A Prospectus for Aurora Water's Hayden Ranch River Parcel Mitigation Bank

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List of Acronyms and Abbreviations

Ac.: *Acre*

BEI: Bank Enabling Instrument

CDOT: Colorado Department of Transportation

Corps: U.S. Army Corps of Engineers

CPW: Colorado Parks and Wildlife

Headwaters Bank: *The City of Aurora, Colorado's* Headwaters Umbrella Mitigation Bank

HUC: Hydrologic Unit Code

IRT: Interagency Review Team

NEPA: National Environmental Policy Act

NWO: Omaha District of the Corps' Northwest Division

SPA: Albuquerque District of the Corps' South Pacific Division

SPK: Sacramento District of the Corps' South Pacific Division

Sponsor: Aurora Water, Colorado

Definitions

1. AURORA HEADWATERS BANK – An umbrella mitigation bank covering portions of the South Platte, Arkansas, and Colorado River basins.
2. BANK SPONSOR: Any public or private entity responsible for establishing, and, in most circumstances, operating a mitigation bank. In the case of the Headwaters Bank, the sponsor is the City of Aurora.
3. BANK ENABLING INSTRUMENT (BEI): means the legal document for the establishment, operation, and use of a mitigation bank (aka, The Mitigation Banking Instrument).
4. BUFFER: means an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses.
5. COMPENSATORY MITIGATION: the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.
6. CREDIT: means a unit of measure (e.g., a functional or areal measure or other suitable metric) representing the accrual or attainment of aquatic functions at a compensatory mitigation site. The measure of aquatic functions is based on the resources restored, established, enhanced, or preserved.
7. DEBIT: means a unit of measure (e.g., a functional or areal measure or other suitable metric) representing the loss of aquatic functions at an impact or project site. The measure of aquatic functions is based on the resources impacted by the authorized activity.
8. ENHANCEMENT: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.
9. ESTABLISHMENT (A.K.A, CREATION): The manipulation of physical, chemical, or biological characteristics to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

10. FINANCIAL ASSURANCES: Assurances that may be requested by the Corps to ensure compensatory mitigation is in full compliance with performance standards. Assurances may include, but are not limited to, performance bonds, escrow accounts, letters of credits, etc.
11. LONG-TERM STEWARD: The title holder of the mitigation site property who is responsible for the ownership and long-term management of the wetlands and/or other aquatic resources.
12. MITIGATION PLAN: Document describing the specific approach to effecting ecological improvements during a mitigation project at a mitigation site. The mitigation plan addresses the 13 points described in 33 CFR 332.4(c) and includes the mitigation work plan.
13. MITIGATION SITE: A physical location where wetlands and/or other aquatic resources are restored, created, enhanced or, in exceptional circumstances, preserved expressly for the purpose of providing compensatory mitigation.
14. MITIGATION WORK PLAN: Detailed written specifications and work descriptions for the compensatory mitigation project, including, but not limited to, the geographic boundaries of the project; construction methods, timing, and sequence; source(s) of water, including connections to existing waters and uplands; methods for establishing the desired plant community; plans to control invasive plant species; the proposed grading plan, including elevations and slopes of the substrate; soil management; and erosion control measures. For stream compensatory mitigation projects, the mitigation work plan may also include other relevant information, such as planform geometry, channel form (e.g., typical channel cross-sections), watershed size, design discharge, and riparian area plantings.
15. INTERAGENCY REVIEW TEAM (IRT): means an interagency group of federal, tribal, state, and/or local regulatory and resource agency representatives that reviews documentation for, and advises the district engineer on, the establishment and management of a mitigation bank or an in-lieu fee program.
16. PRESERVATION: means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.
17. PROSPECTUS: A standalone document that provides a summary of the information regarding the proposed mitigation bank or in-lieu fee program, at a sufficient level of detail to support informed public and IRT comment.
18. RE-ESTABLISHMENT: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.
19. REHABILITATION: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.
20. RESTORATION the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: **re-establishment** and **rehabilitation**.

Bank Administration & Operation

Introduction

This document is a prospectus for the initial mitigation site in Aurora Water's ("Sponsor") Headwaters umbrella mitigation bank ("Headwaters Bank"). This prospectus describes how a mitigation bank site at the River Parcel of the Hayden Ranch will be established, operated, and administered. It also summarizes the pre-mitigation character and condition of the site and the treatments prescribed to improve the ecological functioning of its floodplain wetland and riparian habitats. This prospectus limits its specific consideration to mitigation at Hayden Ranch River Parcel, while acknowledging that additional mitigation projects may be carried out by the Sponsor elsewhere on the Hayden Ranch in the future. Therefore, this mitigation bank is named the Hayden Bank (or "Bank"), and this prospectus describes the first phase of restoration at its river parcel. Future phases of the Hayden Bank, if they should occur, would be established, operated and administered in a similar manner as is described in this prospectus.

This prospectus follows an umbrella banking plan developed for the Headwaters Bank, whose earlier draft was thoroughly reviewed by all three US Army Corps of Engineer ("Corps") districts (Albuquerque, Omaha, and Sacramento) and the Interagency Review Team (IRT). This prospectus is an adaptation of the South Pacific Division's mitigation banking prospectus checklist to Colorado and the circumstances of umbrella banking.

The purpose of the Hayden Bank is to provide compensatory mitigation for unavoidable impacts to non-tidal wetlands and streams within the Bank's service area as authorized under Section 404 of the Clean Water Act and to ensure that mitigation planning is consistent with the requirements of the 2008 Rule (33 CFR Part 325 & 332). Mitigation credits developed by the Bank may also serve to fulfill the requirements of other policies and laws including, but not limited, to the National Environmental Policy Act (NEPA) and the State of Colorado Fish and Wildlife mitigation policy (§37-60-122.2 Colorado Revised Statute). Utilization of completed mitigation for purposes other than §404 CWA mitigation will be authorized by appropriate regulating agencies on a case-by-case basis. Aurora Water understands that completion of mitigation under this umbrella instrument carries with it no assurance that future permits for regulated actions will be granted.

The Hayden Bank will be for the sole use of the Sponsor. It will provide Aurora Water with a means of carrying out long-term strategic planning related to water supply development. The Hayden Bank will provide the City of Aurora with high quality, functioning mitigation wetlands that can be utilized to offset unavoidable wetland or stream impacts, using the federally-preferred compensatory mitigation option. The Hayden Bank, along with other sites that may be added under the umbrella, will allow Aurora Water to minimize or eliminate the temporal impacts of potential future projects.

The goal of the mitigation is to re-establish and re-habilitate severely degraded riverine wetlands and associated upland buffers in the floodplain of the Arkansas River. Wetland and riparian

habitats in the floodplain have suffered greatly as the result of isolation from overbank flows and chemical contamination by mine tailings. US EPA Super Fund operations physically and chemically stabilized the tailings in place and seeded a cover species of grass. The Hayden Bank site and surroundings have all been released from Super Fund jurisdiction and have been removed from the federal priority list.

The EPA efforts were focused solely on addressing the deposited tailings, leaving the floodplain disconnected from the river which historically had supported its wetlands. Moreover, the massive haul roads used in soil remediation remained on the site further isolating historical wetland habitats from their water source.

The derelict beaver pond complex habitats of the Hayden Bank site formerly provided important aquatic life support functions, by lending stability to the Arkansas River channel, providing fish nursery habitat in the form of backwaters and the organic material that forms the base of the aquatic food chain, along with a host of other functions. It appears highly feasible to restore impaired wetlands at the Hayden Bank to a generally high level of functioning through implementation of minimally-invasive treatments. Restoration of functioning to the Hayden Bank's wetlands would provide critically important ecosystem support to the Arkansas River aquatic habitat, which has recently been added to the State's list of "Gold Medal Fisheries" by Colorado Parks and Wildlife (CPW). The Hayden Ranch River Parcel in which in the Bank is located, is currently open to the public for passive recreation, particularly sport fishing.

1 *Proposed mitigation bank name*

THE CITY OF AURORA'S HAYDEN RIVER PARCEL MITIGATION BANK ("Hayden Bank")

2 *Bank Applicant and Contact information*

Bank Applicant: CITY OF AURORA

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3 *Location Map (Fig. 1)*

The Hayden Bank will be located on Aurora Water's 370 ac. Hayden Ranch River Parcels located approximately nine miles south of Leadville, CO. Figure 1 provides a vicinity map showing the location of the Bank relative to Leadville and other features.

4 *Site Map (Fig. 2)*

5 *Aerial Photograph (Fig. 3)*

6 *Mitigation bank establishment and operation*

The Hayden Bank is intended to serve the sole needs of Aurora Water, which may use its mitigation credits to offset impacts resulting from infrastructure development, operation, maintenance, or expansion, or other needs of Aurora Water as identified. The Hayden Bank will be the initial mitigation site of Aurora Water's Umbrella Mitigation Bank.

The Hayden Ranch was purchased in in 1998 by The City of Aurora. Most of the historical ranch has been donated or exchanged to different entities including the US Bureau of Land Management (BLM) and Colorado Mountain College; however, five parcels along the Arkansas River were retained by Aurora for the expressed purpose of improving the aquatic habitats present with the aim of generating mitigation credits.

Baseline monitoring and characterization of habitats began in 2012. Improvement of the Hayden Bank's wetland habitats commenced in the fall of 2013 with the removal of the cross-floodplain haul roads. Additional improvements in the form of connecting channels, small artificial beaver dams and aggressive willow planting are scheduled for the spring of 2015. Implementation of mitigation will be entirely funded by Aurora Water, subject to appropriation of the City of Aurora's Annual Budget. After construction, performance monitoring and interim management will be conducted by Aurora Water and its consultants and will continue through the establishment period, which will be a minimum of five years, or until performance standards are achieved. Interim management measures will include site monitoring, water and vegetation management as needed, and removal of incidental garbage or trash. Aurora Water intends to be the long-term manager of the Hayden Bank Property, however, it

reserves the right to transfer this responsibility to an appropriate entity approved by the Corps. Long-term management will be funded by an annual allocation assigned in Aurora Water's operational budget, and long-term management will be funded in perpetuity, with the amount and distribution of funding following an approved long-term management plan included in the Bank Enabling Instrument, subject to appropriation of the City of Aurora's Annual Budget. Long-term maintenance and management needs (beyond the required monitoring period) will be determined according to the circumstances as they develop at the mitigation site, the requirements 33 CFR 332.7(d), and decisions of the District Engineer. Monitoring and maintenance activities will be reported per the requirements of 33 CFR 332.8 (q)(3).

Mitigation treatments are designed to restore historical wetlands in the bank area. If stream flow depletions exceed the historical wetland depletions, Aurora Water has sufficient water rights and infrastructure in place to compensate for those excess depletions.

