Section 6

Habitat Models for Fish and Wildlife

Description and Map of Northern Alaska Ecotypes

Terrestrial habitat types adapted from the ecotypes described by Jorgenson and Heiner (2003) are described in Table 6.1. The distribution of ecotypes is depicted in Figure 6.1. Distribution of ecotypes among ecoregions of the North Slope is presented in Table 6.2.

Table 6.1. Description of ecotypes (local-scale ecosystems) for northern Alaska.

Class	Description
Alpine Ecotypes	
Alpine Glaciers	Perennially frozen snow and ice at high elevations in the Brooks Range, typically on north-facing slopes.
Alpine Non-carbonate Barrens	Barren (<5% plant cover) to partially vegetated (5–30%) areas on noncarbonate bedrock and talus slopes above treeline in the Brooks Range. Bedrock includes felsic intrusive (e.g., granite, granodiorite), noncarbonate metamorphic (e.g., slate, schist), and noncarbonated sedimentary (e.g., conglomerate, sandstone, shale) rocks that generally have low calcium and sodium and high aluminum concentrations that lead to acidic soils. Soils are rocky, excessively drained, lacking in surface organic accumulations, and strongly acidic (pH <5.5). At high elevations, common species include *Geum glaciale, Saxifraga bronchialis, S. flagellaris, S. nivalis, S. eschscholtzii,* and crustose and fruticose lichens. Lower elevations have species similar to Alpine Noncarbonate Dwarf Shrub Tundra.
Alpine Carbonate Barrens	Barren (<5% plant cover) to partially vegetated (5–30%) areas on carbonate bedrock and talus slopes above treeline in the Brooks Range. Bedrock includes both sedimentary (limestone, dolostone) and metamorphic (marble) carbonate rocks. Soils are rocky, excessively drained, lacking in surface organics, and alkaline (pH >7.3). Common pioneering plants include *Dryas integrifolia, D. octopetala, Saxifraga oppositifolia, Potentilla uniflora, Oxytropis nigrescens, O. arctica,* and *Carex rupestris*.
Alpine Mafic Barrens	Barren areas on intermediate, mafic, and ultramafic plutonic rocks above treeline in the Brooks Range that typically have dark-colored mineral assemblages with abundant iron and magnesium. Soils are rocky, excessively drained, lacking in surface organic accumulations, and are neutral to alkaline. Some areas have high levels of trace metals. Areas usually are devoid of vegetation.

Alpine Non-carbonate Dwarf Shrub Tundra	Areas on noncarbonate bedrock and talus slopes above treeline in the Brooks Range with dwarf shrub vegetation. Soils are rocky, excessively drained, have very thin surface organic accumulations, and are strongly acidic. Vegetation is dominated by dwarf shrubs including *Dryas octopetala* (mostly south slopes), *Salix phlebophylla, S. arctica, Loiseleuria procumbens, Diapensia lapponica, Arctostaphylos alpina, Empetrum nigrum, Vaccinium uliginosum,* and *Cassiope tetragona* (north slopes). Other species include *Carex podocarpa, C. bigelowii, Hierochloe alpina, Cladina mitis, C. rangiferina,* and *Rhizocarpon geographicum*.
Alpine Carbonate Dwarf Shrub Tundra	Areas on carbonate bedrock and talus slopes above treeline in the Brooks Range with dwarf shrub vegetation. Soils are rocky, excessively drained, rich in humus, and alkaline. Vegetation is dominated by dwarf shrubs including *Dryas integrifolia* (mostly south slopes), *D. octopetala, Cassiope tetragona* (north slopes), *Salix arctica,* and *Arctostaphylos alpina.* Other species include *Carex rupestris, C. bigelowii, Saxifraga oppositifolia, Potentilla uniflora, Oxytropis nigrescens, O. arctica, Nephroma arcticum, Rhytidium rugosum, Flavocetraria cucullata,* and *Thamnolia vermicularis.*
Alpine Mafic Dwarf Shrub Tundra	Areas on intermediate, mafic, and ultramafic plutonic rocks above treeline in the Brooks Range with dwarf shrub vegetation. Rocks have dark-colored mineral assemblages with abundant iron and magnesium. Soils are rocky, excessively drained, lacking in surface organic accumulations, and are neutral to alkaline. Some areas have high levels of trace metals. Vegetation is poorly described for this type but it probably is similar to that described for Alpine Noncarbonate Dwarf Shrub Tundra.
Upland Ecotypes	
Upland Spruce Forest	Upland areas on mid- to upper slopes on weathered bedrock, colluvium, and glacial till with vegetation dominated by needleleaf trees. Soils are loamy to rocky, well-drained, have moderately thick organic horizons, are acidic, and may or may not have permafrost. This late-successional forest is dominated by an open to closed canopy of *Picea glauca*, but can include minor amounts of *Betula papyrifera* and *P. mariana*. Understory plants include *Alnus crispa, Vaccinium vitis-idaea, Ledum groenlandicum, Empetrum nigrum, Rosa acicularis, Cornus canadensis, Shepherdia canadensis, Spiraea beauverdiana, Linnaea borealis, Calamagrostis canadensis, Hylocomium splendens,* and *Pleurozium schreberi*.
Upland Birch-Aspen-Spruce Forest	Upland areas on mid- to upper slopes on weathered bedrock, colluvium, and glacial till with vegetation co-dominated by broadleaf and needleleaf trees. Soils are well-drained, have thin organic horizons, are moderately acidic, and usually lack permafrost. This mid-successional mixed forest is dominated by an open to closed canopy of *Betula papyrifera, Populus tremuloides,* and *Picea glauca.* Understory plants include *Alnus crispa, Salix glauca, Vaccinium vitis-idaea, Ledum groenlandicum, Rosa acicularis, Cornus canadensis, Shepherdia canadensis, Linnaea borealis, Calamagrostis canadensis,* and feathermosses.
Upland Birch-Aspen Forest	Upland areas on mid- to upper slopes on weathered bedrock, colluvium, and glacial till with vegetation dominated by broadleaf deciduous trees. Soils are loamy to rocky, well-drained, have thin organic horizons, are acidic, and usually lack permafrost. The mid-successional forest is dominated by an open to closed canopy of *Betula papyrifera* and *Populus tremuloides*. Understory plants include *Alnus crispa, Salix glauca, Vaccinium vitis-idaea, Ledum groenlandicum, Rosa acicularis, Cornus canadensis, Shepherdia canadensis, Spiraea beauverdiana, Linnaea borealis, Calamagrostis canadensis*, and feathermosses.

