, with 80% Ov and significant Sb.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Tongue Creek valley at Highway 22 near Hartell in NW 9-19-1-W5, with co-dominant Ov, Sb and TB.
- **Significant** (one to three sites types, each of 10 to 30%): Benches of the Sheep River near Black Diamond in 8-20-1-W5, dominated by SwG, with significant Gr and Ov.

Example(s) of non-typical occurrence: Low-gradient and down-slope inflections in areas with bedrock control that have Overflow in association with Thin Breaks, and Badlands/Bedrock.

Thin Breaks (TB)

Definition: Areas with soft or hard bedrock at or near the soil surface; partially vegetated; thin, eroded, and immature soils on gentle to steep landscapes, including slumped or failed slopes.

Representative example: Ridges are commonly controlled by shallow depths to bedrock in the Foothills Parkland and this includes ridges from Millarville to DeWinton.

Usual landscape position: moderate to steep coulee or valley sides; or ridges and plains with thin surficial sediments overlying bedrock.

Common association with other GVI site types: BdL, Li, Ov.

Differentiation from the most similar site type(s): Both Li and TB usually exhibit immature soils (ie. Rego or Calcareous) but TB is usually distinguished by bedrock within 1 m. Badlands generally have negligible to sparse vegetative cover, while TB has moderate to high vegetative cover.

Correlation with Soil Landscape Models: Applies to: **1**) all steeply-sloping landscapes with less than 10% bedrock exposures; **2**) largely vegetated areas with bedrock at or near (within 5 m) the surface; **3)** AGRASID 3.0 landscape models I3m, I3h or I4m; and 4) Soil Series or variants (xp,yp) indicative of shallow to bedrock.

Native Vegetation: Usually graminoid with some bare soil; less vegetation on south or west facing slopes.

Expression on Colour Infrared Photography: Light tones if graminoid.

Examples in GVI area:

- **Dominant** (≥65%): Ridge crest in SE 31 and SW 32-21-2-W5, with bedrock control dominated by TB and with significant Lo.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Tongue Creek valley at Highway 22 near Hartell in NW 9-19-1-W5, with co-dominant Ov, Sb and TB.
- **Significant** (one to three sites types, each of 10 to 30%): Exposed bedrock on the walls of the Highwood River banks at Longview, with significant TB.

Example(s) of non-typical occurrence: Westerly aspects on inclined slopes with exposed softrock or hardrock. Sometimes soft sandstone deposits have been subjected to wind erosion, and may exhibit deflation hollows.

Site Types Defined Mainly by Soil Features

Blowouts/Solonetzic Order (BlO)

Definition: Areas dominated by Solonetzic Order (hardpan) soils, which seldom have the presence of eroded surface pits in the Foothills Parkland, and seldom occur.

Representative example: Infrequent but occurs 8 km S of DeWinton in NE 6-21-29-W4.

Usual landscape position: Often in swales or at slope inflections within plains; can be valley bottoms and inclined surfaces. Often associated with siltstone or shale <5 m from surface, or in areas of former groundwater discharge.

Common association with other GVI site types: Lo, Ov, TB; to a lesser extent SL, Sy

Differentiation from the most similar site type(s): There are no areas of 100% BlO. BlO usually occur with Lo, with Lo occupying areas between pits.

Correlation with Soil Landscape Models: Applies to all SLMs where soils from the Solonetzic order are dominant (>50%) or co-dominant (30 to 50%). Solonetzic soils have an impervious hardpan layer (Bnt horizon) in the subsoil that is caused by excess sodium (Na^+). The land surface is usually characterized by rough microtopography.

Native vegetation: Usually with wheatgrasses and some bare ground. Mottled appearance, as BlO may exhibit microtopography on a 1 to 5 m range laterally, and 20 to 50 cm vertically.

Expression on colour infrared photography: Speckled or mottled.

Examples in GVI area:

- **Dominant** (≥65%): Site-specific and infrequent locations such as 8 km S of DeWinton in NE 6-21-29-W4 with some Lo.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Site-specific and infrequent locations such as 4 km SE of Springbank Airport in NE 26-24-3-W5 with co-dominant Cy.
- **Significant** (one to three sites types, each of 10 to 30%): Significant BlO occurs with co-dominant Lotic or Lentic Unknown and SL in the area 8 km S of DeWinton in NE 6-21-29-W4

Example(s) of non-typical occurrences: BlO areas at the edge of springs from bedrock-controlled uplands.

Limy (Li)

Definition: Eroded or immature soils with free lime ($CaCO_3$) at the soil surface. The soil pH is generally >7.5.

Representative Example: Escarpments and adjacent hillsides with thin soils such as Bow River and Springbank Creek.

Usual landscape position: Eroded side slopes, upper and crest positions, moderate to steep coulee or valley sides, and occasional areas with bedrock (BdL and TB). Also in areas of ephemeral calcareous groundwater discharge characterized by moderately well drained soils.