The City of Aurora shall record a restrictive covenant, conservation easement, deed restriction or similar device on the Hayden Bank site subject to the approval of City Council in favor of a neutral third party, and provide a copy to the Interagency Review Team (IRT) in accordance with 40 CFR 230.97 (a). A copy of the recorded document shall be provided to the Corps within 30 days of recordation.

7 *Qualifications of the Sponsor*

The City of Aurora's drinking water supply comes from surface water collection systems in three major river basins – the South Platte, the Colorado, and the Arkansas. This diverse water source portfolio is an asset to Aurora and requires Aurora Water to monitor and assess the watershed health of vast sections of Colorado's forested lands. Healthy watersheds are needed to provide high quality water, and are essential to overall water supply quantity. Wetlands are an important component of these watersheds.

The City of Aurora, acting by and through its Utility Enterprise, Aurora Water, has entered into a number of agreements with United States Government Entities, State and Local Governments and Non-governmental Organizations (NGO's) for various long-term projects to improve forest health and promote environmental health and protection. For example, in the past three years Aurora Water has executed multi-year agreements with the Pike-San Isabel National Forest, The Rocky Mountain Region (Region 2) of the US Forest Service, and the National Forest Foundation to improve forest health, conduct environmental studies and to restore valuable riparian areas damaged in the Hayman Fire. By further example, Aurora Water has entered into many long-term cooperative agreements with other entities including The U.S. Bureau of Reclamation, Denver Water, Colorado Springs Utilities, Pueblo Board of Water Works, Eagle County, Eagle Water and Sanitation District, Southeastern Colorado Water Conservancy District. Aurora Water staff has the experience to negotiate, implement, and manage multi-year, multi-million dollar agreements.

The consultants planning, designing and overseeing mitigation have extensive experience and expertise in ecological restoration, functional assessment and Section 404 Clean Water Act mitigation.

8 *Approved Jurisdictional Determination (JD)*

Wetland boundaries are shown in Fig. 4. The wetland boundary delineation report and JD are included as Attachment 1.

9 *Preliminary biological resource survey*

9.1 Historical Conditions

The habitats of the Hayden Bank site are, or historically were, riverine wetlands adjacent to the main Arkansas River channel. The site's mosaic of palustrine emergent and shrub-scrub vegetation, its relict beaver-created features such as channels and dams, and the expanses of dried organic soil mats up to nearly 10 cm thick indicate that the site was historically much wetter than it is now. These attributes convincingly demonstrate that historically the floodplain was dotted with beaver ponds interconnected by small distributary channels. Highly functioning or reference standard examples of this habitat type of habitat are found specifically in the greater Arkansas valley, as well as the central Colorado Mountains in general.

The connection of the river to its floodplain habitats is the fundamental ecological forcing factor driving the spectrum of wetland and aquatic functions. A connected floodplain spreads the flow of the river, particularly at high flows, thereby reducing the effective energy of floodwaters and is also of critical importance to the maintenance of channel stability. Floodplain ponds, channels and backwaters provide critical fisheries habitat, particularly in the form of nurseries, and in large they fuel the aquatic food chain by providing the bulk of the organic matter eaten by macroinvertebrates, which in turn feed fish populations.

In addition to creating open water habitat, functioning beaver dams elevate the water table across the floodplain and as such they are primary drivers of wetland conditions on the floodplain. Ponds and the network of distributary channels which feed them, are the natural infrastructure that enables the function of floodplain water storage. The wetlands at the surface are the outward manifestation of floodplain water storage, therefore, this function is of fundamental importance to the ecological character and health of riverine habitats along the Arkansas River. The wetlands in return support the connected river habitat by tempering the strongly snow-melt driven hydrograph by releasing water slowly throughout the summer. This helps sustain healthy base flows, which are essential to supporting aquatic habitat, among other things. Water storage is also of fundamental importance to the maintenance of a healthy hyporheic zone in the floodplain's cobbly substrate. The hyporheic zone is extremely important to overall stream health, supporting fish and macroinvertebrate populations and influencing everything from biogeochemical cycling to stream water temperature.

Healthy, functioning floodplain habitats in the Arkansas River headwaters support thriving willow-dominated vegetation. The robust root structure of willows and their underlying, deep-rooted graminoid sward are the primary means by which unconfined mountain rivers maintain their geomorphic stability. Willows are particularly important along this reach of the Arkansas River since the channel tends strongly toward instability due to the effects of mining and, less so, agriculture.

9.2 Current functions and services of aquatic resources

The Functional Assessment of Colorado Wetlands (FACWet) 3.0 method was used to assess and describe the baseline functional condition of the Bank's habitats (Johnson, Beardsley and Doran 2010). FACWet is commonly thought of as a rapid assessment method. While it can be used as such, FACWet can use observational and intensively collected quantitative data equally to inform and support variable scores. As such, the method's structure serves to efficiently develop a concise and informative picture of causes and effects of functional impairment. This baseline assessment was initiated at the start of the Hayden Bank's monitoring program in 2012 and it is informed by two seasons of quantitative data and observations.

Table 1 lists FACWet variables and the score and letter grade assigned to each. The rationale for each score is provided in the third column. This FACWet evaluation considers the functional condition of wetlands across the Hayden Bank as a whole to provide an overview description. For crediting purposes, a finer resolution FACWet analysis was performed as explained in Section 12d.

The poor habitat conditions found throughout most of the floodplain are obvious. Four primary stressors were identified during the baseline ecological assessment of the Hayden Bank's habitats: 1) the floodplain's connection to the Arkansas River has been impaired by geomorphological changes in the channel caused by historical mining activity; 2) the floodplain was transected by seven haul roads used to treat tailings deposited on the floodplain; 3) critical surface water distributaries were blocked; and 4) the whole area has been variously affected by metals-laden mine tailings (Fig. 5). Together these stressors combined to make the floodplain inhospitable to beaver and their ponds, which nurtured the wetlands. The floodplain is now largely dewatered and wetlands are essentially confined to the deep swales, which come near to or reach the water table.

The conditions at the Hayden Bank precluded the performance of most functions associated with riverine wetlands or those functions are being performed at only highly impaired levels. Considering the seven functions highlighted in FACWet, the site's capacity to support the Arkansas River fishery is nearly extinguished. The wildlife habitat value of the Hayden Bank is also greatly diminished. For animals such as beaver, waterfowl and amphibians the vast majority of the floodplain habitats have been rendered non-viable. For elk and deer, on the other hand, the floodplain still provides habitat, but of comparatively poor quality.

The flood attenuation function of the Hayden Bank's wetlands has been greatly degraded by their increased isolation from the main stem of the Arkansas River. Isolation from overbank flows in conjunction with the loss of beaver has resulted in a marked degradation in the short- and long-term water storage function of the floodplain habitats, as well as their ability to positively influence water

chemistry. Isolation from overbank flows, widespread loss of willows and beaver, and the general decline of strongly rooted wetland graminoid species have likewise damaged the ability of habitats to retain sediment and successfully stabilize the rapidly meandering channel. Finally, the floodplain isolation along with the construction of the roads and widespread vegetation impacts have greatly reduced the site's capacity for material export and food chain support.

Table 1. Summary of the Hayden Bank's FACWet assessment findings.

Variable Name	Variable Rating	Rationale (Primary Stressors)
Habitat Connectivity	0.89 (B+)	AA is in rural landscape that has seen some loss of wetlands and riparian habitat. Connectivity near the river is only interrupted by a few primitive roads. Hwy 24 poses a barrier to east-west migration and movement.
Contributing Area	0.67 (D)	Surrounding land use is managed as natural habitat for passive recreation, predominately fishing, but much of the area surrounding the bank is a freshly recovering US EPA Super Fund remediation site.
Water Source	0.63 (D)	Geomorphic impacts and flow management of Arkansas River have caused a dramatic reduction in site flooding, which has probably happened in only 28 – 43% of the years in the 14-year gauge record. Only one well has documented wetland hydrology during one year (2013).
Water Distribution	0.58 (F)	The eight haul roads spanning the floodplain formed a series of substantial dams that completely blocked surface water near the head of the mitigation site.
Water Outflow	0.58 (F)	Impacts to the water source and distribution essentially preclude characteristic hydrologic outflow from the site.
Geomorphology	0.78 (C+)	Substantial road beds covered 1.4 ac of the site, and mine tailings cover another 0.4 ac for a total of 6% of the site area. The remainder of the site's geomorphology is in excellent condition.
Chemical Environment	0.62 (D)	Hayden Bank site is adjacent to extensive mine tailings deposited in near-channel portions of the floodplain. Tailings have been geochemically stabilized by US EPA and remain in place. This phase of mitigation purposefully avoids tailings to the extent possible. Throughout most of the Hayden Bank site, vegetation does not appear to be metals stressed. Alteration of the soil redox potential is a major stressor on Hayden Bank's habitat, resulting in the oxidation of organic mats and other impacts.
Vegetation Structure and Complexity	0.63 (D)	The vegetation on Hayden Bank is generally extremely water stressed and widespread decadence or total loss of the willow canopy is common. 74% of vegetation plots had hydrophytic vegetation, but in most cases this was because of the persistence of arctic rush, shrubby cinquefoil and/or willows. Plots generally lacked a characteristic level of herbaceous vegetation cover and species diversity.
Composite Score (FCI)	**0.65 (D)**	Site holds a gradient of wetland conditions from highly functioning at its top to non-functional throughout much of the remainder site. Overall Hayden Bank's habitats are functionally impaired.

9.3 Inventory of biological resources

Baseline vegetation structure and composition was characterized in 2012 in 13 permanent sample plots and eight cross-floodplain transects (Fig. 6). Attachment 2 provides a list of species found in study plots along with their life form, wetland indicator status, common synonym, average percent coverage across all plots, and the rank of the species in terms of its average cover as compared with all other species.

Multivariate and cluster analysis parsed out five distinct types of vegetation at Hayden Bank's vegetation sample plots in 2012. One additional vegetation type was recognized based on its topographical position in swales, and two other vegetation types, identified by transects, were also added to the list. These eight vegetation types were mapped using a combination of vegetation plot and transect data and aerial photograph interpretation (Fig. 7).

Table 2. A description of vegetation types mapped at the Hayden Bank.