Upland Tall Alder Shrub	Upland areas on mid- to upper slopes on weathered bedrock, colluvium, and glacial till with vegetation dominated by tall shrubs. Soils are loamy to rocky, well-drained, have thin organic horizons, are acidic, and usually lack permafrost. Vegetation is dominated by an open to closed canopy of *Alnus crispa,* although *Salix pulchra, Salix glauca,* and *Betula glandulosa* occasionally are abundant. Understory species include *Vaccinium uliginosum, Vaccinium vitis-idaea, Betula nana, B. glandulosa, Ledum groenlandicum, Empetrum nigrum, Equisetum arvense, Spiraea beauverdiana, Calamagrostis canadensis,* and *Petasites frigidus*. Mosses include *Sphagnum* spp., *Hylocomium splendens*, and *Dicranum* spp.
Upland Low Birch-Willow Shrub Tundra	Upland areas on mid- to upper slopes on weathered bedrock, colluvium, and glacial till with vegetation dominated by low shrubs. Soils are loamy to rocky, well-drained, have moderately thick organic horizons, are acidic, and usually have permafrost. Vegetation has an open to closed canopy of *Betula nana* and/or *Salix pulchra*. Other species include *Salix glauca, Vaccinium uliginosum, V. vitis-idaea, Ledum decumbens, Empetrum nigrum, Arctostaphylos alpina, Dryas octopetala, D. integrifolia, Salix reticulata, Equisetum arvense, Carex bigelowii,* and the mosses and lichens *Hylocomium splendens, Tomentypnum nitens, Sphagnum* spp.*, Aulacomnium palustre, Dicranum* spp.*, Cladina rangiferina,* and *Flavocetraria cucullata*.
Upland Dryas Dwarf Shrub Tundra	Upland windswept ridges and upper slopes on weathered bedrock, colluvium, inactive sand dunes, and coastal plain deposits with vegetation dominated by dwarf shrubs. Soils are well-drained, loamy to rocky, have thin organic horizons, and are circumneutral to acidic. Common dwarf shrubs include *Dryas octopetala* (mostly south slopes)*, D. integrifolia, Salix phlebophylla, S. arctica, S. reticulata, Loiseleuria procumbens, Diapensia lapponica, Arctostaphylos alpina, Empetrum nigrum, Vaccinium uliginosum, Ledum decumbens,* and *Cassiope tetragona* (north slopes). Other common species include *Carex bigelowii, C. scirpoidea, Arctagrostis latifolia, Equisetum variegatum, Tomentypnum nitens, Hylocomium splendens,* and *Cladina stellaris.*
Upland Shrubby Tussock Tundra	Gently sloping uplands and ridges on loess and colluvium over bedrock and glacial till, primarily within the Brooks Foothills (>120 m elevation), with vegetation co-dominated by tussock-forming sedges and low shrubs. Soils are somewhat poorly drained, loamy, have moderately thick surface organics, are acidic, and are underlain by ice-rich permafrost. The open low shrub canopy of *Betula nana* and *Salix pulchra* usually overtop the *Eriophorum vaginatum* tussocks. Other dominant plants include *E. angustifolium, Carex bigelowii, Ledum decumbens, Vaccinium vitis-idaea, V. uliginosum, Rubus chamaemorus, Hylocomium splendens, Sphagnum* spp.*, Aulacomnium palustre, Cladina rangiferina, C. arbuscula, C. mitis,* and *Flavocetraria cucullata*.
Upland Tussock Tundra	Gently sloping uplands and ridges on loess, colluvium, and coastal plain deposits, primarily within the Beaufort Coastal Plain (<120 m elevation), with vegetation dominated by tussock-forming sedges. Soils are moist, somewhat poorly drained, loamy, and have moderately thick surface organics, are circumneutral to acidic, and are underlain by ice-rich permafrost. Vegetation is dominated by *Eriophorum vaginatum*. On circumneutral soils, *Carex bigelowii, Dryas integrifolia, Salix pulchra, Cassiope tetragona, S. reticulata, Tomentypnum nitens,* and *Hylocomium splendens* are common. On acidic soils, dominant plants include *E. angustifolium, Betula nana, Salix pulchra, Ledum decumbens, Vaccinium vitis-idaea, Rubus chamaemorus, Hylocomium splendens, Sphagnum* spp.*, Aulacomnium palustre,* and *Cladina rangiferina.*

