

Appendix 3

Field useable copy of the "*Spiranthes diluvialis* Habitat Monitoring Checklist"

Spiranthes diluvialis Habitat Monitoring Checklist

Direct Threats and Changes to Habitat	Attribute Type	Indicator or Surrogate Measured	"A" Transect Scale Indicator Values <i>Evaluation within each 5 x 5 m sample block; Recorded in Table "A" of Tally Sheet</i>	"B" Landscape Scale Indicator Values <i>Evaluation within a specified radius of the mid-point of transect; Recorded in Table "B" of Tally Sheet</i>
Hydrologic and Fluvial Geomorphic Change	1) Bank erosion (e.g., cut-banks, meander widening, flood scouring)	Distance (perpendicular) from nearest actively eroding river channel (marked at lower limit line of terrestrial vegetation) to mid-point of transect line (if 30 m or less).	Not measured	Measured distance, perpendicular from mid-point of transect to nearest active river channel. Describe erosion in comments.
	2) Deposition (e.g., recent sand, woody debris, or other alluvium)	Depth of recent alluvial deposits (e.g., unconsolidated silt, sand, gravel, cobble, or woody debris) deposited in the last 10 years (date estimated). Must be more than a trace present.	0=0 to 5 cm (trace amounts in block) 1=5 to 15 cm 2=16 or more cm	Not measured
	3) Loss of soil moisture at capillary fringe caused by river down-cutting and subsequent drop in water table	Total cover of all mesic graminoid species typically associated with <i>Spiranthes diluvialis</i> . These species include, but are not limited to: <i>Agrostis stolonifera</i> , <i>Carex lanuginosa</i> , <i>C. nebrascensis</i> , <i>Eleocharis palustris</i> , <i>Juncus balticus</i> , <i>J. ensifolius</i> , <i>Muhlenbergia</i> spp., <i>Phalaris arundinacea</i> , and <i>Poa pratensis</i> .	0=40% or more cover 1= 3 to 39% cover 2=less than 3% cover	Not measured
Invasive and Noxious Weeds	4) Invasion and colonization by noxious and invasive weedy species	Total cover of all highly invasive and noxious weed species typically associated with <i>Spiranthes diluvialis</i> . These species include, but are not limited to: <i>Agropyron repens</i> , <i>Bromus inermis</i> , <i>Carduus nutans</i> , <i>Centaurea diffusa</i> , <i>C. maculosa</i> , <i>Cirsium arvense</i> , <i>C. vulgare</i> , <i>Euphorbia esula</i> , <i>Phalaris arundinacea</i> , <i>Sonchus arvensis</i> , <i>Tanacetum vulgare</i> . Do not consider <i>Agrostis stolonifera</i> and <i>Poa pratensis</i> here. Indicate the species present in the comments.	0=zero 1=less than 10% cover 2=10% or more cover	0=none, or only widely scattered noxious weeds within 100 m radius; colonies not noticeable (only consider noxious weeds, don't include <i>Phalaris arundinacea</i>) 1=noxious weeds commonly scattered & noticeable; only small colonies, but no large colonies present 2=noxious weeds common & widespread, usually large colonies
Livestock Grazing Impacts	5) Hoof prints and scat piles	Number of obvious hoof prints and scat piles from this year.	0=ungrazed 1=less than 10 prints or scat piles 2=more than 10 prints or scat piles	Not measured
	6) Forage Utilization	Stubble height of graminoids (leaves, not inflorescences) in cm (estimated with ruler at center of each 5 x 5 m sample block)	0=over 10 cm or ungrazed 1=5 to 10 cm 2=less than 5 cm	Not measured
	7) Trails and bedding (e.g., trampled or missing vegetation)	Trampled vegetation and/or bare ground (soil and gravel, not generally rocks) obviously exposed by livestock trailing or bedding (if the area is ungrazed, then assume the cause is recreation). The number of trails and beds is measured.	0=ungrazed 1=one trail or bed with trampled vegetation, minimal bare ground 2=one or more trail or bed; or trail/bed with much bare soil	Not measured
Off-Highway Vehicle Use Impacts	8) Tracking and trailing through population areas	Number of recent track sets/trails through the sample block caused by OHVs (including, but not limited to, all-terrain vehicles, motorcycles, mountain bikes, and 4 x 4 vehicles). This doesn't include heavy equipment.	0=none 1=one track set 2=more than one track set	Within 100 m radius: 0=none visible 1=one to three track sets 2=more than three track sets

