WETLAND/RIPARIAN KEY

1a. Wetlands and riparian areas of Colorado's eastern plains, including all areas below ~6,000 ft. from the Front Range east to the Kansas boarder. Within Colorado, this area is referred to as the Eastern Plains, but from a national perspective, these are part of the Western Great Plains Division *[If on the edge of the foothills, try both Key A and Key B.]* ..... **Key A: Wetlands and Riparian Areas of Colorado's Eastern Plains**

1b. Wetland and riparian areas west of the Great Plains **2**

2a. Wetlands and riparian areas with alkaline or saline soils within the inter-mountain basins of the Rocky Mountains (San Luis Valley, South Park, North Park, etc.). *[If the site does not match any of the descriptions within Key B, try Key C as well. Not all wetlands and riparian areas of the inter-mountain basis will fit within this key.]* ..... **Key B: Wetlands and Riparian Areas of the Inter-Mountain Basins & Valleys**

2b. Wetlands and riparian areas of the Rocky Mountains, including the foothills of the Front Range and all of the Western Slope. Localized "hanging garden" wetlands of the Colorado Plateau are also keyed here, as they are the only system specific to that region. ..... **Key C: Wetlands and Riparian Areas of the Rocky Mountains & Western Valleys**

Wetlands and Riparian Key A: Colorado's Eastern Plains

1a. Low stature shrublands dominated by species such as greasewood (*Sarcobatus vermiculatus*), saltbush (*Atriplex* spp.), rabbitbrush (*Ericameria nauseosa*), silver sagebrush (*Artemisia cana*), and big sagebrush (*Artemisia tridentata*). Vegetation may be sparse and soils may be saline. Sites may be located on flats or in washes, but typically not associated with river and stream floodplains. Shrublands with >10% total vegetation cover, located on flats or in temporarily or intermittently flooded drainages, and dominated by *Sarcobatus vermiculatus* and *Atriplex* spp. with inclusions of alkali sacaton (*Sporobolus airoides*), western wheatgrass (*Pascopyrum smithii*), saltgrass (*Distichlis spicata*), Nuttall's alkaligrass (*Puccinellia nuttalliana*), and common spikerush (*Eleocharis palustris*) herbaceous vegetation. ..... **Inter-Mountain Basins Greasewood Flat**

1b. Wetland is not a low stature shrub-dominated saline wash or flat. **2**

2a. Herbaceous wetlands of the Western Great Plains that are isolated or partially isolated from surface water stream networks, not located on floodplains, headwaters, or in riparian zones, often depressional basins with or without an outlet..... **3**

2b. Sites located within the floodplain or immediate riparian zone of a river or stream and part of the surface water stream network. Sites may occur at the vary headwaters of a stream network and be primarily groundwater driven. Vegetation may be entirely herbaceous or may contain tall stature woody species, such as cottonwood (*Populus* spp.) or willow (*Salix*

spp.). Water levels variable. Woody vegetation that occurs along reservoir edges can also be included here. **5**

3a. Natural shallow depressional wetlands in the Western Great Plains, often called playas or playa lakes, with an impermeable soil layer, such as dense hardpan clay, that causes periodic ponding after heavy rains. Playas are variable in size and can range from less than an acre to many acres in size. Sites generally have closed contour topography and are surrounded by upland vegetation. Hydrology is typically tied to precipitation and runoff, though some sites have a strong groundwater connection. Ponding is often ephemeral or seasonal and sites may be dry throughout the entire growing season during dry years. Sites with a groundwater connection or artificial inflows can stay wet throughout the year. Species composition depends on soil salinity, may fluctuate depending on seasonal moisture availability, and many persistent species may be upland species..... **4**

3b. Herbaceous wetlands in the Western Great Plains not associated with playas or saline basins. If depressional, the system has a connection to a downslope drainage network. .... **Western Great Plains Wet Meadow and Marsh Drainage Network**

4a. Shallow depressional wetlands with less saline soils than the next. Dominant species are typically not salt-tolerant. Sites may have obvious vegetation zonation tied to water levels, with the most hydrophytic species occurring in the wetland center where ponding lasts the longest. Common native species include western wheatgrass (*Pascopyrum smithii*), buffalograss (*Buchloe dactyloides*), spikerush (*Eleocharis* spp.), spotted evening primrose (*Oenothera canescens*), green prairie coneflower (*Ratibida tagetes*), plantain (*Plantago* spp.), knotweed (*Polygonum* spp.), and wedgeleaf (*Phyla cuneifolia*). Non-native species are very common in these sites, including Russian thistle (*Salsola tragus, =australis*), burningbush (*Bassia scoparia, =sieversiana*), and bigbract verbena (*Verbena bracteata*). Site zonation and hydrology can be impacted by agriculture and concentrated grazing. Many have been dug out or "pitted" to increase water retention and to tap shallow aquifers..... ....**Western Great Plains Closed Depression Wetland & Playa**