Upland Moist Sedge-Shrub Tundra	Upland ridges and upper slopes on weathered bedrock, loess-mantled bedrock, colluvium, and glacial till, with vegetation co-dominated by sedges and low and dwarf shrubs. Soils are loamy to rocky, somewhat poorly drained, have moderately thick surface organics, and are alkaline to acidic depending on substratum. On acidic soils more common in the upper foothills and mountains, dominant plants include *Betula nana, Salix pulchra, Carex aquatilis, Eriophorum angustifolium,* and *Sphagnum* spp. On circumneutral to alkaline soils more common on the coastal plain and lower foothills, dominant plants include *Salix lanata richardsonii, Dryas integrifolia, S. reticulata, Arctostaphylos rubra, Rhododendron lapponicum, Equisetum arvense, Carex bigelowii, Tomentypnum nitens,* and *Thamnolia vermicularis*.
Lowland Ecotypes	
Lowland Spruce Forest	Low-lying flats and gentle slopes on colluvium and abandoned floodplains with vegetation dominated by needleleaf forests. Soils are wet, somewhat poorly drained, have moderately thick surface organics, are acidic, and usually are underlain by permafrost. The open tree canopy (usually 5–10 m high) is dominated by *Picea mariana,* although *P. glauca, Larix laricina,* and *Betula papyrifera* occasionally can be present in small amounts. In the wettest areas the trees can be very stunted. Common understory plants include *Salix pulchra, Betula nana, Vaccinium uliginosum, Ledum groenlandicum, Potentilla fruticosa, Rubus chamaemorus, Equisetum arvense, and Carex bigelowii*. Mosses and lichens include *Sphagnum* spp., *Hylocomium splendens, Pleurozium schreberi, Cladonia* spp., *Nephroma* spp., *Cetraria* spp., and *Peltigera* spp.
Lowland Low Birch-Willow Shrub Tundra	Low-lying flats and lower slopes on drained-lake basins, abandoned floodplains, colluvium, and coastal plain deposits with vegetation dominated by low shrubs. Soils typically are poorly drained, loamy, have moderately thick surface organics, are acidic, and are underlain by permafrost. The open to closed low shrub canopy is dominated by *Salix pulchra* and *Betula nana.* On acidic soils other common species include *Ledum decumbens, Vaccinium uliginosum, V. vitis-idaea, Empetrum nigrum, Petasites frigidus, Rubus chamaemorus, Eriophorum angustifolium, Carex aquatilis, Calamagrostis canadensis,* and *Sphagnum* spp. On circumneutral to alkaline soils, *Salix lanata richardsonii, S. reticulata, Dryas integrifolia, Arctostaphylos rubra, Equisetum arvense, Eriophorum angustifolium, and Carex aquatilis* are common.
Lowland Moist Sedge-Shrub Tundra	Low-lying flats and gentle slopes on drained lake basins, abandoned floodplains, colluvium, and coastal plain deposits, particularly on the Beaufort Coastal Plain, with vegetation co-dominated by sedges and low or dwarf shrubs. Soils are saturated at intermediate depths (>15 cm), loamy with moderately thick surface organics, are circumneutral to alkaline, and are underlain by ice-rich permafrost. Sites generally are free of surface water during summer. Vegetation is dominated by *Carex aquatilis, C. bigelowii, Eriophorum angustifolium,* and *Dryas integrifolia.* Other common species include *Salix lanata richardsonii, S. pulchra, S. reticulata, Tomentypnum nitens,* and *Hylocomium splendens*. Acidic vegetation could not be adequately differentiated from non-acidic vegetation on the Beaufort Coastal Plain.

Lowland Wet Sedge Tundra	Low-lying flats and drainages on drained lake basins, abandoned floodplains, colluvium, and coastal plain deposits, particularly on the Beaufort Coastal Plain, with vegetation dominated by sedges. Soils are poorly drained, have moderately thick to thick (10–50 cm) surface organics over silt loam, usually circumneutral, and are underlain by ice-rich permafrost. Ice-wedge development in older landscapes creates distinctive low-centered polygons. The surface generally is flooded during early summer (depth <0.3 m) and drains later, but soils remain saturated ≥15 cm from the surface throughout the growing season. Vegetation is dominated by *Carex aquatilis* and *Eriophorum angustifolium*, while willows, including *Salix lanata richardsonii* and *S. pulchra*, often are present but usually not co-dominant. Other common species include *Dryas integrifolia, S. reticulata, C. bigelowii,* and *Equisetum scirpoides* on higher microsites and polygon rims.
Lowland Lake	Shallow (<1.5 m) ponds and deep (≥1.5 m) lakes resulting from thawing of ice-rich permafrost, primarily on the coastal plain and distal portions of abandoned floodplains. In shallow ponds, water freezes to the bottom during winter, thaws by early to mid-June, and is warmer than water in deep lakes. In deep lakes, water does not freeze to the bottom during winter in deeper portions of the lake. Sediments are loamy to sandy. These lakes lack riverine influences (flooding), but they may have distinct outlets or connections to rivers.
Lacustrine Ecotypes	
Lacustrine Barrens (not mapped)	Barren or partially vegetated (<30% cover) areas on newly exposed sediments in recently drained lake basins. The surface form generally is nonpatterned due to the lack of ice-wedge development. Soils are saturated to well-drained, sandy to loamy, lack surface organics, and are alkaline. Typical colonizers are *Arctophila fulva, Carex aquatilis, Dupontia fisheri, Scorpidium scorpioides,* and *Calliergon* spp. on wet sites and *Poa alpigena, Senecio congestus, Salix ovalifolia,* and *Salix arctica* on drier sites.
Lacustrine Marsh (not mapped)	Shallow (depth <1 m), permanent waterbodies with emergent aquatic sedges and grasses. Water and bottom sediments freeze completely during winter, but the ice melts in early June. The sediments range from sands to organics (10–50 cm deep) overlying silt loam. In deeper water (30–100 cm), *Arctophila fulva* can form sparse to dense stands and is the predominant vegetation. In shallower (<30 cm) water, *Carex aquatilis* and *Eriophorum angustifolium* are dominant, and *Utricularia vulgaris* is common. This ecosystem type is important to waterbirds but could not be mapped separately and is included in both Lowland Lakes and Lowland Wet Sedge Tundra.
Riverine Ecotypes	
Riverine Spruce Forest	Flat areas on inactive floodplains subject to infrequent flooding with vegetation dominated by needleleaf trees. The late-successional forest has an open to closed tree canopy dominated by *Picea glauca*. Soils are well-drained, loamy to gravelly, have moderately thick surface organics, and are acidic. The understory is dominated by *Alnus crispa, Vaccinium uliginosum, V. vitis-idaea, Arctostaphylos rubra, Cornus canadensis, Viburnum edule, Rosa acicularis, Mertensia paniculata,* and feathermosses *(Hylocomium splendens, Rhytidiadelphus triquetrus,* and *Pleurozium schreberi)*.