Status	Vegetation Type	Description
Wetland	Wet Riparian Scrub-shrub	Generally occurring where active connection to the river still exists. Vegetation is dominated by tall willow species, most commonly *Salix geyeriana*. The understory is dominated by graminoids, most commonly *Deschampsia cespitosa, Juncus balticus, Carex aquatilis,* and *Calamagrostis* spp., along with the low-statured willow *S. brachycarpa.*
	Wet Swale	Wet habitat dominated by the graminoid species listed above. Located in the elongated natural troughs that form the water distributary network across the floodplain. Swales are mainly wet from alluvial ground water, but may also flood during high flows.
	Wet Riparian Meadow	Similar to the above, but drier and located out of swales. Shrubby cinquefoil (*Dasiphora floribunda*) is common in patches and *S. brachycarpa* is present as scattered individuals.
Upland	Upland Riparian Meadow	Vegetation structure similar to that of wet riparian meadow, but with a prevalence of FACU and upland species, particularly fringed sage and scattered sagebrush (*Artemisia* spp.).
	Dry Cinquefoil/declining Willows	This vegetation has an open canopy of dead or declining willows and an understory of shrubby cinquefoil and *J. balticus.* Oxidizing organic layers several inches think are common here.
	Relict Beaver Complex	Tall-willow habitat that has been dewatered and is in decline, but wherein willows roots are still able to access the water table to varying degrees. Generally lacking shrubby cinquefoil, the understory is mainly dominated by *Juncus balticus, Muhlenbergia richardsonis* and FACU *Poa* spp.
	Decadent Tall-willow	These areas house the remains of dead or nearly dead willows commonly rooted in a layer of dried and cracked organic soil. The understory tends to be very sparse and comprised mainly of *J. balticus* and *M. richardsonis.*

9.4 Past and present land uses

From the time it was homesteaded in the 1800's until the early 2000s, the Hayden Ranch was a working ranch, with land uses typical of mountain agricultural settings. The primary known use of the floodplain area, where the Hayden Bank is sited, was for grazing. Grazing was removed in or around 2001. The portion of the historical ranch property included in the Hayden Bank does not appear to have been hayed, nor did widespread willow removal occur there as part of ranch operations. There is no evidence that the floodplain has been actively irrigated, although portions of the high terrace and plains east of Hayden Bank were irrigated and hayed up until about 2001. The floodplain in Hayden Bank may have received some return flow from irrigation on the terrace, but the amount appears trivial.

Presently the Hayden Ranch River Parcels where Hayden Bank is located is open to public access, mainly for passive recreation and the site is managed cooperatively with CPW.

10 *Map of the proposed bank service area (Fig. 8)*

The intersection of a U.S. Geological Survey 8-digit Hydrologic Unit Code Sub-basin (HUC 8 – Arkansas Headwaters) and a USDA Level 3 Ecoregion (Southern Rocky Mountains; Omernick 1995) was used to form the Hayden Bank service area. This is the most common way to size service areas across the country according to Womble and Doyle 2010. The entire Arkansas Headwater HUC 8 falls within the Southern Rocky Mountain Level 3 Ecoregion, thus the Hayden Bank Service area equates to the Arkansas Headwaters sub-basin.

11 *Other conserved lands in the vicinity of the Bank*

The Hayden Bank is situated in a rural landscape with a high proportion of public lands held by US Bureau of Land Management (BLM) and Colorado Parks and Wildlife (CPW). The property forms an important link in the Arkansas River riparian corridor that has long reaches of intact habitat broken by dysfunctional reaches such as those exemplified in Hayden Ranch. As such, restoration and rehabilitation of Hayden Bank's riverine wetlands will have disproportionately large ecological benefits because it will simultaneously improve ecosystem functioning at both the site and watershed scales.

12 *Ecological Objectives and Conceptual Plan*

Table 3 provides a summary of the Hayden Bank's ecological objectives and conceptual plan. The sections following the table provide expanded information on specific topics as required in the SPD mitigation banking checklist.

Table 3. A summary of the stressors affecting FACWet variables at the Hayden Bank followed by the treatments and designs targets aimed at remediating them. Monitoring protocols documenting mitigation performance are provided in the right-most column.

	Variable Name	Stressor(s)	Treatments and Design Targets	Monitoring Protocols
Buffer-Landscape Context	Habitat Connectivity	• Unpaved roads and CO Hwy 24 • Fences • Artificially open habitats	• Maintain or improve ranch management practices. • Work with agencies and private landowners to maintain or improve adjacent lands	• No formal monitoring protocols
	Contributing Area	• Mine tailings • Passive Recreation • Agriculture	• As above • Phase 2 of the bank may address areas of adjacent tailings	
Hydrology	Water Source	• Induced isolation from channel surface water • Flow management	• Reconnect floodplain to river by constructing a passively functioning ingress channel replicating nearby reference examples	• 14 data-logging groundwater wells installed throughout the floodplain • Site inspections throughout the growing seasons of the monitoring period
	Water Distribution	• 8 haul roads constructed across floodplain • Lack of active beaver ponds	• Remove haul roads • Connect natural distributary channels as needed • Check flow in distributaries to re-induce down-floodplain flow • Create "beaver starter" ponds and re-establish physical conditions capable of supporting beaver populations	
	Water Outflow	• Impacted water source and distribution of water through the wetland	• Allow water to passively return to the Arkansas R. at the bottom of the bank site	
Abiotic and Biotic Habitat	Geomorph.	• Haul Roads	• Remove haul roads • Repair surface topography (distributaries) as needed	• Hydrologic monitoring protocols will be used to gauge the efficacy of topographic improvements
	Soil and water chem	• In situ chemically stabilized mine tailings • Widespread oxidized soil environment	• Re-establish a characteristic	• Nests of IRIS tubes will be placed at wells to confirm chemically reduced soil conditions
	Vegetation Structure and Complexity	• Water stress • Chemical stress	• Re-establish the hydrologic conditions capable of supporting healthy riverine wetland habitat. • Planting approximately 4000 rooted willow starts • Seed road beds with native riparian grasses.	• 31 permanent monitoring plots • 8 cross-sectional vegetation transects • Planted willow tracking

12.1 Ecological Objectives and Design Targets

The goal of mitigation treatments is to return the floodplain wetland and riparian habitats to a generally highly functioning condition that can sustain itself with minimal human intervention. In the case of the Hayden Bank's habitats this means, (1) creating a passively maintained water source for the wetlands to be restored by reconnecting the floodplain to the main Arkansas R. channel, (2) removing the elevated cross-floodplain haul roads, (3) stitching together the severed network of distributary channels, and (4) initiating willow canopy re-establishment and facilitating beaver re-colonization through intensive and extensive willow planting.

12.2 Conceptual Plan

The mitigation plan includes reconnecting the Arkansas R. with its floodplain via the creation of a small ingress channel leading from a backwater to the upper pond of the Bank (Fig. 9). Through the ingress water will be able to access the floodplain's existing network of water distributaries.

The feasibility of distributing water across and along the flood plain had to be evaluated to determine the viability of proposed treatments. The topography of the floodplain is subtle enough that the behavior of surface water could not be reliably predicted or modeled. The only way to determine mitigation feasibility was to remove the haul roads, allow any overbank flows to migrate down the floodplain and identify where connections or blockages are required to facilitate hydrologic restoration.

The haul roads were removed in the fall of 2013 to preempt the 2014 flood cycle under a NWP 27 (SPA-2013-00426-SCO). In the spring of 2014, overbank flows entered the bank at approximately 1000 cfs and floodwater patterns were closely observed. From these observations the conceptual plan for reparation of the water distribution system was created (Fig. 9). Reparation of the hydrologic system is scheduled for the spring of 2015.

Simultaneously with hydrology repair, approximately 4000 rooted willows will be planted throughout the site. Planting density will vary depending on the habitat and need. Figure 9 presents an approximation of the willow planting plan, with planting densities based on mapped habitat types and a random distribution of willows within habitat patches. Numerous whole willows will also be transplanted throughout the Bank, particularly on the remediated road beds.

12.3 Ecological suitability of the site

The Hayden Bank is an ideal mitigation site. Hydrologic stressors are well defined and they can be mitigated to a high degree and with relatively low risk. The water source of the historic wetlands can be re-established through minimally invasive means that will yield passively functioning wetland and riparian habitat. The viability of Hayden Bank's hydrologic design, which utilizes relict habitat features, was tested in a controlled fashion during 2014 flood period. Finally, waters reintroduced to the Hayden Bank's floodplain distributary network will passively return to the main channel of the Arkansas R. through natural flow paths at the bottom of the site.

Native wetland vegetation still exists throughout the majority of the site – even if it is commonly sparse, and a viable seedbank of wetland plants likely exists in even the driest areas. Natural seed sources also surround the Hayden Bank site. All of these site characteristics strongly favor a more rapid recovery.

Any natural area that receives frequent human visitation and usage must be maintained in order to sustain habitat quality. The Hayden Bank will require long-term maintenance in order to ensure that its habitats are kept in the best possible condition, but the Hayden Bank's mitigation design minimizes the long-term maintenance requirements over and beyond that accorded to any well managed natural area.

13 Improvement in functions

To accurately account for the potential ecological lift, the variability in existing functional condition across the Hayden Bank had to be accounted for. Figure 10 shows the Hayden Bank with habitat conditions mapped according to one of four categories. Only one area was rated as functional and it was very small (0.25 ac), so for accounting purposes it was lumped into the highly functional category.

Table 4 provides a summary of pre-mitigation FACWet scores for Highly Functional, Functionally Impaired, and Non-functional wetland areas in the Bank. Target post-mitigation FACWet scores are provided to the right of pre-mitigation scores and finally the predicted change in FACWet scores are calculated in the last three columns. The predicted change (symbolized by "Δ") in FACWet scores, calculated by subtracting post-mitigation FACWet scores from pre-mitigation ones, is an enumeration of the expected amount of functional lift that will be generated by mitigation treatments.

Based on the alleviation of the identified stressors listed in Table 3 and through the described mitigation treatments, it is predicted that the functional condition of the Hayden Bank's floodplain habitats can be elevated to a *Highly Functioning* condition (B or 0.85). From this predicted condition the projected change in FACWet score for each category of wetland was calculated. Based on the amount of projected lift, mitigation involving *Highly Functioning* areas is considered "minor rehabilitation". Mitigation involving *Functionally Impaired* habitats is projected to constitute "major rehabilitation", and that in *Non-functional* areas is predicted to count as "superior re-establishment".

Table 4. Summary of FACWet variable scores in Highly Functional (HF), Functionally Impaired FI) and Non-functional (NF) portions of the Hayden Bank.