Common association with other GVI site types: TB, Lo, Cy, Sb.

Differentiation from the most similar site type(s): Lo represents a normally developed Orthic Black Chernozemic soil, while Li is an immature Rego or Calcareous Black Chernozemic. TB may be developed on similar soils as Li, but TB is characterized by shallow bedrock, and vegetative cover is sparser. Sb is characterized by imperfectly drained soils and temporary to seasonal discharge.

Correlation with Soil Landscape Models: Applies to all immature or eroded soils with free lime (calcium carbonates) at the soil surface or in the B horizon. Free lime is detected by effervescence when soil is treated with 10% hydrochloric acid (HCl). Li soils include Rego or Calcareous Chernozemics, eroded phases, and subgroups from the Regosolic order if they are calcareous.

Native vegetation: Graminoid with patchy shrub cover.

Expression on colour infrared photography: Smooth tones.

Examples in GVI area:

- **Dominant** (≥65%): Steep slopes in glaciolacustrine sediments adjacent to Elbow River in Twp. 24 R 2 and 3 W5 if not slumped or shallow to rock.
- **Co-Dominant** (two or three site types each cover 30 to 60%): In areas of calcareous groundwater discharge with a mix of moderately well drained soils (Li) and imperfectly drained soils (Sb).
- **Significant** (one to three sites types, each of 10 to 30%): South portion of 7-25-2-W5 in west Calgary on north side of Bow River on upper terrace, with co-dominant Lo and Ov with significant Li and Sy.

Example(s) of non-typical occurrences: Lacustrine plain areas such as Springbank and Turner Valley characterized by occasional to significant Calcareous Rego Chernozems developed on fine to very-fine textured sediments.

Sub-irrigated (Sb)

Definition: Water table is close to surface during growing season, but rarely above. The water table is relatively stable, and is not subject to strong seasonal fluctuations.

Representative Example: Areas with a high water table east of Glenbow Lake, in Sec. 15 and 16 Twp. 25 Rge. 3 W5.

Usual landscape position: Almost always occurs in concave settings (swales). Ranchers often locate dugouts within lowland portions of Sa or CS areas, due to reliable shallow water table conditions.

Common association with other GVI site types: Ov, Lotics, Lentics and to a lesser extent, Lo, Li and TB.

Differentiation from the most similar site type(s): LenT and Sb both typically represent gleyed subgroups. The water table is near the surface in the Sb site type, but water seldom ponds on the soil surface. In contrast, LenT has a basinal edge and standing water for a short duration (typically less than a season), after which the water table may or may not be out of range for plant roots. Ov does not have subsurface seepage as with Sb.

Correlation with Soil Landscape Models: Sb best represents areas with the water table near the surface causing gleyed soils. Sb includes Gleyed, non-saline, very coarse to medium textured soils. Gleyed subgroups have faint to distinct mottles within 50 cm, or prominent mottles between 50 and 100 cm.

Native vegetation: Often a higher density of shrubs can be an indicator. Bebb's Willow is a Sb indicator but can readily occur in Lotics, Ov, Lo, and TB.

Expression on colour infrared photography: Reddish-speckled appearance, with dark areas receiving groundwater enrichment from a near-surface water table.

Examples in GVI area:

- **Dominant** (≥65%): Occurs in high water table areas in native cover such as sporadic occurrences in the floodplain of the Elbow River.
- **Co-Dominant** (two or three site types each cover 30 to 60%): In areas of calcareous groundwater discharge with a mix of moderately well drained soils (Li) and imperfectly drained soils (Sb).
- **Significant** (one to three sites types, each of 10 to 30%): May occur in variable water table areas in native cover in Sy, Sa or Gr site types, such as adjacent to the Sheep River.

Example(s) of non-typical occurrences: Areas with an artificial high water table adjacent to reservoirs.

Saline Lowland (SL)

Definition: Native areas with negligible or limited vegetation due to electrical conductivity (salts) and/or sodium adsorption ratio limitations.

Representative example: Rare in Foothills Parkland.

Usual landscape position: lower slopes; can be broad concave settings.

Common association with other GVI site types: Sb, BlO

Differentiation from the most similar site type(s): Distinguished from Lentic Alkali by the lack of a defined basin.

Correlation with Soil Landscape Models: Applies to salt-enriched soils, including Saline phase Chernozemic, Saline phase Regosolic, and occasionally Saline phase Gleysolic soils. Saline phase soils generally have an electrical conductivity greater than 4.0 dS/m, which retards most plant growth.

Native vegetation: Wheatgrass, Saltgrass, Foxtail Barley

Expression on colour infrared photography: White when dry; can be red when lush growth of salophytes is present.

Examples in GVI area:

- **Dominant** (≥65%): Site-specific and infrequent locations such as 8 km S of DeWinton in NE 6-21-29-W4 with significant BlO.
- **Co-Dominant** (two or three site types each cover 30 to 60%): SL in association with Sb east of Glenbow Lake.
- **Significant** (one to three sites types, each of 10 to 30%): Local occurrences of saline seepage (SL) such as in NE 26-24-3-W5 with co-dominant Lo, Cy and BlO.