Riverine Spruce-Balsam Poplar Forest	Flat areas on inactive floodplains subject to infrequent flooding with mixed forests co-dominated by needleleaf and broadleaf trees. The mid-successional forests have an open to closed tree canopy dominated by *Picea glauca* and *Populus balsamifera*. Soils are well-drained, loamy to gravelly, have moderately thick surface organics, and are circumneutral to acidic. The understory is dominated by *Alnus crispa, Vaccinium uliginosum, V. vitis-idaea, Arctostaphylos rubra, Cornus canadensis, Viburnum edule, Rosa acicularis, Equisetum arvense, Epilobium angustifolium, Calamagrostis canadensis,* and feathermosses *(Hylocomium splendens, Rhytidiadelphus triquetrus,* and *Pleurozium schreberi)*.
Riverine Balsam Poplar Forest	Flat areas on inactive floodplains subject to infrequent flooding and that have vegetation dominated by broadleaf forests. Soils are well-drained, loamy to gravelly, have thin surface organics, and are circumneutral. The mid-successional forest has an open to closed canopy dominated by *Populus balsamifera* or occasionally *Betula papyrifera*. The understory has *Alnus crispa, Rosa acicularis, Equisetum arvense, Epilobium angustifolium, Hedysarum alpinum, Calamagrostis canadensis, Galium boreale,* and *Rhytidiadelphus triquetrus*.
Riverine Tall Alder-Willow Shrub	Flat areas on active floodplains subject to frequent flooding that have vegetation dominated by tall shrubs in the boreal region. Soils are well-drained, loamy to gravelly, have very thin surface organics, and are circumneutral. The early succession community has an open to closed tall shrub canopy dominated by *Salix alaxensis, S. arbusculoides, S. monticola,* and *Alnus crispa*. The understory is dominated by *Vaccinium uliginosum, Artemisia tilesii, Calamagrostis canadensis, Petasites frigidus,* and *Equisetum arvense*. Mosses and lichens are not abundant.
Riverine Low Willow Shrub Tundra	Flat to gently sloping areas on active and inactive floodplains in arctic regions subject to variable flooding frequency and that have vegetation dominated by tall and low shrubs. On the narrow zone close to the river, soils are frequently flooded, well-drained, lack organic accumulations, and have vegetation dominated by open tall (>1.5 m) *Salix alaxensis, S. arbusculoides,* and *S. glauca. Alnus crispa* is uncommon. In the understory, *Equisetum arvense, Astragalus alpinus, Aster sibericus,* and *Festuca rubra* are common. On inactive floodplains, where soils have interbedded organic layers and are seasonally saturated, *Salix lanata richardsonii* and *S. pulchra* are dominant. Common understory species include *Salix reticulata, Arctostaphylos rubra, Dryas integrifolia, Arctagrostis latifolia, Equisetum* spp., legumes, *Tomentypnum nitens,* and other mosses.
Riverine Dryas Dwarf Shrub Tundra	Flat areas on inactive floodplains subject to infrequent flooding and that have vegetation dominated by dwarf shrubs. Soils are well-drained, sandy to rocky, have thin surface organics, are alkaline, and are underlain by ice-poor permafrost. The dwarf shrub *Dryas integrifolia* is dominant, and *Salix reticulata, S. lanata richardsonii, Carex bigelowii, Arctagrostis latifolia, Astragalus* spp., *Oxytropis deflexa,* and *Equisetum scirpoides* are common. *Tomentypnum nitens* and *Distichium capillaceum* are common mosses.
Riverine Moist Sedge-Shrub Tundra	Flat areas on inactive floodplains subject to infrequent flooding and that have vegetation co-dominated by sedges and low and/or dwarf shrubs. Soils are moderately well-drained, loamy, have moderately thick surface organics, are circumneutral and underlain by ice-rich permafrost. Vegetation is dominated by *Carex aquatilis* and *Eriophorum angustifolium* with *Dryas integrifolia, Salix lanata richardsonii, S. reticulata,* and *Carex bigelowii, Equisetum* spp*., Tomenthypnum nitens,* and *Campylium stellatum* as common associates

Riverine Wet Sedge Tundra	Flat areas on active and inactive floodplains subject to frequent or infrequent flooding and that have vegetation dominated by sedges. Soils are poorly drained, loamy with moderately thick to thick surface organics, are circumneutral to alkaline, and are underlain by ice-rich permafrost. Surface forms vary from nonpatterned to low-relief, low-centered polygons; the latter are indicative of progressive ice-wedge development. Vegetation is dominated by *Carex aquatilis* and *Eriophorum angustifolium*, although occasionally the willow *Salix lanata richardsonii* is a co-dominant. Other species include *Dupontia fisheri, Equisetum variegatum, Pedicularis sudetica, Campylium stellatum, Scorpidium scorpioides,* and *Limprichtia revolvens*.
Riverine Marsh (not mapped)	Shallow waterbodies (0.1–1.0 m) on active and inactive floodplains subject to occasional flooding with vegetation dominated by emergent aquatic grasses and sedges. Due to shallow water depths, the water freezes to the bottom in the winter, and the ice melts by early June. *Arctophila fulva* usually is found in deeper water while Carex aquatilis is usually found in very shallow water. *Hippuris vulgaris* occasionally is present.
Riverine Barrens	Barren or partially vegetated (<30% cover) areas on active river channel deposits associated with meandering or braided rivers. Frequent sedimentation and scouring restricts establishment and growth of vegetation. Soils are poorly to excessively drained, sandy to gravelly, lack surface organics, are alkaline, and usually have ice-poor permafrost in arctic regions and lack permafrost is boreal regions. Typical pioneer plants include *Salix alaxensis, Deschampsia caespitosa, Chrysanthemum bipinnatum, Epilobium latifolium, Artemisia arctica, Festuca rubra, Arctagrostis latifolia,* and *Trisetum spicatum*.
Riverine Waters	Permanently flooded channels of freshwater rivers and streams, and lakes on inactive floodplains that are subject to occasional flooding. Some stream water flows throughout the year. Peak flooding generally occurs during spring breakup, and the lowest water levels occur during mid-summer. Riverbed materials can be either sand or gravel. Shallow (<1.5 m) or deep lakes usually are associated with old river channels, point bars, and meander scrolls, although some result from thawing of ice-rich permafrost on large floodplains. Some may have connecting channels that flood during high water. Shorelines usually are smooth (lack polygonization).
Coastal Ecotypes	
Coastal Grass and Dwarf Shrub Tundra	Low-lying, salt-affected areas along the coast with vegetation dominated by either grasses or dwarf shrubs. Soils are well-drained, slightly saline, and alkaline. This class includes three vegetation types. On active dunes and beaches, vegetation includes *Elymus arenarius, Chrysanthemum bipinnatum, Puccinellia* spp*., Artemisia tilesii,* and *Salix ovalifolia*. Well-drained inactive tidal flats dominated by dwarf shrub vegetation have *S. ovalifolia, Stellaria humifusa, E. arenarius, Deschampsia caespitosa, Dupontia fisheri, Carex subspathacea,* and *A. tilesii*. Inactive dunes along the Chukchi Sea with slightly saline sandy soils have dwarf shrub vegetation dominated by *Empetrum nigrum, S. ovalifolia, E. arenarius, Lathyrus maritimus, C. bipinnatum*, and lichens. Substantial areas of this mapped class would have been more accurately mapped as Lowland Moist Sedge-Shrub Tundra but could not be adequately differentiated spectrally or by modeling.