FACWet Before-After Mitigation Index							
	Mitigation Site Pre-project			Target Scores	Functional Lift		
FACWet Variable	*Highly Functioning (HF)*	*Functionally Impaired (FI)*	*Non-functional (NF)*	*Post-project Predictied Score*	*Δ HF*	*Δ FI*	*Δ NF*
Habitat Connectivity	0.89	0.89	0.89	0.90	0.01	0.01	0.01
Contributing Area	0.65	0.65	0.65	0.73	0.08	0.08	0.08
Water Source	0.84	0.63	0.50	0.87	0.03	0.24	0.37
Water Distribution	0.80	0.62	0.50	0.85	0.05	0.23	0.35
Water Outflow	0.75	0.61	0.50	0.87	0.12	0.26	0.37
Geomorphology	0.81	0.73	0.65	0.93	0.15	0.20	0.28
Water and Soil Environment	0.77	0.73	0.55	0.78	0.01	0.05	0.23
Vegetation Structure and Complexity	0.85	0.74	0.58	0.87	0.02	0.13	0.29
COMPOSITE FACWet Score (FCI)	**0.79**	**0.68**	**0.58**	**0.85**	**0.06**	**0.17**	**0.27**
				Percentage Aquatic Functioning Restored	**0.12**	**0.34**	**0.54**
Watershed Approach Modifiers				**Watershed Priority (0.9 - 1.2)**	**1.1**	**1.1**	**1.1**
				Watershed Connectivity (1.0 - 1.2)	**1.1**	**1.1**	**1.1**
				Watershed Species (1.0 - 1.2)	**1.0**	**1.0**	**1.0**
				Final Ratio	**0.15**	**0.41**	**0.65**
				Acres	**5.65**	**8.29**	**17.54**
				Credits	**0.82**	**3.41**	**11.46**
					Total Projected Credits		
					15.69		

14 Proposed methodology to be used to determine credit availability and bank success

The Corps requires that crediting ratios be set based on ecological lift alone. To create a lift-based crediting mechanism, a Before-After Mitigation Index (BAMI) crediting ratio procedure useable with FACWet was developed based on SPD guidance and detailed consultation with Colorado's three Corps districts.

In the FACWet BAMI, the amount of functional lift enumerated by the pre- and post-mitigation difference in the composite FACWet FCI score is converted to a percentage of aquatic functioning restored (Table 4). That is, FACWet scores can range from 0.50 – 1.0, therefore, if there is a predicted increase in FACWet score of 0.27 (as in the case of Δ NF; Table 4) that represents 54% of the increase that is possible on the FACWet scoring scale (0.27/0.5 = 0.54). Continuing the Δ NF example from Table 4, 0.54 is the base crediting ratio. Three watershed approach modifiers are multiplied against the base ratio. Base ratios were multiplied by 1.1 to reflect the high watershed priority of the Hayden Ranch River Parcel restoration, and again by 1.1 to acknowledge the important increase in watershed scale connectivity that successful mitigation would bring (see Section 13 and Fig. 12). Because rare or sensitive species are not the target of mitigation, a Watershed Species multiplier of 1.0 is applied and this does not affect the product. Final crediting ratios for Δ HF, Δ FI, and ΔNF habitats are 0.15 (6.7:1), 0.41 (2.4:1) and 0.65 (1.5:1) (Table 4).

The total number of acres of each condition class of habitat times the crediting ratio was used to calculate the number of credits that successful mitigation is expected to earn. The total *predicted* number of credits is used for planning purposes and to create schedules of early credit release. The *actual* total number of credits earned by mitigation will be determined at the end of the monitoring period when a final functional assessment and wetland delineation will be performed. Areas achieving performance standards (Attachment 4) will be deemed as having achieved the target FACWet score of 0.85 and will receive the crediting ratio listed in Table 4. Treatment areas that are over- or under-performing relative to performance standards may be subject to an adjustment of the crediting ratio using the FACWet BAMI. Habitats on Aurora Water property that are outside of the predicted area of improvement, but which demonstrably benefit from mitigation treatments will be eligible to earn additional mitigation credits using the crediting procedure outlined above.

15 Performance standards

Performance standards were developed using SPD's *Worksheet for Uniform Performance Standards for Compensatory Mitigation Requirements (12505.2 – SPA)*. The performance standard worksheet is included as Attachment 5.

16 Monitoring

The monitoring program for the Bank began in 2012 with the collection of baseline data. Table 3 and Figure 5 provide summaries of the monitoring parameters used to evaluate pre-treatment condition and post-treatment mitigation performance. This monitoring program will be carried out annually, except in the case of the assessment of species composition, which will be done on a bi-annual basis.

17 Historic aerial photographs (Figure 11)

An aerial photograph of the Hayden Bank taken in September of 1955 is included as Figure 11.

18 *Watershed Approach Explanation of the way in which the bank will contribute to connectivity and ecosystem function*

Mitigation treatments at the proposed Hayden Bank will patch a substantial break that exists in the Arkansas River floodplain corridor (Figs. 1 and 6). The Hayden Bank would restore riverine shrub-scrub wetland and riparian habitat along about 1.25 mi. of channel. This proposed mitigation bank is situated at an elevation of about 9,200 ft. at the boundary of the upper montane and subalpine zones. It constitutes a key link in wildlife, particularly elk, migration routes leading to and from the subalpine timber habitat. It is also important wildlife over-wintering habitat in the Arkansas River valley.

Like most of Colorado, in the Arkansas Headwaters Sub-basin, Riverine shrub-scrub wetlands and riparian habitats have been disproportionately impacted by post-European settlement human activities. These impacts arrived first in the form of beaver trapping that resulted in the near extirpation of this keystone species in the central Colorado mountains by around 1838. To a very large degree, beaver create and sustain Colorado's expansive riverine shrub-scrub complexes, and these complexes are fundamentally important to both stream stability and functioning, as well as, providing the foundation for the aquatic food chain. The loss of beaver, no doubt, had a profound effect on the functioning of riverine systems throughout the sub-basin, but we will never know the full ramifications of their decimation because it happened when the region was still an unsettled wilderness before the advent of photography.

Starting in the late 1850's, a new, intensively invasive land use assaulted Arkansas River headwaters wetland and aquatic system in the form of hard rock and placer mining. These activities have caused untold impacts across the region virtually erasing numerous stream channels, such as Box and Corseke Creeks, and polluting many waters with acid mine drainage and/or tailings. Aside from notable exceptions such as the Climax Molybdenum Mine, hard-rock mining activity has dwindled in modern times, but still occurs in the region. It is the legacy of hard-rock mining that currently holds the greatest significance for the watershed's natural habitats and aquatic systems. The most notable instance of tailings contamination is that along the Arkansas River south of Leadville, below the confluence with California Gulch. This eleven-mile reach of the river was listed on the US EPA's Superfund Program national priority list in 1983. Beginning in 2005, the channel reach was the subject of intensive remediation actions by a variety of state and federal agencies, which was completed in 2010. The Hayden Bank lies within US EPA's California Gulch remediation zone, which has since been removed from the Federal priority list. The Hayden Bank also lies along the reach of the Arkansas River which was targeted for extensive channel improvement by CPW.

Haying operations are the third major land use change that has driven loss of riverine scrub-shrub wetland in the Arkansas Headwaters. Haying operations alter hydrology and generally simplify the wetland ecosystem, by removing the shrub stratum and homogenizing as many aspects of the site as possible.

Development of water resources has been a longstanding, continuous, and very important land use in the area. The region has proven to be the literal well-spring that supports the bulk of Colorado's populace. It is not an exaggeration to say that the water resources of the headwaters region are the foundation upon which the Front Range corridor was built. A highly complex and sophisticated water management infrastructure system enmeshes the entire region. This infrastructure is in continual need of maintenance and improvement as demand increases, structures age, and "natural" events, such as wildfire, floods, and climate change impact operational capacity of system components.

The sum effect of these land uses on wetland coverage is summarized using wetland profiles as described in Johnson (2005) and as recommended in the multi-agency training syllabus developed to

provide guidance on meeting the requirements for the use of a watershed approach during mitigation planning and review (see Sumner, Johnson and Orme 2012; and Lemly, Johnson and others 2013).

Figure 11 provides a map showing ecological regions, or "process domains", that were created based on patterns in climate, elevation, geology, and geomorphology. These physical factors control the abundance and distribution of wetlands across the region. Thus, within each process domain, the abundance and distribution of wetlands is expected to be relatively even. Figure 12 provides wetland profiles, or graphical tabulations of wetland acreage stratified by wetland type for the "Valley" process domain in which the Hayden Bank is sited. One profile in Fig. 12 is based on Colorado Natural Heritage Program mapping of wetlands off 2009 imagery. For comparison, a second profile is included which estimates historical conditions in the Valley process domain, based on land forms, vegetation, and other visual cues. Based on these data, the Valley process domain has lost almost 5,000 ac. of scrub-shrub wetland, most of which was riverine. This represents a 62% amount of reduction in this type of habitat.

Restoration of wetland and riparian habitats at the Hayden Bank would make a significant contribution toward restoring the wetland profile of the Arkansas Headwaters Valley bottom habitats. As is clearly shown by the wetland profiles, this habitat type has been disproportionately impacted, therefore, mitigation focusing on restoration of riverine scrub-shrub wetlands has disproportional benefits for the watershed.

19 *Real estate records and assurances*

19.1 Property ownership and availability

After review of all relevant real estate documentation, it is determined that there are no right-of-ways, easements, liens, or any other types of restrictions that currently exist on the portion of the Hayden Ranch property that will host the bank site (as defined by Figure 2) that will impair or prohibit its use as a mitigation bank. The Warrantee Deed and Property map (Attachment 4) are included in this report for reference, as well.

19.2 Assurance of sufficient water rights to support long-term sustainability of the bank

Mitigation treatments are designed to restore historical wetlands in the bank area. If stream flow depletions exceed the historical wetland depletions, Aurora Water has sufficient water rights and infrastructure in place to compensate for those excess depletions.

19.3 Ownership information on surface and subsurface mineral rights

After review of all relevant real estate documentation, it is determined that the City of Aurora is the owner of all surface and subsurface mineral rights on the portion of the Hayden Ranch property that will host the bank site (as defined by Figure 2).

19.4 Description of access to the bank

The bank can be accessed from Lake County Road 10, east from Highway 24, approximately 9 miles south of Leadville, Colorado. Reasonable public access is currently provided on the property until terminated per the Intergovernmental Agreement between Aurora and Lake County dated April 18, 2014.

19.5 Real estate protections

The City of Aurora shall record a restrictive covenant, conservation easement, deed restriction or similar device on the Hayden Bank site subject to the approval of City Council in favor of a neutral third party, and provide a copy to the IRT in accordance with 40 CFR 230.97 (a). A copy of the recorded document shall be provided to the Corps within 30 days of recordation.

19.6 Property status

Was the bank property:

Used as mitigation for a previous project(s)? **No**

Already designated or dedicated as passively used park or open space use, where that use is generally compatible with sustaining biological values **Yes**

Designated for purposes which are inconsistent with habitat preservation (i.e., lands purchased for roads, landfills, etc.); and **No**

Acquired by a public entity (e.g., with State Bond Act funds) or provided to a jurisdiction for park or natural open space purposes[1]. **No**. This property is a part of a voluntary collection of properties in the Lake County Open Space Initiative (LCOSI). The property is not legally bound to any conditions through this affiliation with LCOSI. Also, reasonable public access is currently provided on the property until terminated per the Intergovernmental Agreement between Aurora and Lake County dated April 18, 2014 (Attachment 5).