Example(s) of non-typical occurrences: None known.

Site Types Defined as Wetlands

Lotic Undifferentiated - *Note: This is Not a Site Type*

Definition: *Any riparian habitat associated with a flowing stream, and represents the active floodplain. True riparian areas only include the valley floor portions that are prone to occasional flooding (Eg., 1 in 10 years). Lotics do not include fans, aprons, or mid to high elevation terraces in valley or coulee settings. A wide range of vegetation types occur, depending on moisture, and nutrient regime, soil chemistry (salinity and sodicity), texture, parent material, etc.*

Correlation with Soil Landscape Models: *AGRASID and soil surveys have a correlation to Lotic Undifferentiated.* ***The GVI interpreters are required to identify the appropriate Lotic site type.*** *Valley systems on AGRASID are often identified as undifferentiated Soil Landscape Models. The AGRASID 3.0 correlation includes FP1, FP2, FP3, SC1-l, SC1-h, SC2, SC3 and SC4 landscape models from AGRASID 3.0.*

Lotic River (LtcR)

Definition: Any river that is generally wider than 20 m, and conforms to the double-line base-features hydrography, representing water edge to water edge.

Associated with other ecological range sites: Any other Lotics; also Ov. Occasionally where a river borders a steep bank the bank may be BdL or TB. Islands in LtcR that are larger than 0.16 ha in size and are either partially or totally vegetated will be mapped and described as other Lotic polygons.

Landscape Position: Wide stream or river.

Representative Example: Bow River.

Non-typical Example(s): Artificial channel.

Native Vegetation: None, due to permanent water.

Expression on Colour Infrared Photography: Dark.

Lotic Coniferous (LtcC)

Definition: "Riparian wetlands" that border flowing water systems and coniferous trees have a combined canopy cover of >25% OR more than 25 trees per ha.

Representative Example: Occurs in the Foothills Parkland such as on Priddis Creek north of the hamlet of Priddis with dense white spruce (*Picea glauca*).

Usual landscape position: Terraces immediately above rivers or creeks.

Common association with other GVI site types: Mainly LtcD, but may be adjacent to LtcS, LtcH, or LtcR. In occasional cases it may border Ov, Li, TB, or BdL.

Differentiation from the most similar site type(s): LtcD may present some difficulty in interpretation. However, deciduous trees have more canopy cover, as coniferous trees are generally pointed.

Native vegetation: Mainly White Spruce plant communities.

Expression on colour infrared photography: Very dark red colours, often as ribbons near rivers or streams.

Examples in GVI area:

- **Dominant** (≥65%): Portions of the Threepoint Ck. valley upstream of Millarville, in Twp. 20 Rgs. 3 and 4 -W5.
- **Co-Dominant** (two or three site types each cover 30 to 60%): There may be occasional small polygons (>1 ha) that cannot be subdivided into specific Lotic site types (LtcD, LtcS, LtcH), and are therefore composed of varying percentages of different Lotics.
- **Significant** (one to three sites types, each of 10 to 30%): There may be occasional small polygons (>1 ha) that cannot be subdivided into specific Lotic site types (LtcD, LtcS, LtcH), and are therefore composed of varying percentages of different Lotics.

Lotic Deciduous (LtcD)

Definition: "Riparian wetlands" that border flowing water systems and deciduous trees have a combined canopy cover of >25% OR more than 25 trees per ha.

Representative example: *Populus balsamifera* (Balsam Poplar) stands in the Bow River Valley in Cochrane.

Usual landscape position: Terraces immediately above rivers or creeks.

Common association with other GVI site types: Mainly LtcS, but may be adjacent to LtcC, LtcH or LtcR. In occasional cases it may border Ov, Li, TB, or BdL.

Differentiation from the most similar site type(s): LtcS of tall shrubs may present some difficulty in interpretation. However, shrubs have a high degree of canopy cover, and are shorter than deciduous tree species. LtcC have a pointed top.

Native vegetation: Mainly Balsam and Aspen Poplar plant communities.

Expression on colour infrared photography: Very bright red colours, often as ribbons near rivers or streams.

Examples in GVI area:

- **Dominant** (≥65%): Portions of the Bow River valley in Glenbow Prov. Pk. in Secs. 28 and 29 Twp. 25 Rgs. 3 -W5.

- **Co-Dominant** (two or three site types each cover 30 to 60%): There will be small polygons (>1 ha) that cannot be subdivided into specific Lotic site types (LtcD, LtcS, LtcH), and are therefore composed of varying percentages of different Lotics.
- **Significant** (one to three sites types, each of 10 to 30%): There will be small polygons (>1 ha) that cannot be subdivided into specific Lotic site types (LtcD, LtcS, LtcH), and are therefore composed of varying percentages of different Lotics.