Coastal Wet Sedge Tundra	Low-lying, salt-affected areas on tidal flats, deltas, and muddy beaches along the coast that are frequently flooded and have vegetation dominated by sedges. The surface is nonpatterned. Soils are poorly drained, clayey to loamy, usually lack surface organics, and are brackish and alkaline. The soils are underlain by ice-poor permafrost. Vegetation is dominated by *Carex subspathacea, Carex ursina,* and *Puccinellia phryganodes,* with *Dupontia fisheri, Puccinellia andersonii, Cochlearia officinalis,* and *Stellaria humifusa* also common. Non-vascular plants usually are absent. Substantial areas of Lowland Wet Sedge Tundra are included in these mapped areas but could not be adequately differentiated.
Coastal Barrens	Barren or partially vegetated, low-lying, salt-affected areas on tidal flats, deltas, and muddy beaches along the coast that are frequently flooded. Soils are poorly drained, clayey to loamy, usually lack surface organics, and are brackish and acidic to alkaline. The soils are underlain by ice-poor permafrost. Common colonizing plants include *Deschampsia caespitosa, Elymus arenarius, Salix ovalifolia,* and *Stellaria humifusa* in well-drained areas, and *Puccinellia phryganodes, Dupontia fisheri,* and *Carex subspathacea* in wetter areas. This class also includes tundra that has been killed by saltwater intrusions from storm surges and is being colonized by salt-tolerant plants. Newly deposited sediments typically are found on top of a thick organic horizon. These areas have low pH, high salinity, and shallow thaw depths. Common colonizing plants include *Puccinellia phryganodes, Stellaria humifusa, Cochlearia officinalis,* and *Salix ovalifolia*.
Coastal Water	Shallow (~<2 m) estuaries, lagoons, embayments, and tidal ponds along the coast of the Beaufort and Chukchi Seas. Winds, tides, river discharge, and icing create dynamic changes in physical and chemical characteristics. Salinity ranges widely from nearly fresh near rivers to saline in unprotected areas. Tidal ranges normally are small (<0.2 m) along the Beaufort and moderate (0.5–1 m) along the Chukchi Seas, but storm surges produced by winds may raise sea level as much as 2–3 m. Bottom sediments are mostly unconsolidated mud and sand. The ice-free period extends from July until October. Winter freezing generally begins in late September.
Other Ecotypes	
Marine Water (not mapped)	Deep (~>2 m) marine waters of the Beaufort and Chukchi Seas outside of lagoons and barrier islands. Ice coverage is highly variable from permanent pack ice to seasonally ice free areas. Small areas of Marine Water included in Coastal Water for mapping purposes.
Human Modified	Barren or partially vegetated areas resulting from human disturbance. As mapped, the human-modified areas are predominantly roads, pads, and mine pits and overburden.
Cloud, Snow and Ice	Areas with clouds, snow, and ice. The Clouds and Ice Class was combined with the Shadow classes for the final map. Most of the original shadow classes in the input maps in the Brooks Range were recoded to alpine classes based on modeling. Remaining shadow areas are primarily due to clouds in the Brooks Foothills. Aufeis on rivers was classified as Riverine Barrens to avoid creation of a separate Riverine Ice class.

Figure 6.1 Distribution of ecotypes in northern Alaska (Jorgenson and Heiner 2003)