19.7 Any other restrictions on the bank property

There are no other restrictions on the Hayden Bank property that would negatively affect its operation as a wetland mitigation bank and its ability to support improved wetland habitats.

[1] *This criterion excludes land purchased by state and local agencies specifically for the purposes of mitigation or mitigation banking assuming the funding source is appropriate*;

20 *Public funding received for restoration or acquisition of bank property*

Aurora Water purchased the Hayden Bank property and is funding, in full, all wetland mitigation activities occurring within the bank.

21 *List of permits required for construction and operation of the bank*

A Department of the Army Nationwide 27 permit is required to undertake certain bank activities and operations.

22 *Proposed credit release schedule*

Mitigation ratios would be assigned according to crediting procedure described in Section 12d. Full credit will be given to wetland improvements once: 1) the banking instrument and final mitigation plan have been approved, 2) appropriate financial assurances and real estate assurances have been met, and 3) the wetlands within the mitigation bank are functioning in compliance with the success criteria. The City may utilize a percentage of mitigation credits prior to fulfillment of the four conditions listed above. So called "pre-release" credits will be available following the schedule provided in Corps guidance (NWO 2005) on credit release and mitigation ratios. The pre-release scenario would allow for a maximum 30% release of credits prior to achievement of total functioning, according to the milestone schedule presented in Table 5. The pre-release schedule allows 5% of the predicted mitigation credits to be available once the banking instrument is approved. An additional 10% of credits will be available for release immediately after construction of the mitigation treatments. Finally, another 15% of the total credit value will be available once the treated area meets the Corps' three-parameter wetland determination. To qualify for this level of credit pre-release a formal wetland delineation will need to be performed and approved by the Corps. Once the site has demonstrably attained success and is determined to be ecologically sound (at least three years post-construction) the remaining 70% of credits will be released.

Table 5. The credit release schedule in-force should the sponsor require a release of credits prior to meeting mitigation performance criteria (pre-release).

Project Status	Percentage of Credits Pre-released	Cumulative Percentage of Credits Pre-released
Banking Instrument Approved and Signed	5%	5%
Construction and Planting Completed	10%	15%
Restoration Areas Meet the Corps manual wetland criteria	15%	30%
Demonstrably Ecologically Sound/Success Criteria Met	70%	100%

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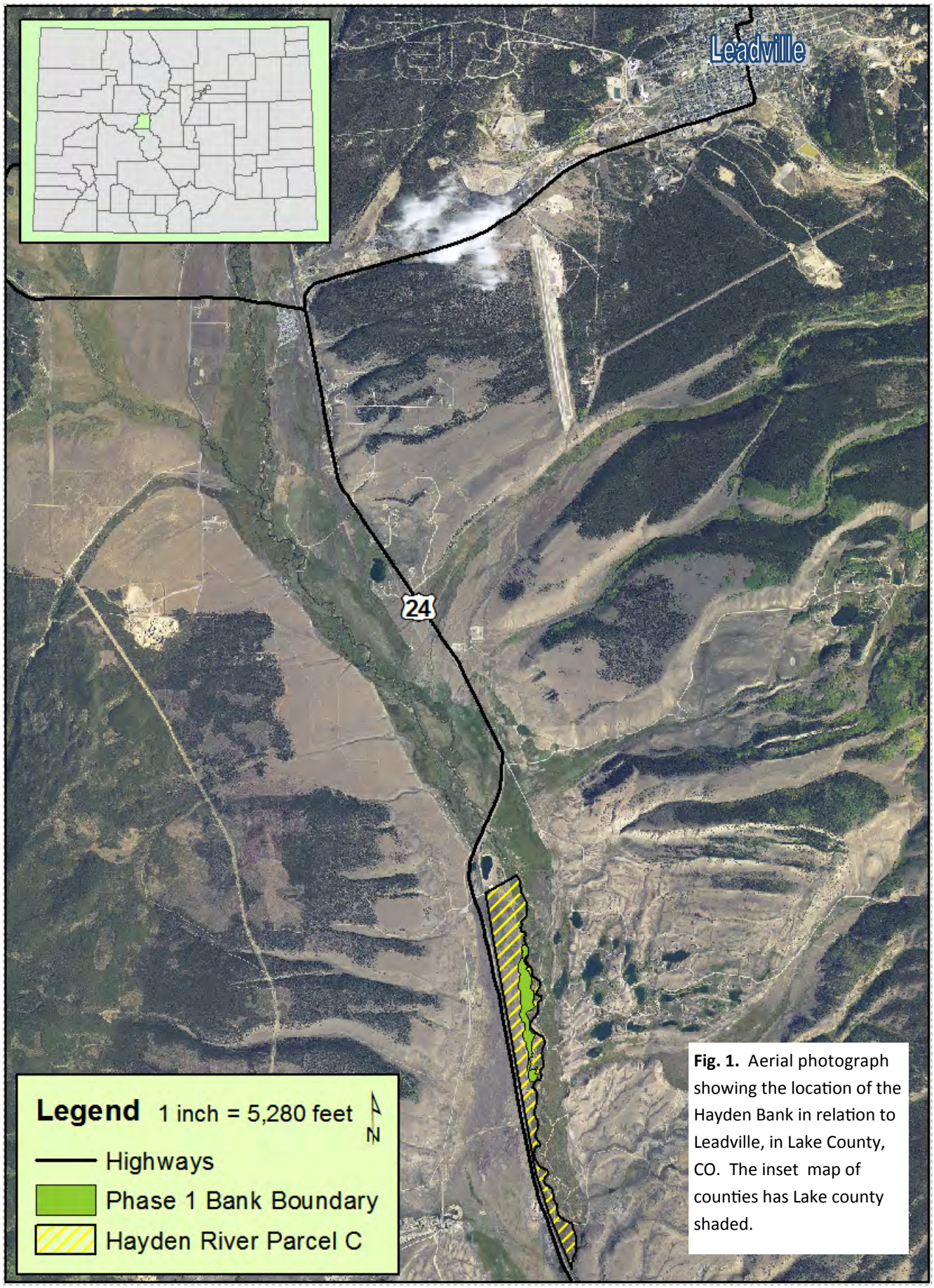


Fig. 1. Aerial photograph showing the location of the Hayden Bank in relation to Leadville, in Lake County, CO. The inset map of counties has Lake county shaded.

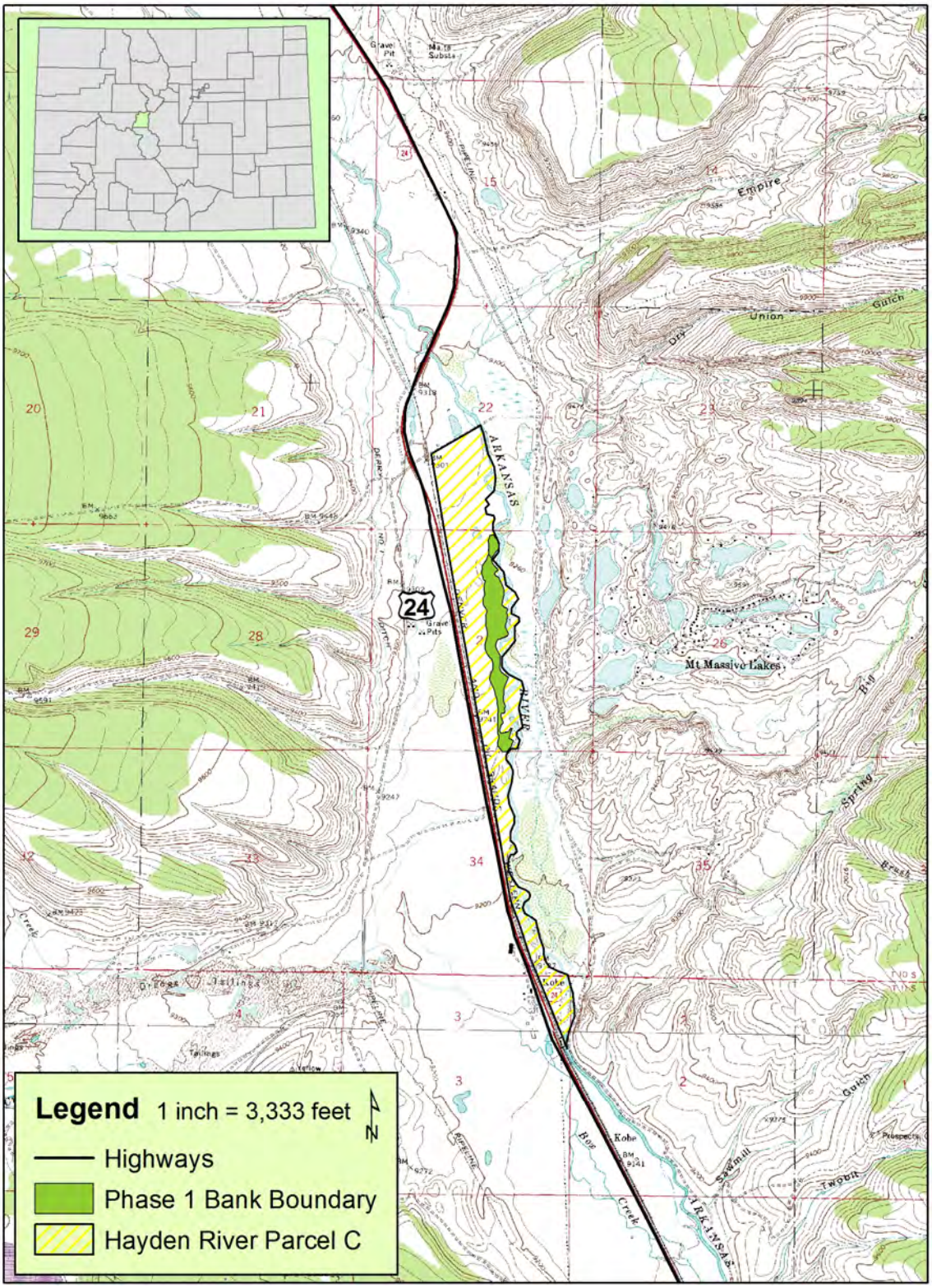


Fig. 2. A portion of a 1:24:000 scale USGS Quadrangle showing the boundary of the Hayden River parcel property which holds the Hayden Bank.

Fig. 3. An aerial photograph of the Hayden Bank boundary, including points and lines indicating features remediated by US EPA.