Lotic Shrub (Ltc S)

Definition: "Riparian wetlands" that border flowing water systems and have a combined canopy cover of greater than 10% shrub species.

Representative example: Upper Tongue Ck. Floodplain west of Hartell in Twp. 19 R 2 and 3 W5 is covered mainly with willow.

Usual landscape position: Terraces immediately above rivers or creeks.

Common association with other GVI site types: Mainly LtcD and LtcH, and may be adjacent to LtcC or LtcR. In some cases it may border Ov, Li, TB, or BdL.

Differentiation from the most similar site type(s): LtcS has varying shrub heights, of which the tall ones may be similar to short trees. However, Lotic Shrub usually has denser canopy and has a different appearance compared to LtcD. Ltc S may also be confused with LtcH in locations where the shrub cover is near 10%. If the shrub cover is interpreted as less than 10%, then LtcH is correct.

Native vegetation: A range of shrub species, from snowberry to willow to birch.

Expression on colour infrared photography: Bright red to pinkish red colours; may flank bright red rings or linear features that are LtcD.

Examples in GVI area:

- **Dominant** (≥65%): 70% LtcS and 30% LtcH in the Beaverdam Creek floodplain in Sections 1 and 12, Twp. 29 Rg. 3 W5. The main shrubs are willow, snowberry and shrubby cinquefoil.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Co-dominant association of LtcS and LtcD in Dogpound valley, in 29-4-W5.
- **Significant** (one to three sites types, each of 10 to 30%): Significant LtcS with Dominant LtcD in the Fish Creek Valley in the Tsuu T'ina Nation from sections 6 to 1 Twp. 23 R. 2 W5.

Lotic Herbaceous (Ltc H)

Definition: "Riparian wetlands" that border flowing water systems and are usually dominated by emergent herbaceous plants (Eg. sedges), but also can be dominated by bare ground indicative of recent features (Eg. gravel bars).

Representative examples: Many segments of the Bow, Sheep and Highwood Rivers.

Usual landscape position: Point bars, meander scrolls and low level terraces.

Common association with other GVI site types: Mainly adjacent to LtcS, LtcD and LtcR in major rivers. In occasional cases it may border Ov, Li, TB, or BdL.

Differentiation from the most similar site type(s): LtcS has >10% shrub cover and LtcH has <10%

Native vegetation: Emergent herbaceous plants including reed canarygrass, tall manna grass, wheatgrasses, sedges, rushes, horsetail, etc.

Expression on colour infrared photography: More uniform reddish or pinkish tones than with LtcS and LtcD. Lotic Shrub and Lotic Deciduous polygons have texture that indicate some height.

Examples in GVI area:

- **Dominant** (≥65%): With significant LtcS in Nose or Beddington Ck. north of Calgary, in 29-26-2-W5.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Co-dominant association of LtcH and LtcS in Bighill Ck., in E 29-26-3-W5.
- **Significant** (one to three sites types, each of 10 to 30%): There may be occasional small polygons (>1 ha) that cannot be subdivided into specific Lotic site types (LtcD, LtcS, LtcH), and are therefore composed of varying percentages of different Lotics.

Example(s) of non-typical occurrences: Recently formed islands in streams, with pioneer species, such as horsetail, beginning to colonize.

Lentic Undifferentiated –Note: This is Not a Site Type

Definition: *Typically low-lying or depressional positions subject to occupation by water ranging from temporary to permanent in duration. Also known as the lentic zone. AGRASID and soil surveys have a correlation to Lentic Undifferentiated.* ***The GVI interpreters are required to identify the appropriate Lentic site type.***

Correlation with Soil Landscape Models: *Applies to all non-saline or weakly-saline soils of the Gleysolic and Organic orders. Gleysolic soils occur in seasonal to semi-permanent wetlands. They are typified by dull colours or prominent mottles within 50 cm, due to prolonged periods of intermittent or continuous saturation and the lack of oxygen in the soil. Organic soils are dominated by the*

accumulation of decomposing peat material derived mainly from sedges and reeds.

Lentic Temporary (LenT)

Definition: Still-water wetland depression with a defined edge that only holds water for brief periods, usually in the spring.

Representative example: Uncommon in the Foothills Parkland as most Lentics are seasonal or more permanent.

Usual landscape position: Depressional.

Common association with other GVI site types: Other Lentics or other Native/Natural Site Types; edges may be Sb.

Differentiation from the most similar site type(s): LenS holds water seasonally rather than for a few days to weeks for LenT.

Native vegetation: Wet meadow vegetation zones as described by Thompson and Hansen (2003) and Stewart and Kantrud (1971).

Expression on colour infrared photography: Usually a dull colour such as olive to slightly pink, and a contrasting tone compared to the surrounding upland.

Examples in GVI area: LenT is predicted to be uncommon to rare.