4b. Shallow depressional wetlands with high salinity. Salt encrustations frequently occur on the surface, and the accumulation of salt concentrations in the lowest central area of the basin can limit species cover to bare or sparse vegetation. Presence of halophytes such as pickleweed (*Salicornia* spp.), seepweed (*Suaeda* spp.), verrucose seapurslane (*Sesuvium verrucosum*), salt heliotrope (*Heliotropium curassavicum*), and media sandspurry *Spergularia maritima, =media*) can be indicator species. Other species are typically salt-tolerant, including saltgrass (*Distichlis spicata*), alkaligrass (*Puccinellia* spp.), bulrush (*Schoenoplectus* spp.), alkali sakaton (*Sporobolus airoides*), and foxtail barley (*Hordeum jubatum*). These herbaceous saline depressions can have occasional shrubs such as greasewood (*Sarcobatus vermiculatus*) and winterfat (*Krascheninnikovia lanata*), or can transition to shrub cover in the less wetland, more mesic outer zones. ....**Western Great Plains Saline Depression Wetland**

5a. Riparian to floodplain-dominated systems with enough fluvial energy and alluvial processes to support development of tree species and floodplain features such as bed and bank. Vegetation typically a complex of non-wetland and wetland zones that range from sparsely vegetated washes with occasional trees, to closed woodlands and complex patchy floodplains. Inclusion of herbaceous vegetation is possible, especially when in-channel flow is augmented with springs or other sources of groundwater discharge **6**

5b. Lower energy groundwater-dependent or surface flow systems within the headwaters of drainage networks or on low-order streams. Processes are driven by groundwater discharge or by overland flow caught in depressions within ephemeral to intermittent channels. In-channel flow may occur during local high precipitation events, but the dominant factor in wetland creation is seasonal to continuous groundwater discharge and/or ponding in within-channel depressions. Substrate soil texture and vegetation zonation is less shaped by alluvial processes and more by longer residence times from groundwater discharge or ponding. Some examples are broad and expansive, but most are narrow and linear. Sites range from herbaceous meadows and marshes with minimal woody vegetation, but shrub zones can occur and even dominate local slopes where seasonal to continuous groundwater expression occurs. Herbaceous side channels and sloughs supported by groundwater but set within a mosaic of riparian or floodplain system supporting trees generally belong above due to dominance of alluvial processes and site capacity required for tree establishment in the plains. **8**

6a. Riparian woodlands and shrublands of the Rocky Mountain foothills on the very western margins of the Great Plains. Woodlands are dominated by cottonwood species (*Populus angustifolia, P. deltoides,* or the hybrid *P. acuminata*). Common native shrub species include willow (*Salix* spp.), thinleaf alder (*Alnus incana*), river birch (*Betula occidentalis*), redosier dogwood (*Cornus sericea*), and hawthorn (*Crataegus* spp.). Exotic shrub species include saltcedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*). Sites are most often associated with a stream channel, including ephemeral, intermittent, or perennial streams (Riverine HGM Class). This system can occur on slopes, lakeshores, or around ponds, where the vegetation is associated with groundwater discharge or a subsurface connection to lake or pond water, and may experience overland flow but no channel formation (Slope, Flat, Lacustrine, or Depressional Hydrogeomorphic Classes). It is also typically found in backwater channels and other perennially wet but less scoured sites, such as floodplain swales and irrigation ditches. Vegetation composition can have foothill species influence and vertical strata tend to be more layered than the next due to foothill proximity. ....**Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland**

6b. Riparian and floodplain woodlands and shrublands of Colorado's eastern plains. Dominant species include plains cottonwood (*Populus deltoides*), crack willow (*Salix fragilis*), peachleaf willow (*Salix amygdaloides*), narrowleaf willow (*Salix exigua*), ash (*Fraxinus* spp.), and elm (*Ulmus* spp.). Invasive woody species including saltcedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*) can invade sites. Examples of native herbaceous understory species include switchgrass (*Panicum virgatum*), western wheatgrass (*Pascopyrum smithii*), alkali cordgrass (*Spartina gracilis*), prairie cordgrass (*S. pectinata*), and needlegrasses. Non-native or native-invasive species in the genera *Agrostis, Bromus, Phalaris,* and *Phragmites* frequently invade understory with managed or impaired hydrology..... **(7)**