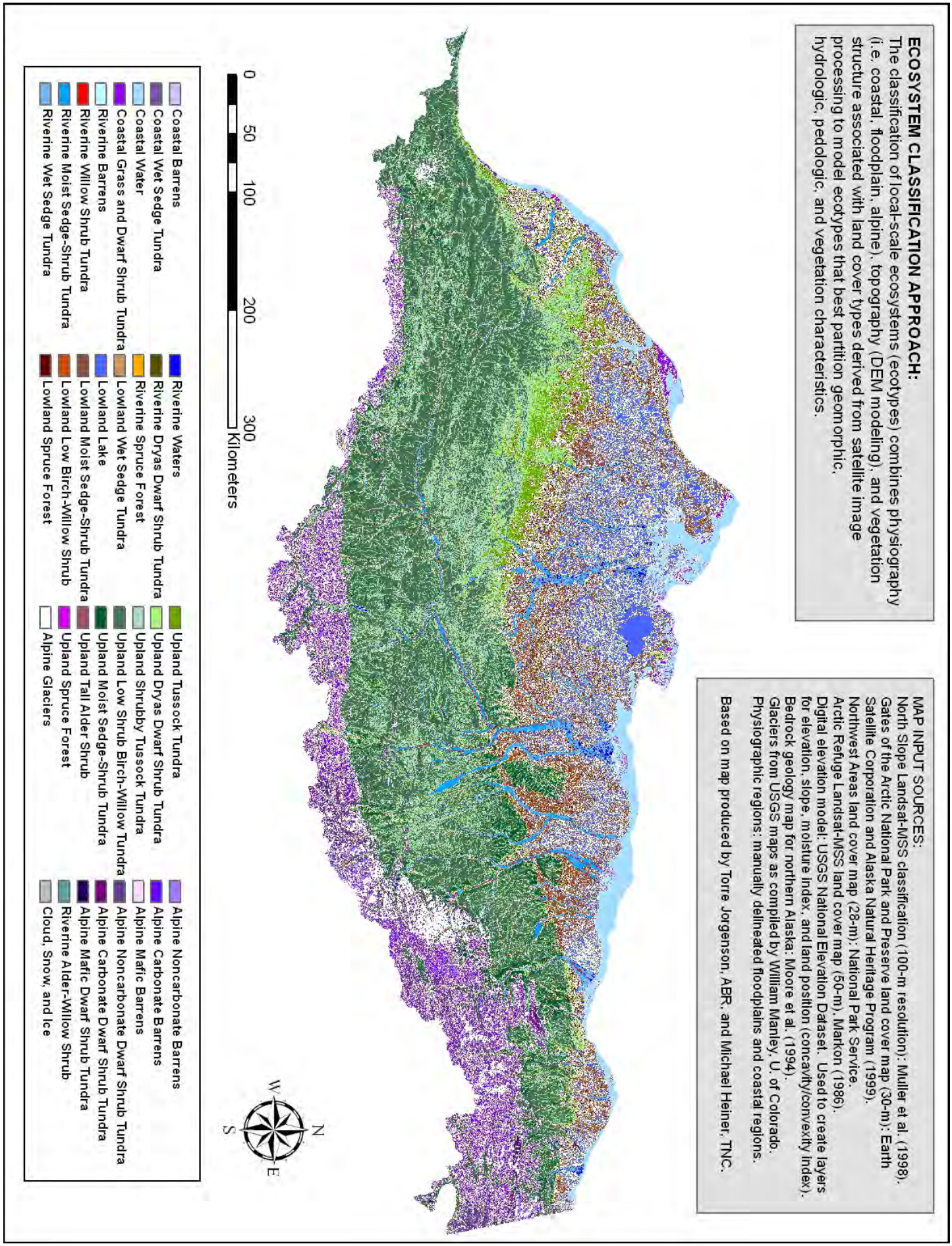


Table 6.2. Distribution of ecotypes on the North Slope. More abundant (>5% of area) ecotypes are highlighted in grey. Aquatic habitats (riverine, lake, and coastal water) are further defined and modified in Section 7, under "Freshwater Resident and Anadromous Fish."

Ecotype	Coastal Plain		Foothills		Brooks Range		North Slope (Total Area)	
	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%	Area (km^2)	%
Coastal Barrens	507.7	0.9	9.5	0.0	0.0	0.0	517.2	0.2
Coastal Wet Sedge Tundra	1253.8	2.3	40.9	0.0	0.0	0.0	1294.7	0.6
Coastal Water	6741.6	12.1	301.4	0.3	0.0	0.0	7043.0	3.4
Coastal Grass and Dwarf Shrub Tundra	1320.0	2.4	79.2	0.1	0.0	0.0	1399.2	0.7
Riverine Barrens	548.4	1.0	921.1	1.0	228.3	0.4	1697.8	0.8
Riverine Willow Shrub Tundra	75.9	0.1	920.9	1.0	146.9	0.3	1143.7	0.5
Riverine Moist Sedge-Shrub Tundra	1374.4	2.5	2948.2	3.1	579.5	1.0	4902.1	2.3
Riverine Wet Sedge Tundra	951.3	1.7	914.4	1.0	135.3	0.2	2000.9	1.0
Riverine Waters	554.2	1.0	610.9	0.6	132.1	0.2	1297.2	0.6
Riverine Dryas Dwarf Shrub Tundra	0.0	0.0	4.8	0.0	270.2	0.5	275.0	0.1
Riverine Spruce Forest	0.0	0.0	0.0	0.0	1.8	0.0	1.8	0.0
Lowland Wet Sedge Tundra	11239.0	20.2	3511.4	3.7	643.6	1.1	15394.0	7.4
Lowland Lake	7983.2	14.4	1665.3	1.7	246.3	0.4	9894.9	4.7
Lowland Moist Sedge-Shrub Tundra	12671.0	22.8	6923.7	7.2	0.0	0.0	19595.5	9.4
Lowland Low Birch-Willow Shrub	683.2	1.2	1293.7	1.4	297.6	0.5	2274.6	1.1
Lowland Spruce Forest	0.0	0.0	0.0	0.0	11.5	0.0	11.5	0.0
Upland Tussock Tundra	7480.6	13.5	9682.7	10.1	0.0	0.0	17163.7	8.2
Upland Dryas Dwarf Shrub Tundra	891.5	1.6	551.7	0.6	1089.5	1.9	2532.9	1.2
Upland Shrubby Tussock Tundra	17.6	0.0	33469.3	34.9	10448.6	18.2	43938.2	21.0
Upland Low Shrub Birch-Willow Tundra	1199.5	2.2	23831.6	24.9	11357.8	19.8	36390.4	17.4
Upland Moist Sedge-Shrub Tundra	18.1	0.0	7869.5	8.2	5621.5	9.8	13510.1	6.5
Upland Tall Alder Shrub	0.0	0.0	0.0	0.0	211.8	0.4	211.8	0.1
Upland Spruce Forest	0.0	0.0	0.4	0.0	41.2	0.1	41.6	0.0
Alpine Glaciers	0.0	0.0	0.0	0.0	198.6	0.3	198.6	0.1
Alpine Noncarbonate Barrens	0.0	0.0	62.7	0.1	8133.0	14.2	8195.8	3.9

Alpine Carbonate Barrens	0.0	0.0	0.0	0.0	103.2	0.2	103.2	0.0
Alpine Mafic Barrens	0.0	0.0	0.0	0.0	103.1	0.2	103.1	0.0
Alpine Noncarbonate Dwarf Shrub Tundra	0.0	0.0	51.5	0.1	16060.3	28.0	16112.0	7.7
Alpine Carbonate Dwarf Shrub Tundra	0.0	0.0	0.0	0.0	129.5	0.2	129.5	0.1
Alpine Mafic Dwarf Shrub Tundra	0.0	0.0	0.0	0.0	185.4	0.3	185.4	0.1
Riverine Alder-Willow Shrub	0.0	0.0	0.0	0.0	2.0	0.0	2.0	0.0
Cloud, Snow, and Ice	5.4	0.0	123.7	0.1	1071.7	1.9	1200.8	0.6
Total	**55516.4**		**95788.7**		**57450.1**		**208762.5**	

Figure 6.2. Habitat model for birds in summer.