- **Dominant** (≥65%): None known
- **Co-Dominant** (two or three site types each cover 30 to 60%): Wetlands with a mix of LenT and LenS (shallow marsh) habitats.
- **Significant** (one to three sites types, each of 10 to 30%): None known

Lentic Seasonal (LenS)

Definition: Still-water wetland that usually holds water for a few months, usually in the spring.

Representative example: Numerous wetlands in the Spy Hill - Bearspaw area (Twp. 25 - Rge. 2 - W5) northwest of Calgary.

Usual landscape position: Depressional

Common association with other GVI site types: Other Lentics and Lo

Differentiation from the most similar site type(s): LenT only holds water for a few days to a few weeks; LenSP holds water for most to all of most years.

Correlation with Soil Landscape Models: Applies to non-saline or weakly saline Gleysolic Order soils in depressions with shallow marsh vegetation and is usually willow-ringed. Usually applies to Gleysol soil series and ZGW soils.

Native vegetation: Characterized by shallow marsh vegetation in the deepest part, and wet meadow and willow or poplars at the edges.

Expression on colour infrared photography: Pink tones.

Examples in GVI area:

- **Dominant** (≥65%): Outer wetland component of Northern Reedgrass (*Calamagrostis inexpansa)* in NE 27-26-4-W5 located north of Cochrane.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Wetlands with a mix of LenT and LenS (shallow marsh) habitats.
- **Significant** (one to three sites types, each 10 to 30%): Shallow marsh edges of dominant LenSP wetlands, e.g. Spy Hill area NW of Calgary.

Example(s) of non-typical occurrences: Depressions in oxbows of riverine systems.

Lentic Semi to Permanent (LenSP)

Definition: Still-water wetland that usually holds water for several months, usually to late summer, and is usually wet in the majority of years.

Representative example: Numerous wetlands in the Spy Hill area NW of Calgary.

Usual landscape position: Depressions.

Common association with other GVI site types: LenW where the water is deeper and permanent, and LenS where the water is shallower.

Differentiation from the most similar site type(s): LenW where the water is deeper and permanent; LenS where the water is shallower and typically occurs for only a few months of the year.

Correlation with Soil Landscape Models: Applies to non-saline or weakly saline Gleysolic Order soils in depressions with deep marsh vegetation. Usually applies to Gleysol soil series, ZGW soils, or occasionally ZWA soils. Usually W1, W2 or W3 landscape models.

Native vegetation: Deep marsh vegetation (reeds, cattails but also may include water sedge and/or beaked sedge (*Carex aquatilus* and *Carex utriculata*). May have open water in deeper areas.

Expression on colour infrared photography: Usually bright red or reddish pink tones.

Examples in GVI area:

- **Dominant** (≥65%): The edges surrounding the wetland east of Spruce Meadows in NW 21 – Twp 22 Rg 1 W5 can be mapped as a single polygon dominated by LenSP.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Water bodies >1 ha in size, where the LenSP habitat cannot be mapped separately due to size constraints. This could be with LenW or LenS.

- **Significant** (one to three sites types, each of 10 to 30%): May occur where LenW polygons are surrounded by tall marsh habitat (LenSP), but the LenSP cannot be delineated due to size constraints.

Example(s) of non-typical occurrences: Depressions in oxbows of riverine systems.

Lentic Alkaline (LenA)

Definition: Still water wetland that holds water for variable time periods ranging from a few weeks to several months, and has a salt (saline) fringe. Vegetation types are variable to none.

Representative example: Not expected to occur in Foothills Parkland.

Usual landscape position: Depressional flats with apparent salts.

Common association with other GVI site types: SL, Li, and other Lentics.

Differentiation from the most similar site type(s): Saline Lowland does not have a defined basinal edge and is characterized by imperfectly drained soils (usually Saline Regosols). LenA is in a definite basin and is usually represented by poorly drained Saline Gleysolic soils.

Correlation with Soil Landscape Models: Applies to saline soils of the Gleysolic, Organic and Regosolic (if Gleyed) Orders.

Native vegetation: Dominated by bare ground, and salts if dry.

Expression on colour infrared photography: Usually white or grayish-white.

Examples in GVI area: Not expected to occur in Foothills Parkland.

Lentic Open Water (LenW)

Definition: Water bodies, either artificial or natural, that are typically characterized by standing water.

Representative example: Lloyd Lake in Sec 13 and 14 Twp 22 Rg 2 W5.

Usual landscape position: Water bodies.

Common association with and differentiation from other GVI site types: LenSP where the water is shallower and not as permanent.

Correlation with Soil Landscape Models: Applies to ZWA soils and the W3 landscape model, but may occur less commonly with W1, W2, L2 and L3 landscape models.

Native vegetation: Dominated by open water, but may have some occurrences of deep marsh vegetation (reeds, cattails) and water or beaked sedge.

Expression on colour infrared photography: Usually blue or bluish-green tones.