7a. Riparian woodlands and shrublands along small to medium streams where streamflow may dry completely for some portion of the year or water depths are generally wadeable by mid-summer. These riparian areas have less floodplain development and flashier hydrology than the next. Dominant water sources are summer rainfall and alluvial groundwater, although plains riverine systems can have various secondary water sources including irrigation runoff and groundwater. Dominant species include plains cottonwood (*Populus deltoides*), peachleaf willow (*Salix amygdaloides*), narrowleaf willow (*Salix*

exigua), green ash (*Fraxinus pennsylvanica*), western wheatgrass (*Pascopyrum smithii*), switchgrass (*Panicum virgatum*), vine mesquite (*Panicum obtusum*), sand dropseed (*Sporobolus cryptandrus*), and little bluestem (*Schizachyrium scoparium*). Wetland graminoids such as sedges (*Carex* spp.) and bulrush (*Schoenoplectus* spp.) can occupy seasonally inundated channel-fringe zones, secondary channels, swales, or patches of groundwater discharge. Saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), and less desirable grasses and forbs can invade degraded examples. Groundwater depletion, lack of fire and beaver, concentrated grazing, and/or adjacent agricultural activities have resulted in species and hydroperiod changes. Like Rocky Mountain Lower Montane Riparian Woodland and Shrublands, this system can occur around artificial lakeshores where the vegetation is connected to an open water body that may experience fluctuating shoreline water levels. This can mimic the flooding and saturated conditions that occur along riverine channels and their floodplains. .... **Western Great Plains Riparian**

7b. Woodlands, shrublands, meadows, and marshes along large rivers with extensive floodplain development and with a diversity of floodplain-associated structural features. Hydroperiod and flooding is more associated with snowmelt and seasonal dynamics in the mountains than with local precipitation events. Dominant communities within this system include floodplain forests and open cottonwood galleries, mesic to wet shrublands, wet meadow and marsh communities within swales and sloughs, gravel/sand bars, and in-channel islands dominated by early successional herbs and annuals. The diverse array of patches is linked by underlying soils and the flooding regime. Dominant species include plains cottonwood (*Populus deltoides*) and willow (*Salix* spp.), western snowberry (*Symphoricarpos occidentalis*), switchgrass (*Panicum virgatum*), and saltgrass (*Distichlis spicata*). Saltcedar (*Tamarix* spp.), Russian olive (*Elaeagnus angustifolia*), kochia, and non-native grasses and thistles have invaded degraded areas within the floodplains, which are subjected to heavy grazing and/or agriculture. Areas with more intact hydrology can support wetland graminoids such as cordgrass (*Spartina* spp.) and Emory's sedge (*Carex emoryi*). Groundwater depletion and lack of fire have created additional alterations in species composition and hydroperiod. Nearly all native wet meadow communities are heavily impacted by irrigation and water management, and the majority of the remaining mesic to wet meadow floodplain are extremely degraded examples of this system. .... **Western Great Plains Floodplain**

8a. Herbaceous wetland systems including emergent marshes, wet meadows, fens, and narrow drainages set in the headwaters of eastern Colorado prairie streams and along small tributary drainages. Primary water sources include groundwater discharge or surface flow captured in local depressions within drainage networks. Wetland species dominate and vegetation patches include wet meadows at the headwaters of drainages, which can be expansive, and small to medium sized marshes along the drainage where groundwater discharge supplements surface runoff. Shrubs can also occur, including in fen patches and on spring-fed headwater slopes. If depressional, the system has an outlet and eventual connection to a drainage. Seasonal to semi-permanent at-surface saturation or flooding throughout the growing season is common, except in drought years. …….. ..... **Western Great Plains Wet Meadow and Marsh Drainage Network**

8b. Expansive herbaceous wetlands with standing water at or above the surface throughout the growing season, except in drought years. Water levels are often high at some point

during the growing season, but managed systems may be drawn down at any point depending on water management regimes. Vegetation typically dominated by species of cattail (*Typha*), bulrush (*Schoenoplectus*), sedge (*Carex*), spikerush (*Eleocharis*), and floating genera such as pondweed (*Potamogeton*), and arrowhead (*Sagittaria*). While this system is located on the floodplain, it may be disconnected from flooding regimes and the hydrology may be entirely managed. Water may be brackish or not. Soils are highly variable. This system includes a variety of managed wetlands on floodplains (e.g., recharge ponds, moist soil units, shallow gravel pits, etc.). ..... **Western North American Emergent Marsh**