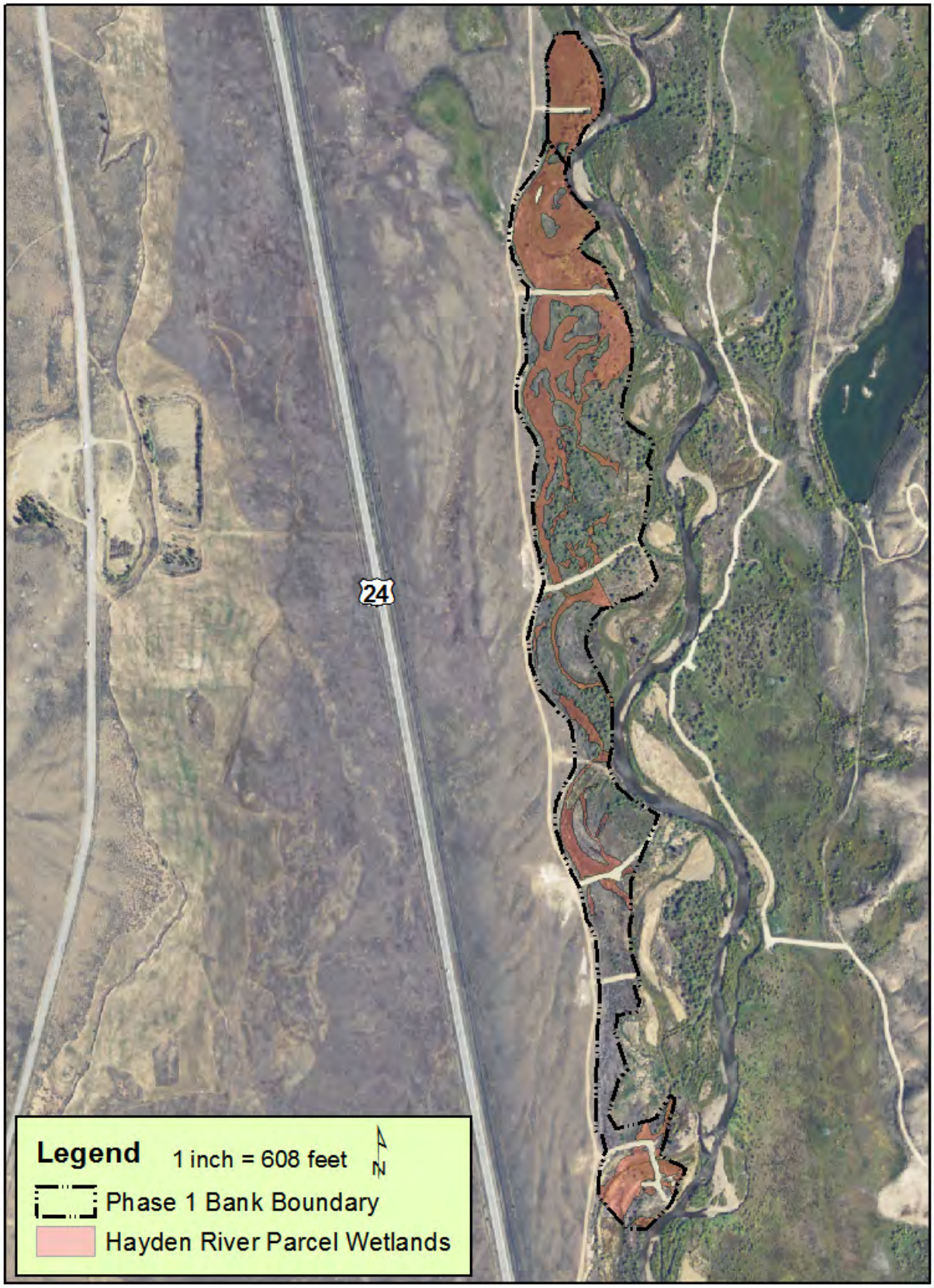


Fig. 4. An aerial photograph showing the extent of jurisdictional wetland habitat within the Bank.

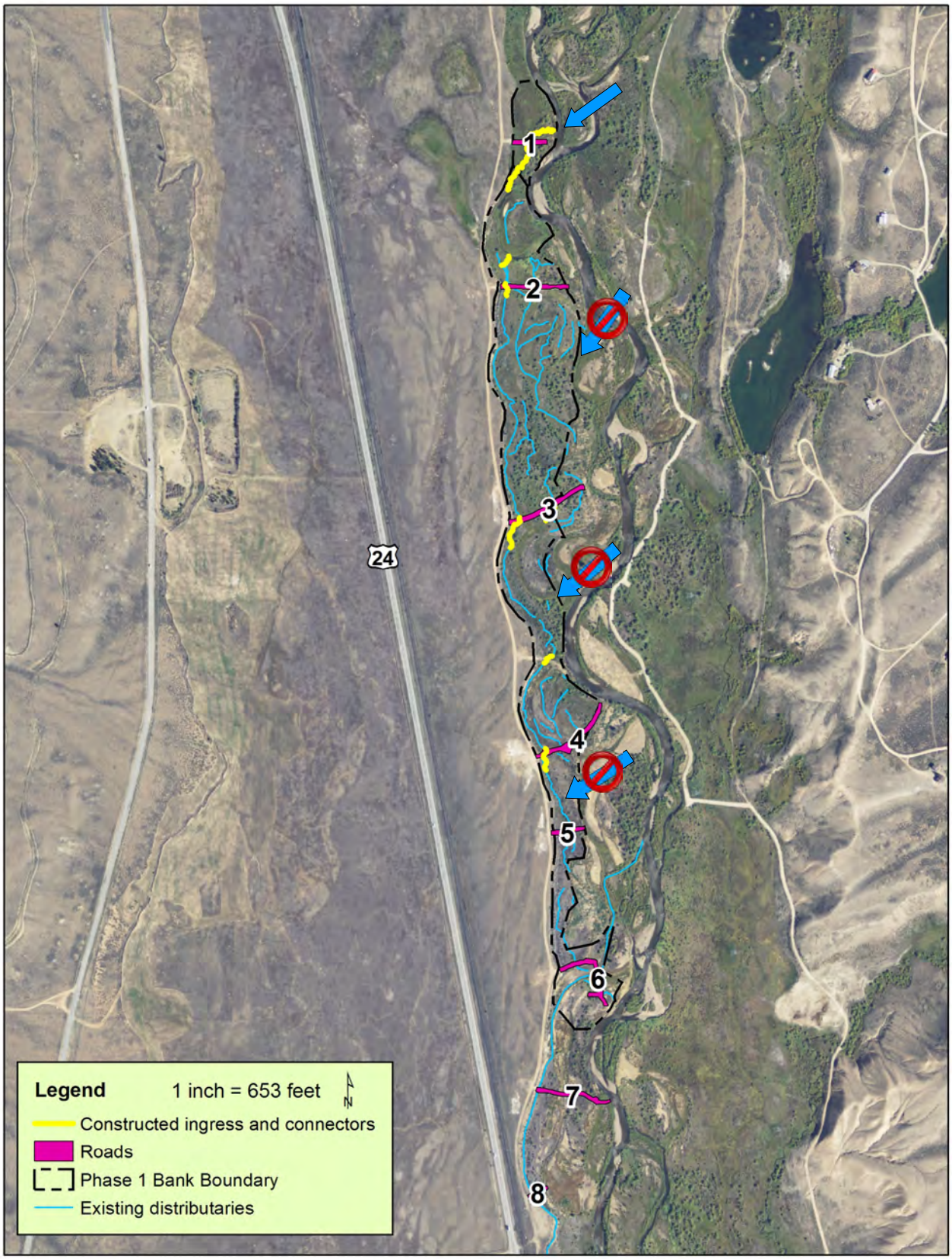


Fig. 5. An aerial photograph showing the location of haul roads and the lack of connection between the floodplain and the Arkansas R. With the roads removed, a small ingress side channel will be cut near the top of the Hayden Bank to restore natural inflow to the dewatered floodplain habitats. A number of small distributary channels and sod check dams will be constructed to reconnect the existing distributary channel network .

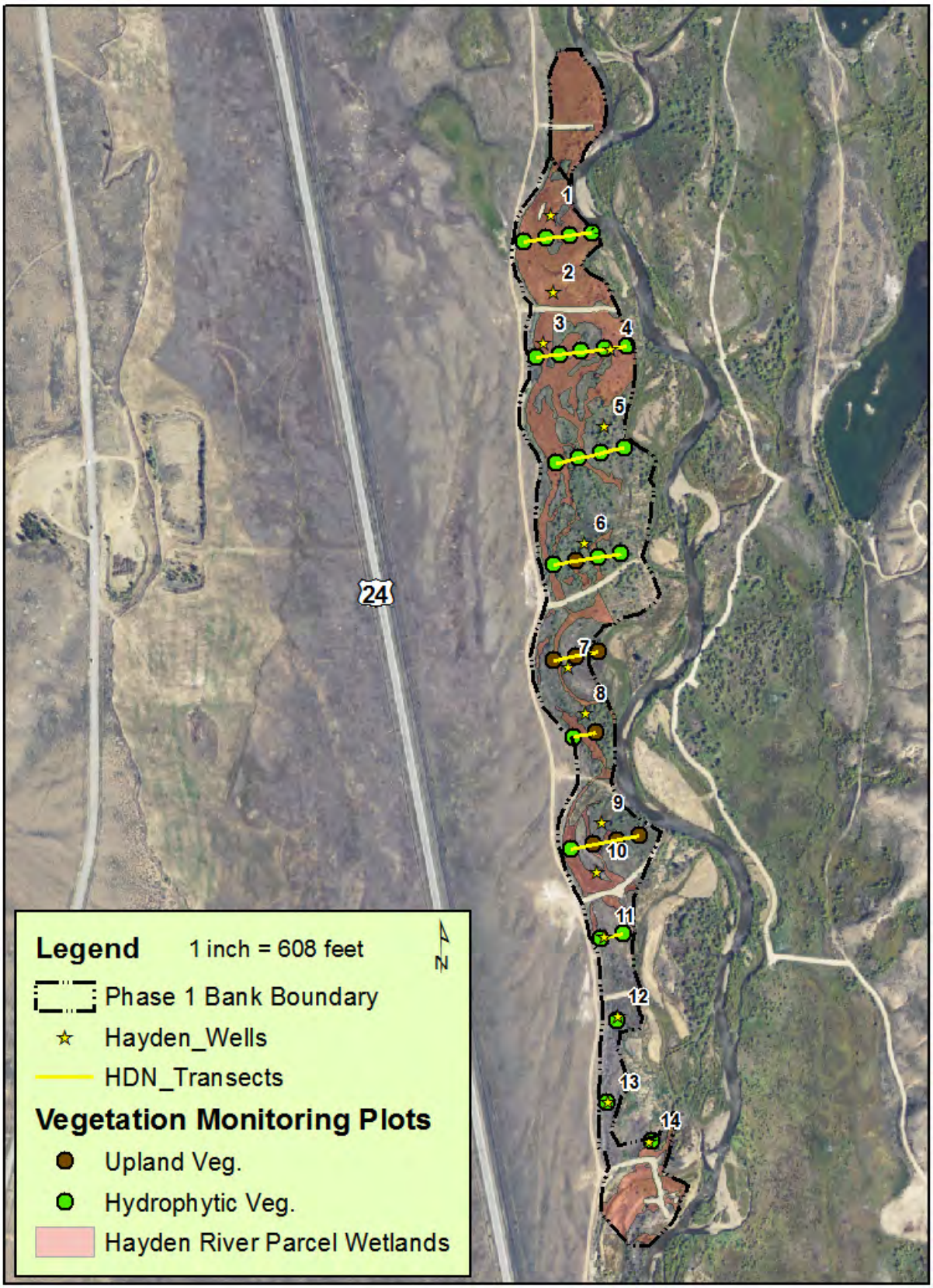


Fig. 6. An aerial photograph showing the locations of monitoring plots, transects and groundwater wells