Examples in GVI area:

- **Dominant** (≥65%): Glenbow Lake in NE 7 Twp 25 Rg 3 W5.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Water bodies >1 ha in size, where the LenW habitat cannot be mapped separately due to polygonal size constraints.
- **Significant** (one to three sites types, each of 10 to 30%): Smaller reservoirs or ponds surrounded by a larger habitat of deep marsh (LenSP).

Ecological/Range Sites Defined Mainly by Textural Groupings

Clayey (Cy)

Definition: Clayey-textured soils including silty clay, sandy clay, clay, and heavy clay. Generally >40% clay.

Representative example: Glaciolacustrine basin in the Millarville to Priddis area.

Usual landscape position: Level, undulating, rolling and inclined.

Common association with other GVI site types: TB, Lo, Li, BlO, Sb.

Differentiation from the most similar site type(s): Many clay soils in the Foothills Parkland occur with shallow bedrock (TB) or with loamy (Lo) soils due to local-relief landscape differences.

Correlation with Soil Landscape Models: Applies to all non-saline and non-gleyed Vertisolic soils; **OR** to fine or very fine Chernozemic soils (soils with A, B and C horizons), and **fine or very fine** non-saline and non-gleyed Regosolic soils (soils that lack a B horizon >5 cm, and may lack an A horizon) (E.g., clay and silty clay textural subgroups, >40% clay).

Native vegetation: Often with willow cover.

Expression on colour infrared photography: Uniform green or can even be a dark green to red or purple colour.

Examples in GVI area:

- **Dominant** (≥65%): Isolated native/natural parcels in the Millarville region that have not been cultivated. Expect 80% Cy, with minor amounts of Sb, Lotic and Lentic.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Isolated native/natural parcels in the Priddis south region that have not been cultivated. Co-dominant Cy and Lo occur with significant Lotic.

- **Significant** (one to three sites types, each of 10 to 30%): Area in SW 8-26-3-W5; south of Glenbow Lake, with co-dominant Sb and Lo and with significant Cy.

Example(s) of non-typical occurrences: Coulee valley bottoms where former shallow lakes (locations where clay may have been deposited) have improved drainage, and are now represented by Regosolic, Chernozemic or Vertisolic soil orders.

Loamy (Lo)

Definition: Includes loam, silt loam, silt, clay loam, sandy clay loam, and silty clay loam soil textures.

Representative Example: The main site type of native areas with bedrock deeper than one metre in the Foothills Parkland.

Usual landscape position: Level, undulating, hummocky, rolling and inclined.

Common association with other GVI site types: TB, Cy, Ov, Lotic, Lentic, and BlO.

Differentiation from the most similar site type(s): Soil texture is intermediate between Cy and Sy. Li has surface carbonates; Lo has carbonates in the subsoil and parent material. Ov occurs in settings that receive additional moisture from run-on, and Lo does not.

Correlation with Soil Landscape Models: Applies to all non-saline and non-gleyed Chernozemic soils (soils with A, B and C horizons), and non-saline and non-gleyed Regosolic soils (soils that lack a B horizon >5 cm, and may lack an A horizon) with soil textures in the **medium and moderately fine** textural subgroups (E.g., loam and clay loam).

Native vegetation: Dominated by grasses, shrubs or trees.

Expression on colour infrared photography: Mottled reddish tones to brownish-green tones.

Examples in GVI area:

- **Dominant** (≥65%): 80% Lo occurs with 15% LenSP, and 5% LenS in NW 33-25-2-W5 on the Calgary Urban Perimeter soil survey, corresponding to soil polygon DVG2/d.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Isolated native/natural parcels in the Priddis south region that have not been cultivated. Co-dominant Cy and Lo occur with significant Lotic.
- **Significant** (one to three sites types, each of 10 to 30%): Expect 20% Lo with 50% Ov and 30% SwG in NE12-24-3-W5, on the Calgary Urban Perimeter soil survey, corresponding to soil polygon SRC3/b (Cullen Ck. fan at Elbow R.)

Example(s) of non-typical occurrences: Loamy textured landscapes that were formerly cultivated, and native landscapes that have returned gradually. GVI interpreters will be assessing whether the native species now predominate (i.e. >50% native).

Sandy (Sy)

Definition: Sandy-loam-textured soils.

Representative example: Upper-level benches of the Elbow River valley, SW of Calgary.

Usual landscape position: Undulating, terraced and inclined.

Common association with other GVI site types: Lo, SwG, Gr, Ov.

Differentiation from the most similar site type(s): Differences in texture.

Correlation with Soil Landscape Models: Applies to all non-saline and non-gleyed Chernozemic soils (soils with A, B and C horizons), and non-saline and non-gleyed Regosolic soils (soils that lack a B horizon >5 cm, and may lack an A horizon) with soil textures in the **moderately coarse** (sandy loam) textural subgroup.

Native vegetation: Herbaceous or shrubby on south and west aspects and trees to shrubs on north and east aspects.

Expression on colour infrared photography: generally smooth to mottled pinkish tone.