Wetlands and Riparian Key B: Inter-Mountain Basins and Valleys

1a. Depressional wetlands. Soils are typically alkaline to saline clay with hardpans. Salt encrustation typically visible on the soil surface or along the water edge. Water levels various. Typically herbaceous dominated, but may contain salt-tolerant shrubs on the margins. Barren and sparsely vegetated playas (generally <10% plant cover). Salt crusts are common throughout, with small saltgrass beds in depressions and sparse shrubs around the margins. These systems are intermittently flooded. The water is prevented from percolating through the soil by an impermeable soil subhorizon and is left to evaporate. Soil salinity varies with soil moisture and greatly affects species composition. Characteristic species may include greasewood (*Sarcobatus vermiculatus*), saltgrass (*Distichlis spicata*), and/or saltbush (*Atriplex* spp.) ..... **Inter-Mountain Basins Playa**

1b. Non-depressional wetlands of flats, washes, or narrow drainage networks, including inter-dunal swales ..... **(2)**

2a. Non-depressional wetlands with alkaline to saline soils. Cover of vegetation variable, can be extremely sparse (<10% cover) or moderate to high (30–60% cover). Typically shrub dominated. Most common species are greasewood (*Sarcobatus vermiculatus*), and saltbush (*Atriplex* spp.) ..... **(3)**

2b. Herbaceous or shrub-dominated non-depressional wetlands or riparian areas not as above. ..... **Key C: Rocky Mountains and Western Valleys**

3a. Shrublands with >10% total vegetation cover, located on flats or in temporarily or intermittently flooded drainages. Vegetation dominated by greasewood (*Sarcobatus vermiculatus*) and saltbush (*Atriplex* spp.) with inclusions of alkali sacaton (*Sporobolus airoides*), western wheatgrass (*Pascopyrum smithii*), saltgrass (*Distichlis spicata*), Nuttall's alkaligrass (*Puccinellia nuttalliana*), and common spikerush (*Eleocharis palustris*) herbaceous vegetation. ..... **Inter-Mountain Basins Greasewood Flat**

3b. Sites with < 10% total vegetation cover and restricted to temporarily or intermittently flooded drainages with a variety of sparse or patchy vegetation including greasewood (*Sarcobatus vermiculatus*), rabbitbrush (*Ericameria nauseosa*), silver sagebrush (*Artemisia cana*), big sagebrush (*Artemisia tridentata*), saltgrass (*Distichlis spicata*), and alkali sacaton (*Sporobolus airoides*). ..... **Inter-Mountain Basins Wash**

INTRODUCTION

Wetlands and Riparian Key C: Rocky Mountains and Western Valleys

1a. Herbaceous wetlands associated with seeps and springs within canyons of the Colorado Plateau region, typically along drainages of the major rivers of the region and their tributaries. Vegetation is supported by perennial water sources (seeps) that form pocketed wetlands and draping vegetation across wet cliff faces. Typical plant species include southern maidenhair fern (*Adiantum capillus-veneris*), northern maidenhair fern (*Adiantum pedatum*), Eastwood's monkeyflower (*Mimulus eastwoodiae*), common large monkeyflower (*Mimulus guttatus*), Purpus' sullivantia (*Sullivantia hapemanii* var. *purpusii*), and several species of columbine, including Mancos columbine (*Aquilegia micrantha*). ..... **Colorado Plateau Hanging Garden**

1b. Wetlands not as above. Not associated with seeps and springs within canyons of the Colorado Plateau. ..... **(2)**

2a. Wetland defined by groundwater inflows and organic soil (peat) accumulation of at least 40 cm in the upper 80 cm. Vegetation can be woody or herbaceous. If the wetland occurs within a mosaic of non-peat forming wetland or riparian systems, then the patch must be at least 0.1 hectares (0.25 acres). If the wetland occurs as an isolated patch surrounded by upland, then there is no minimum size criteria. ..... **Rocky Mountain Subalpine-Montane Fen**

2b. Wetland does not have at least 40 cm of organic soil (peat) accumulation or occupies an area less than 0.1 hectares (0.25 acres) within a mosaic of other non-peat forming wetland or riparian systems. ..... **(3)**