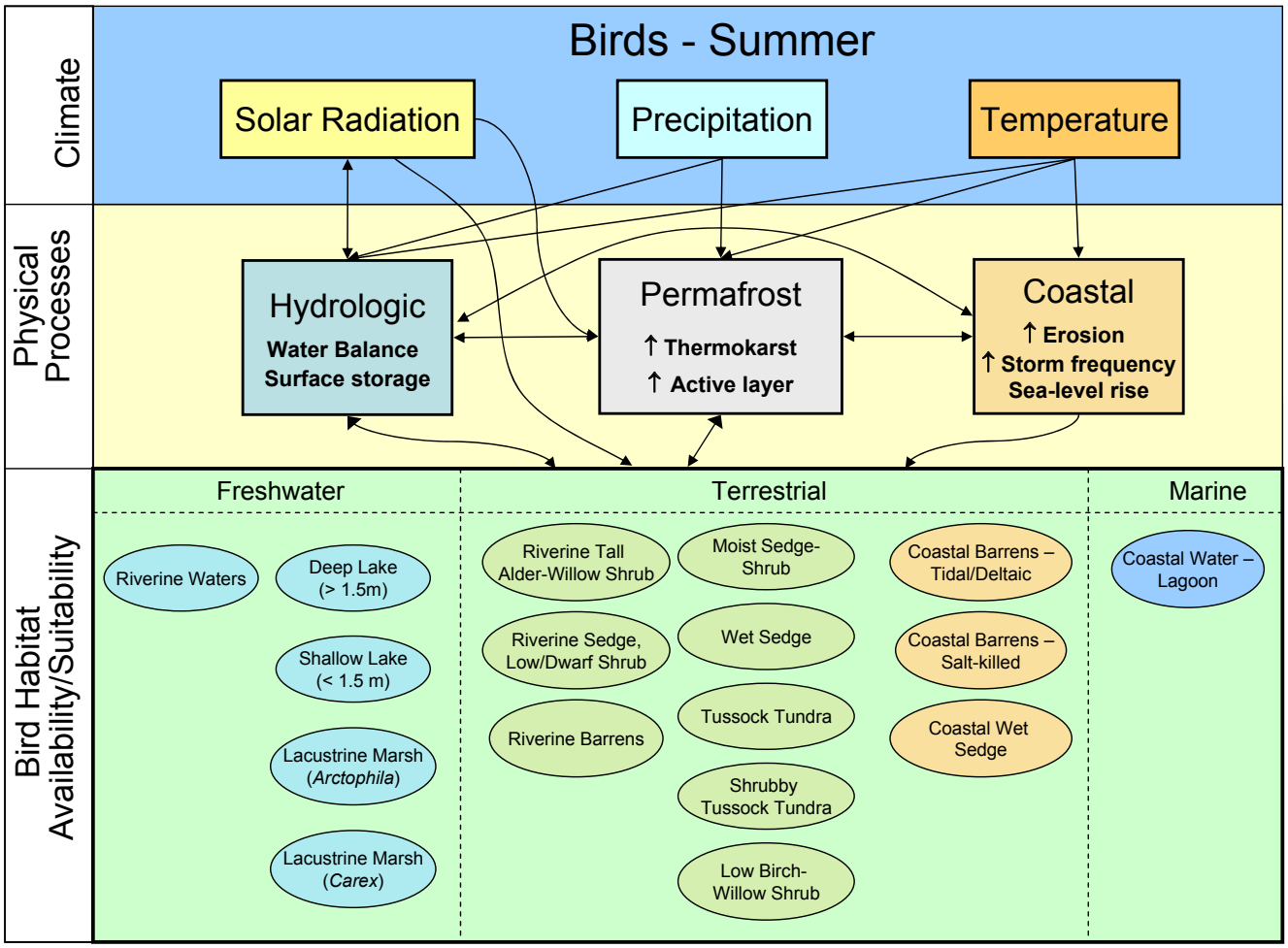
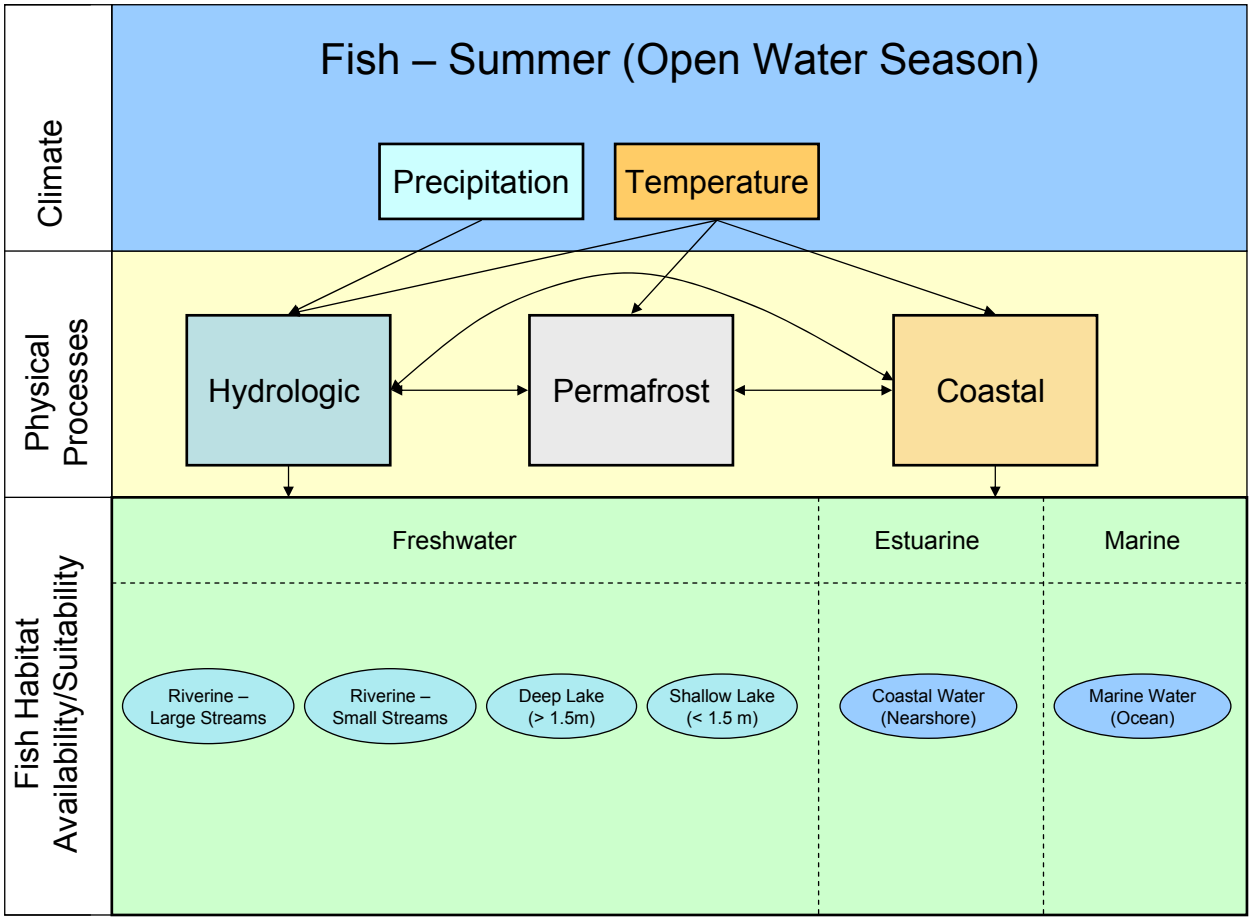