Examples in GVI Area:

- **Dominant** (≥65%): Bow River terrace SE of Happy Valley Trailer Park in NE 32-24-2-W5, with dominant Sy and significant Gr, corresponding to soil unit HPV1/cb on the Calgary Urban Perimeter soil survey.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Co-dominant Sy, Ov and Sb occurs in the Pine Ck. floodplain in 6-22-1-W5, on the Calgary Urban Perimeter soil survey, corresponding to soil polygon TWS2/bd.
- **Significant** (one to three sites types, each of 10 to 30%): Co-dominant Ov and SwG with significant Sy in SW 20-25-2-W5 on the Calgary Urban Perimeter soil survey, corresponding to soil polygon SCO2/e.

Example(s) of non-typical occurrences: Sandy soils with some gravels, where gravels are <20% by volume.

Sands (Sa)

Definition: Loamy sand and sand soils, and not with a duned surface.

Representative example: Elbow River Valley on lower benches (above one in ten year floodplain) in Twp. 24 Rg. 2 and 3-W5. Otherwise, Sa is of limited extent in the Foothills Parkland.

Usual landscape position: Undulating to terraced with gentle ridges.

Common association with other GVI site types: Sy, SwG, Gr, Sb, LenSP.

Differentiation from the most similar site type(s):

- CS does not occur in the Foothills Parkland.
- Sy is more drought tolerant than Sa, but in the Foothills Parkland each will have a similar vegetation expression.
- Sb has a shallow water table, is located in swales, and usually has a high proportion of shrubs, deciduous or coniferous trees.

Correlation with Soil Landscape Models: Applies to all non-saline and non-gleyed Chernozemic soils (soils with A, B and C horizons), and non-saline and non-gleyed Regosolic soils (soils that lack a B horizon >5 cm, and may lack an A horizon) with soil textures in the **very coarse** (loamy sand) textural subgroup. Sa does not apply to duned landscapes.

Native Vegetation: Variable including numerous shrub species, graminoids and trees.

Expression on Colour Infrared Photography: generally smooth to blotchy pinkish-red, grading to pinkish- brown.

Examples in GVI area:

- **Dominant** (≥65%): Predicted to occur in site-specific areas with native cover, in the Elbow River valley.
- **Co-Dominant** (two or three site types each cover 30 to 60%): May occur in site-specific areas with native cover, possibly in the Elbow River valley. Other possible co-dominant site types include SwG, Sb or Sy.
- **Significant** (one to three sites types, each of 10 to 30%): Predicted to occur in site-specific areas with native cover, in the Elbow River valley.

Example(s) of non-typical occurrences: Sand plains are a typical occurrence but no Foothills Parkland occurrences are known; therefore any small upland sand plains would be non-typical.

Choppy Sandhills (CS)

Definition: Loamy sand and sand soils with a rough surface caused by wind, resulting in a duned landscape. Dunes may be longitudinal or parabolic (U-shaped).

Representative example: No known occurrences in the Foothills Parkland.

Usual landscape position: Sand plains with low to high relief dunes; some are active.

Common association with other GVI site types: Sa, Sb.

Differentiation from the most similar site type(s):

- Sa does not include irregular moderate and high-relief dunes.
- Sb has a shallow water table.

Correlation with Soil Landscape Models: Applies to all non-saline and non-gleyed Chernozemic soils (soils with A, B and C horizons), and non-saline and non-gleyed Regosolic soils (soils that lack a B horizon >5 cm, and may lack an A horizon) with soil textures in the **very coarse** (loamy sand) textural subgroup. CS applies to soils that occur on duned landscapes, including Dl1, D1m, D1h, D2l, D2m and D2h in AGRASID 3.0. Applies to **other Sands range sites on duned landscapes**.

Native vegetation: If to occur, expect shrub and tree cover.

Expression on colour infrared photography: Not known but dunes may appear as blemishes and may be oriented in the direction of the prevailing wind (longitudinal) or U-shaped (parabolic).

Examples in GVI area: Not expected in the Foothills Parkland

Example(s) of non-typical occurrences: Dunes on the leeward sides of ridges (e.g. northwest-southeast ridges), where sand textures may accumulate over time.

Gravel (Gr)

Definition: Dominated by gravels or cobbles (>50% coarse fragments). May be covered by a mantle with few gravels, up to 20 cm thick.

Representative example: Gravel terraces along Bow River at Cochrane.

Usual landscape position: Often on terraces and in valley bottoms**.**

Common association with other GVI site types: SwG, Sy, Sb, LtcR.

Differentiation from the most similar site type(s):

- SwG: gravels not at surface but between 20 and 100 cm in depth.
- Sy: Gravels occur only occasionally, and textures are moderately coarse (sandy loam). Gravels are <20% in Sy.
- Sb: Imperfect drainage while Gr ranges from rapid to moderately well drained.