3a. Total woody canopy cover generally 25% or more within the overall wetland/riparian area. Any purely herbaceous patches are less than 0.5 hectares and occur within a matrix of woody vegetation. [Note: Relictual woody vegetation such as standing dead trees and shrubs are included here]. ..... **(4)**

3b. Total woody canopy cover generally less than 25% within the overall wetland/riparian area. Any woody vegetation patches are less than 0.5 hectares and occur within a matrix of herbaceous wetland vegetation. ..... **(6)**

4a. Riparian woodlands and shrublands of the foothill and lower montane zones on both the east and west slopes of Colorado's Rocky Mountains. Woodlands are dominated by cottonwood species (*Populus angustifolia, P. deltoides,* or the hybrid *P. acuminata*). Common native shrub species include willows (*Salix* spp.), thinleaf alder (*Alnus incana*), river birch (*Betula occidentalis*), and redosier dogwood (*Cornus sericea*). Exotic shrub species include saltcedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*). Sites are most often associated with a stream channel, including ephemeral, intermittent, or perennial streams (Riverine HGM Class). This system can occur on slopes, lakeshores, or around ponds, where the vegetation is associated with groundwater discharge or a subsurface connection to lake or pond water, and may experience overland flow but no channel formation (Slope, Flat, Lacustrine, or Depressional HGM Classes). It is also typically found in backwater channels and other perennially wet but less scoured sites, such as floodplain swales and irrigation ditches. ..... **Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland**

4b. Riparian woodlands and shrublands of the montane or subalpine zone. ..... **(5)**

5a. Montane or subalpine riparian woodlands (canopy dominated by trees). This system occurs as a narrow streamside forest lining small, confined low- to mid-order streams. Common tree species include subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), blue spruce (*P. pungens*), or quaking aspen (*Populus tremuloides*). ..... **Rocky Mountain Subalpine-Montane Riparian Woodland**

5b. Montane or subalpine shrub wetlands (canopy dominated by shrubs with sparse or no tree cover). This system is most often associated with streams (Riverine HGM Class), occurring as either a narrow band of shrubs lining streambanks of steep V-shaped canyons or as a wide, extensive shrub stand on alluvial terraces in low-gradient valley bottoms (sometimes referred to as a shrub carr). Beaver activity is common within the wider occurrences. In addition, this system can occur around the edges of fens, lakes, seeps, and springs on slopes away from valley bottoms. This system can also occur within a mosaic of multiple shrub- and herb-dominated communities within snowmelt-fed basins. In all cases, vegetation is dominated by species of willow (*Salix*), alder (*Alnus*), or birch (*Betula*). ..... **Rocky Mountain Subalpine-Montane Riparian Shrubland**

6a. Herbaceous wetlands with a permanent water source throughout all or most of the year. Water is at or above the surface throughout the growing season, except in drought years. This system can occur around ponds, as fringes around lakes and along slow-moving streams and rivers. The vegetation is dominated by common emergent and floating leaved species including species of threesquare or bulrush (*Schoenoplectus*), cattail (*Typha*), rush (*Juncus*), sedge (*Carex*), pondweed (*Potamogeton*), knotweed (*Polygonum*), and pond-lily (*Nuphar*). ..... **Western North American Emergent Marsh**

6b. Herbaceous wetlands that typically lacks extensive standing water. Patches of emergent marsh vegetation and standing water are less than 0.1 ha in size and not the predominant vegetation. ..... **(7)**

7a. Herbaceous wetlands associated with a high water table or overland flow, but typically lacking standing water. Sites with no channel formation are typically associated with snowmelt or groundwater and not subjected to high disturbance events such as flooding (Slope HGM Class). Sites associated with a stream channel are more tightly connected to overbank flooding from the stream channel than with snowmelt and groundwater discharge and may be subjected to high disturbance events such as flooding (Riverine HGM Class). Vegetation is dominated by herbaceous species; typically graminoids have the highest canopy cover including sedges (*Carex* spp.), reedgrass (*Calamagrostis* spp.), and tufted hairgrass (*Deschampsia cespitosa*). ..... **Rocky Mountain Alpine-Montane Wet Meadow**

7b. Large herbaceous wetlands associated with a high water table that is controlled by artificial overland flow (irrigation). Sites typically lack prolonged standing water, but may have standing water early in the season if water levels are very high. Vegetation is dominated by native or non-native herbaceous species; graminoids have the highest canopy cover. Species composition may be dominated by non-native hay grasses. ..... **Irrigated Wet Meadow [Not an official Ecological System.]**