Direct Threats and Changes to Habitat	Attribute Type	Indicator or Surrogate Measured	"A" Transect Scale Indicator Values Evaluation within each 5 x 5 m sample block; Recorded in Table "A" of Tally Sheet	"B" Landscape Scale Indicator Values Evaluation within a specified radius of the mid-point of transect; Recorded in Table "B" of Tally Sheet
Recreation	9) Human trails	Number of obviously recent human foot trails through the sample block (can be difficult to distinguish from cattle trails).	0=none 1=one trail with trampled vegetation, minimal bare ground 2=more than one trail; or one trail with much bare soil	Within 100 m radius: 0=none 1=one to three trails visible 2=more than three trails
	10) Campsite impacts (e.g., tent sites, kitchens, fire rings, boat landings, or other activities) with trampled or missing vegetation, including wood cutting	Trampled vegetation and bare ground (soil and gravel, not generally rocks) obviously recently exposed by human recreation activities (including, but not limited to, tent sites, kitchens, campfire rings, wood cutting, and boat landings). The number of campsites impacts is measured.	0=zero impacts 1=one distinct campsite impact, with or w/out bare ground (trampled vegetation) 2=more than one campsite impact, or one camp impact with much bare soil exposed	Within 100 m radius: 0=no impacts (zero campsites & associated impacts) 1=one to two campsites, or associated impacts visible 2=more than two campsites, or associated impacts widespread and noticeable
Other Human Caused Ground Disturbance	11) Roads, houses, excavation, filling, heavy equipment use (e.g., blading, road building, etc.) firefighting, etc. present. Flood control activities not considered here (see "Alteration of Floodplain" section)	Bare ground (soil and gravel, not generally rocks) obviously recently exposed or deposited by human activities, or presence/absence in the landscape. The number of ground disturbing impacts is measured. Note type and extent in comments.	0=no sign 1=one distinct human impact 2=more than one	Within 400 m radius: 0=no impacts (zero impacts related to excavation, filling, and/or heavy equipment operation visible) 1=trace impacts visible (minimal or peripheral disturbance) 2=impacts noticeable (e.g., one or more)
Fire	12) Wildfire, human or naturally caused	Burn intensity of recent, noticeable burns. Look for charred stumps of trees and shrubs and blackened, ashy soil surface. Herbaceous growth can mask burns quickly in riparian settings.	0=unburned 1=light burn of herbaceous understory present; minimal impact to shrubs and no "sterilized" soil 2=heavy burning of herbaceous understory and/or woody overstory	Within 100 m radius: 0=unburned 1=majority of the area burned is a light burn of herbaceous understory with minimal impact to woody vegetation 2=majority of area is heavily burned, woody vegetation & herbaceous layer mostly removed
Confirmed Direct Loss of <i>Spiranthes diluvialis</i> Individuals	13) Herbicide spraying, human harvest, disease, or other mortality causes	Dead <i>Spiranthes diluvialis</i> are difficult, or impossible, to observe; the cause of death may be unknown. Herbicide spraying is the most obvious cause. Note any mortality in "comments."	0=no mortality 1=up to 3% of herbaceous cover sprayed with herbicides 2=more than 3% of herb cover sprayed	Not measured
Wildlife Activity	14) Ungulate bedding, trampling, trails, grazing, and shrub browsing; beaver wood cutting and piling.	Wildlife trampling, trailing, bedding, and grazing is most noticeable in areas ungrazed by livestock. The number of wildlife trails and beds and the amount of browsing are measured. Note wildlife species (if known) in comments.	0=no noticeable wildlife use; trace shrub browsing may be evident 1=one to two wildlife beds and/or trails visible with trampled vegetation and/or bare ground; moderate browsing 2=more than two trails and/or beds; trampling & grazing is heavy; heavy browsing	Not measured