Correlation with Soil Landscape Models: Applies to any soil with less than 20 cm of a surface mantle of any textural class over gravelly to very gravelly or cobbly to very cobbly (>20% gravel or cobbles) material.

Native vegetation: Variable from graminoids to shrubs to some treed polygons.

Expression on colour infrared photography: Variable

Examples in GVI area:

- **Dominant** (≥65%): 75% Gr occurs with significant SwG on upper level terraces of the Elbow River in NW7-24-2-W5 corresponding to soil polygon SUD1/b on the Calgary Urban Perimeter soil survey.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Co-dominant Gr, SwG and Sy occur in scattered native vegetation areas between Canada Olympic Park and the Trans-Canada Highway in west Calgary (SW33-24-2-W5) and corresponding to soil polygon HPSC1/d on the Calgary Urban Perimeter soil survey.
- **Significant** (one to three sites types, each of 10 to 30%): Bow River terrace SE of Happy Valley Trailer Park in NE 32-24-2-W5, with dominant Sy and significant Gr, corresponding to soil unit HPV1/cb on the Calgary Urban Perimeter soil survey.

Example(s) of non-typical occurrences: Upland gravels which underlay till veneer to blanket such as north of Cochrane at the junction of highways #22 and Sec. 567.

Shallow to Gravel (SwG)

Definition: Soil with 20 to 50 cm of a sandy or loamy surface overlying a gravel or cobble- rich substrate.

Representative Example: On river terraces, with gravels under a loamy veneer.

Usual landscape position: Often on terraces and in valley bottoms

Common association with other GVI site types: Sy, Lo, Gr.

Differentiation from the most similar site type(s):

- Gr has gravels at the surface.
- Lo has only a few gravels between 20 and 100 cm from the surface.

Correlation with Soil Landscape Models: Applies to any soil with 20 to 50 cm of a surface mantle of any textural class overlying gravelly or very gravelly or cobbly to very cobbly (>20% gravel or cobbles) material.

Native vegetation: Variable with graminoids, shrubs and sometimes treed.

Expression on colour infrared photography: Generally a smooth tone.

Examples in GVI area:

- **Dominant** (≥65%): Dominant SwG occurs with significant LtcS and Sb in upper Bigspring Ck. valley in SE 21-26-3-W5 and corresponding to soil polygon SRC2/bd on the Calgary Urban Perimeter soil survey.
- **Co-Dominant** (two or three site types each cover 30 to 60%): Co-dominant Gr, SwG and Sy occur in scattered native vegetation areas between Canada Olympic Park and the Trans-Canada Highway in west Calgary (SW33-24-2-W5) and corresponding to soil polygon HPSC1/d on the Calgary Urban Perimeter soil survey.
- **Significant** (one to three sites types, each of 10 to 30%): Dominant Ov with significant SwG and Sy in SW 20-25-2-W5 on the Calgary Urban Perimeter soil survey, corresponding to soil polygon SCO2/e.

Example(s) of non-typical occurrences: Upland SwG areas which underlay till veneer to blanket such as N of Cochrane at the junction of highways #22 and Sec. 567.

Examples of Other GVI Site Types

Crop Irrigated (CI)

Representative Example: Infrequent

Example(s) of non-typical occurrences: None known

Crop Non-Irrigated (CN)

Representative Example: Black Diamond east area.

Example(s) of non-typical occurrences: Scattered crop production fields in the NSR.

Tame Pasture or Hay - Irrigated (PI)

Representative Example: Centre-pivot hay or pasture production.

Example(s) of non-typical occurrences: Flood irrigation for pasture or hay production near creeks.

Tame Pasture or Hay - Non-Irrigated (PN)

Representative Example: Hay production (and pasture) in numerous areas.

Example(s) of non-typical occurrences: Grain production for forage (greenfeed) or pasture.

Pits Site Type and Examples of Modifiers

Pit Coal: None.

Pit Sand: None known.

Pit Gravel: Many locations. Eg., River floodplains and terraces.

Pit Clay: Possibly occurs in the Turner Valley area.

Pit Quarries: Occasional quarries used for building sandstone.

Developed Site Type and Examples of Modifiers

Developed Confined Feeding Operations: Occasional in area west of Airdrie.

Developed Transportation: Highway #1 in the Calgary – Springbank area.

Developed Agricultural Research or Processing: None known.

Developed Industrial Processing: Spray Lakes Lumber at Cochrane.

Developed Lagoons: Cochrane treatment lagoons.

Developed Oil or Gas Facilities: Gas processing plant at Turner Valley.

Developed Mining Facilities: Not expected in the Foothills Parkland.

Urban Site Type

Representative Examples: Calgary, Cochrane, Okotoks.

Rural Site Type

Representative Examples: Farmsteads; small hamlets, Eg., DeWinton, Madden.
Country residential development (Eg., west of Okotoks and Calgary).
Campgrounds (Eg., Chain Lakes Prov. Park)

Literature Resources Applicable to this Guide

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