Figure 6.3. Habitat models for fish in summer (above) and winter (below)..



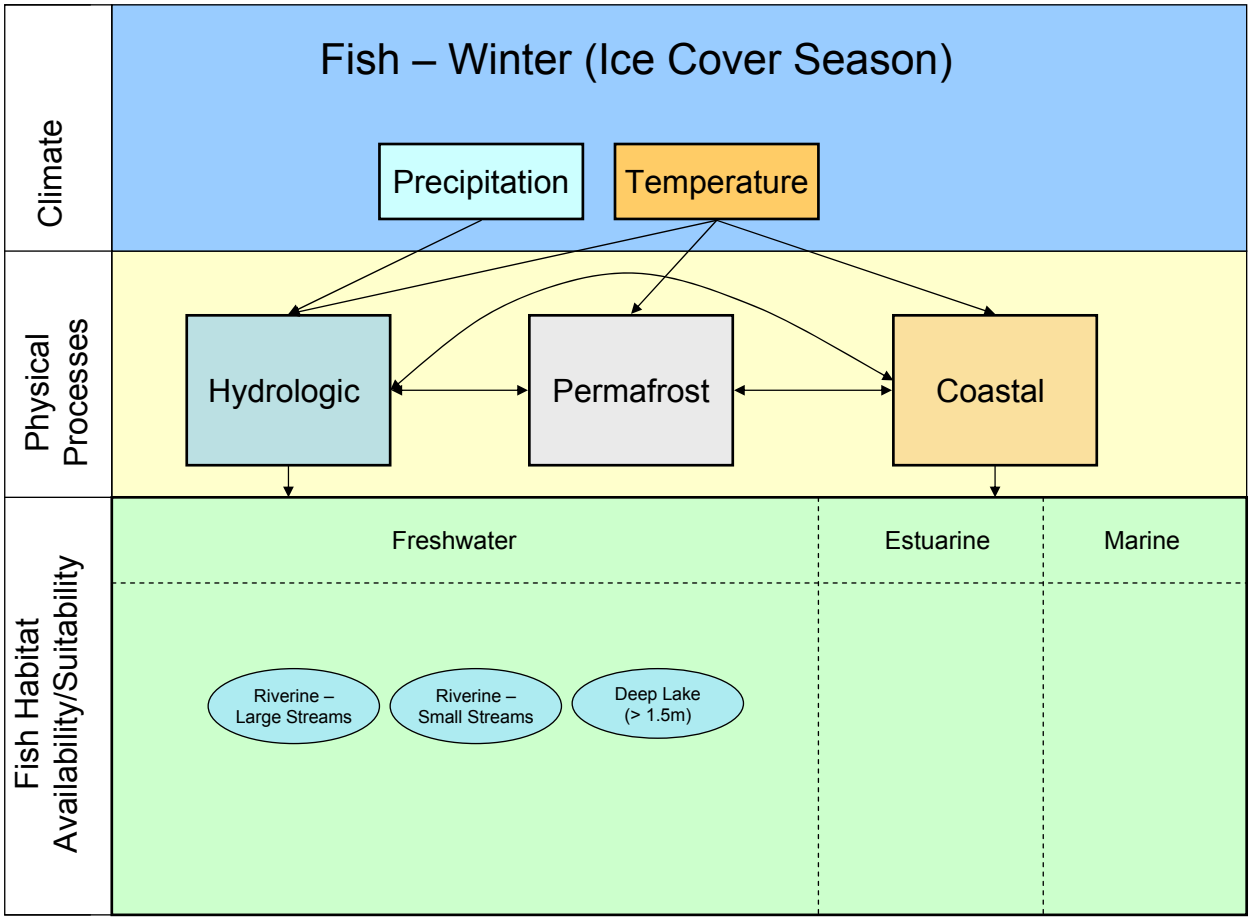


Figure 6.4. Habitat models for mammals in summer (above) and winter (below).