Indirect Threats and Changes to Habitat	Attribute Types	Indicator or Surrogate Measured	"A" Evaluation within each 5 x 5 m sample block; Recorded in Table "A" (Transect Scale)	"B" Evaluation within a specified radius of the mid-point of transect; Recorded in Table "B" (Landscape Scale)
Vegetation Succession	15) Competition by tall or invasive forbs (other than noxious weeds)	Total cover of all forb species in the sample block, other than noxious weeds (but including other weedy spp.) and <i>Equisetum</i> spp. (<i>Equisetum</i> spp. are often associated with <i>Spiranthes diluvialis</i> and do not pose a long-term detrimental competitive threat).	0=less than 30% total cover 1=30 to 50% cover 2=over 50% cover	Not measured
	16) Competition by shrubs and trees	Total cover of all woody species (individuals do not have to be rooted within the sample block), including all shrubs and <i>Populus angustifolia</i> (or other tree species).	0=less than 1% cover 1= 1 to 10% cover 2=more than 10% cover	Not measured
Alteration of Floodplain	17) Levees, rip-rapping, culverts, bridges, causeways, diversions, or other development that alters the hydrology or fluvial geomorphology of the river	Number of floodplain alterations within the landscape.	Not measured	Within 400 m radius: 0=none present 1=one alteration causing minimal impact to river flow within floodplain 2=more than one alteration, or a single large one causing noticeable alteration
<i>Spiranthes diluvialis</i> Conservation Information				
Population Information	18) Population tally	Is <i>Spiranthes diluvialis</i> present?	0=25 or more plants 1=11 to 24 plants 2=1 to 10 plants 3=0 plants	Not measured
	19) Exclosures, fences, or other measures (including biocontrol insects on noxious weeds) present that protect <i>Spiranthes diluvialis</i> from livestock, OHVs, weeds, recreation, or other potential impacts	Presence or absence along and adjacent to transect and the effectiveness of the protective measure.	Not measured	Within 100 m radius: 0=exclosure or other measure present protecting the majority of the sub-population; biocontrol insects effectively controlling noxious weeds 1=exclosure or other measure present but does not protect the majority of the sub-population (impacts not fully excluded); noxious weed biocontrol insects released, but are not yet effective 2=no exclosures or other measures present

Appendix 4

Field useable copy of the "*Spiranthes diluvialis* Habitat Monitoring Tally Sheet"

***Spiranthes diluvialis* Habitat Monitoring Tally Sheet**

Date _____ Observer(s) _____
 Element Occurrence # _____ Transect A B C (circle one) Element Occurrence Name _____

Table "A"

Attribute Types at the Transect Scale		2.5 m		7.5 m		12.5 m		17.5 m		22.5 m		27.5 m		32.5 m		37.5 m		42.5 m		47.5 m	
		L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R	L	R
Direct Changes/Threats																					
Hydrologic and Fluvial Geomorphic Change	2) Deposition																				
	3) Loss of soil moisture																				
Invasive & Noxious Weeds	4) Invasion & colonization by weedy species																				
Livestock Grazing Impacts	5) Hoof prints & scat piles																				
	6) Forage utilization																				
	7) Trails & bedding																				
Off-Highway Vehicle Use	8) Tracking & trailing																				
Recreation	9) Human trails																				
	10) Campsite impacts																				
Other Human Caused Ground Disturbance	11) Roads, houses, excavation, filling, heavy equipment, firefighting, etc.																				
Fire	12) Wildfire, human or natural																				
Confirmed Mortality	13) Herbicide spraying or other mortality																				
Wildlife Activity	14) Ungulate bedding, trampling, trails, browsing, etc.; beaver activity																				
Indirect Changes/Threats																					
Vegetation Succession	15) Competition by tall or invasive forbs																				
	16) Competition by shrubs & trees																				
Conservation Information																					
Population Information	18) Population tally																				

Comments (before each write attribute type and sample block (#, L or R) to which it refers):

Table "B" on back ...

Table "B"

Attribute Types at the Landscape Scale		Measured at Mid-point of Transect	Comments
Direct Changes/Threats			
Hydrologic and Fluvial Geomorphic Change	1) Bank erosion		
Invasive & Noxious Weeds	4) Invasion and colonization by noxious and invasive weedy species		
Off-Highway Vehicle Use	8) Tracking and trailing		
Recreation	9) Human trails		
	10) Campsite impacts		
Other Human Caused Ground Disturbance	11) Roads, houses, excavation, filling, heavy equipment, firefighting, etc.		
Fire	12) Wildfire, human or naturally caused		
Indirect Changes			
Alteration of Floodplain	17) Levees, rip-rapping, culverts, bridges, causeways, diversions, other development		
Conservation Information			
Population Information	19) Enclosures, fences, biocontrol, or other protective measures		

Additional comments (before each write attribute type (#) and sample block (#, L or R) to which it refers):