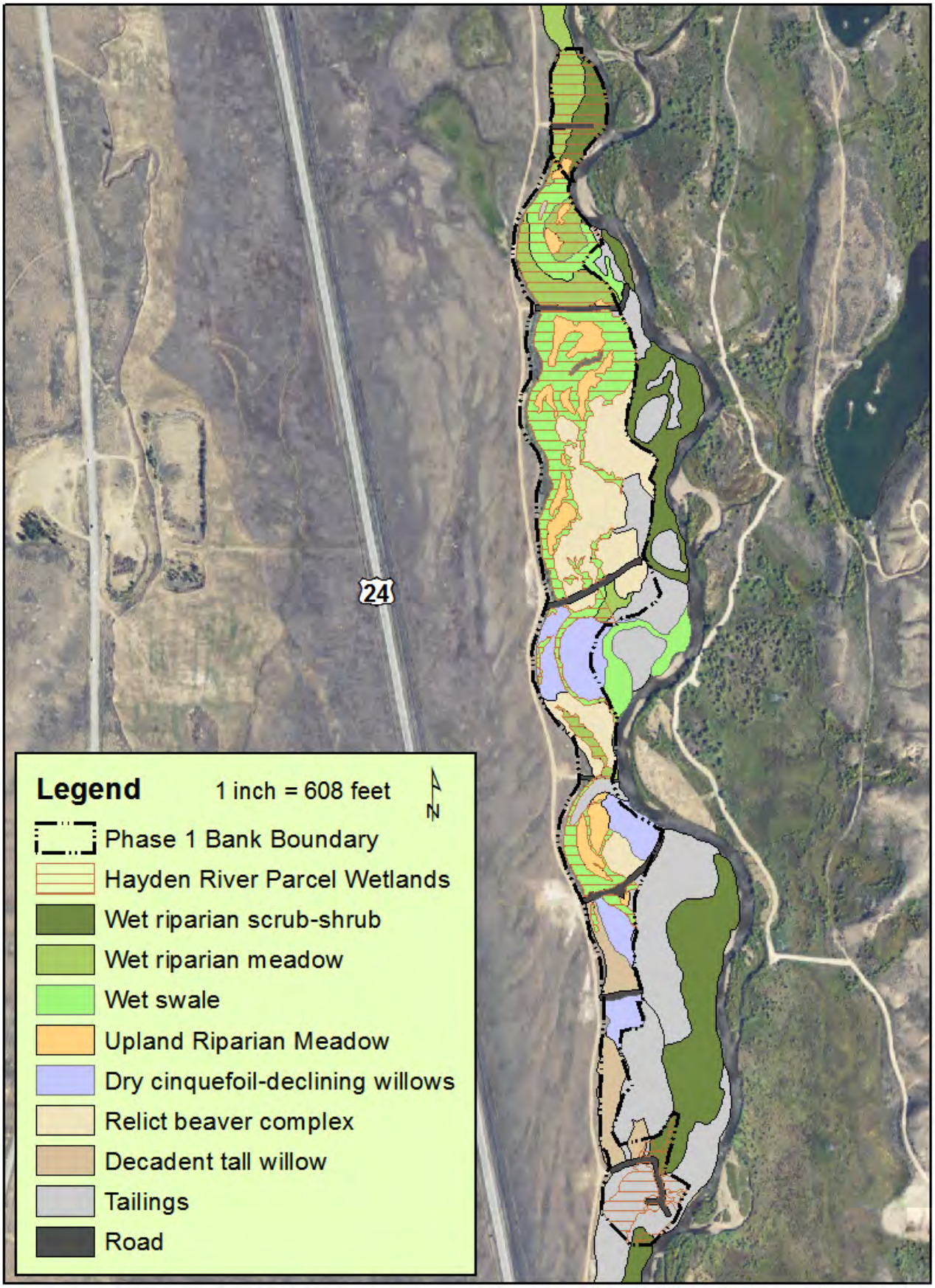


Fig. 7. Detailed mapping of wetland and riparian habitats within and adjacent to the Hayden Bank.

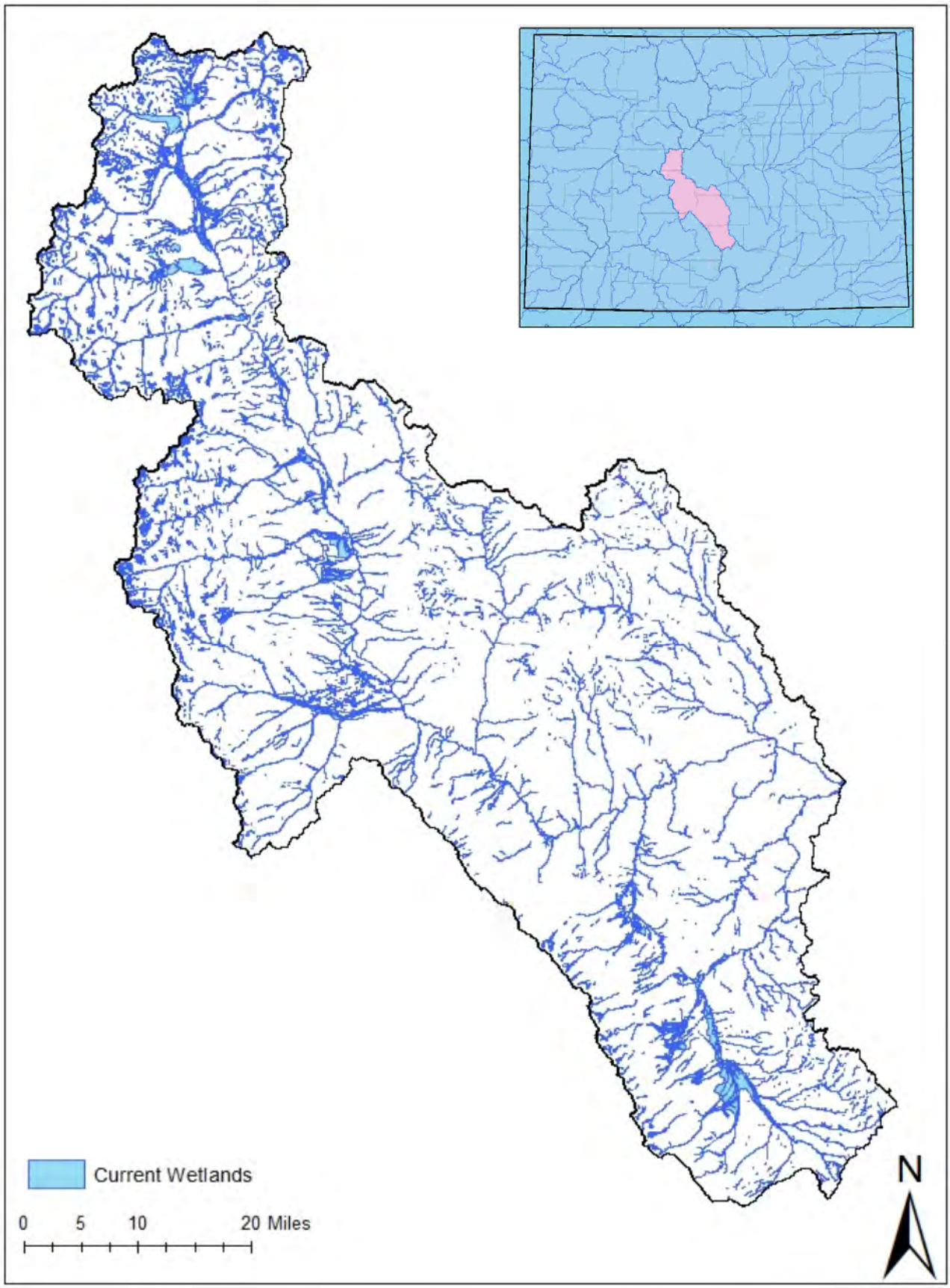
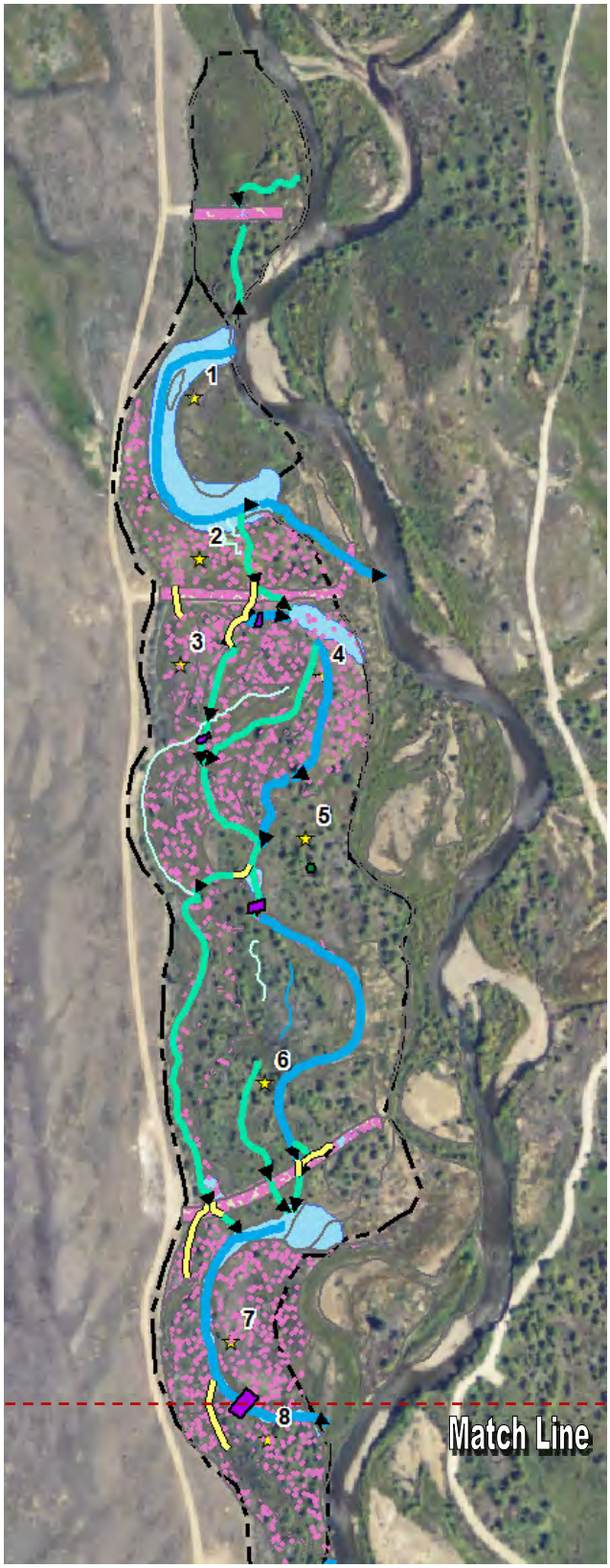


Fig. 8. Map of the Arkansas Headwaters HUC 8 Sub-basin which is the proposed service area for the Hayden Bank.



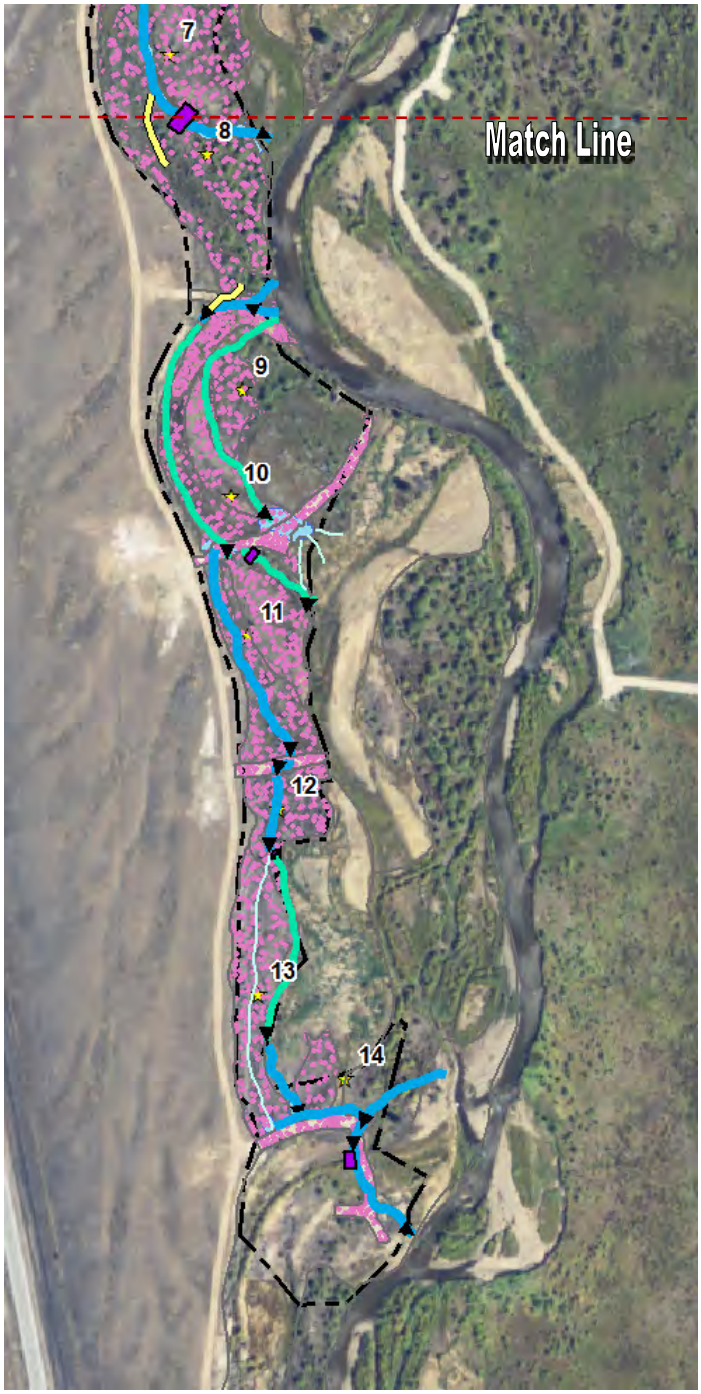


Fig. 9. An illustration of the predicted as-built configuration of the Hayden Bank. Arrows indicate pathways of flow whose importance is symbolized by the size and color of the arrows. Purple polygons represent potential check dam locations. Yellow lines show the locations of connector channels to be cut. Pink dots represent the locations of willow plantings. Within the various zones of the Bank, dots are distributed randomly in this figure, but at the actual density prescribed in the planting plan.

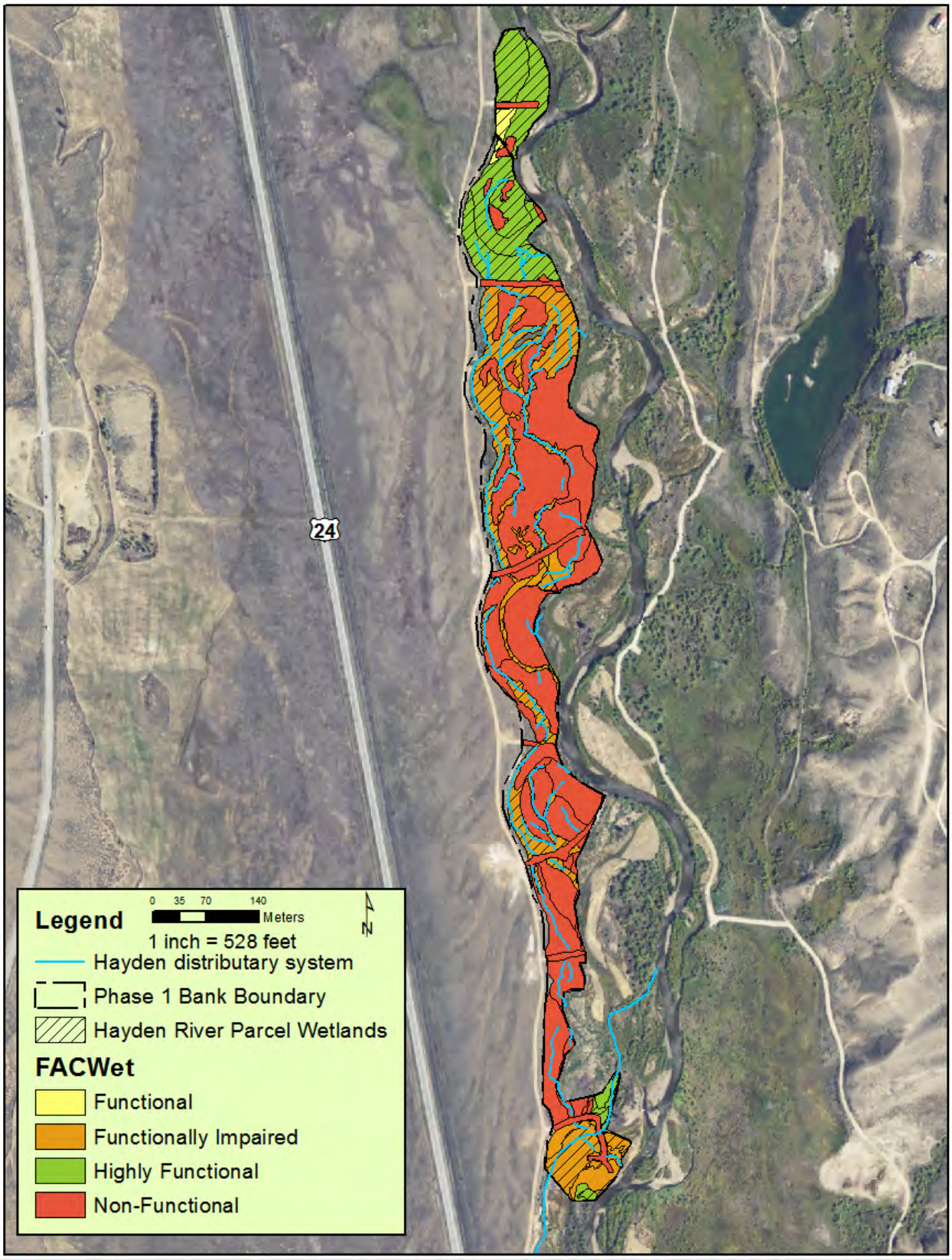


Fig. 10. A map of the condition of riverine wetlands at the Hayden Bank as evaluated by the Functional Assessment of Colorado Wetlands (FACWet) method in 2012.

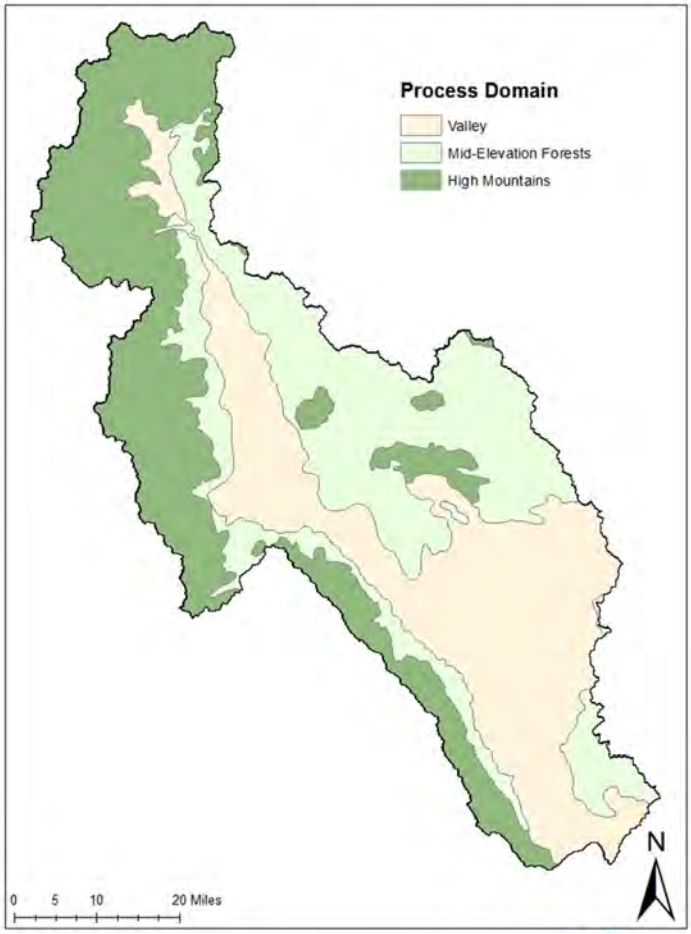
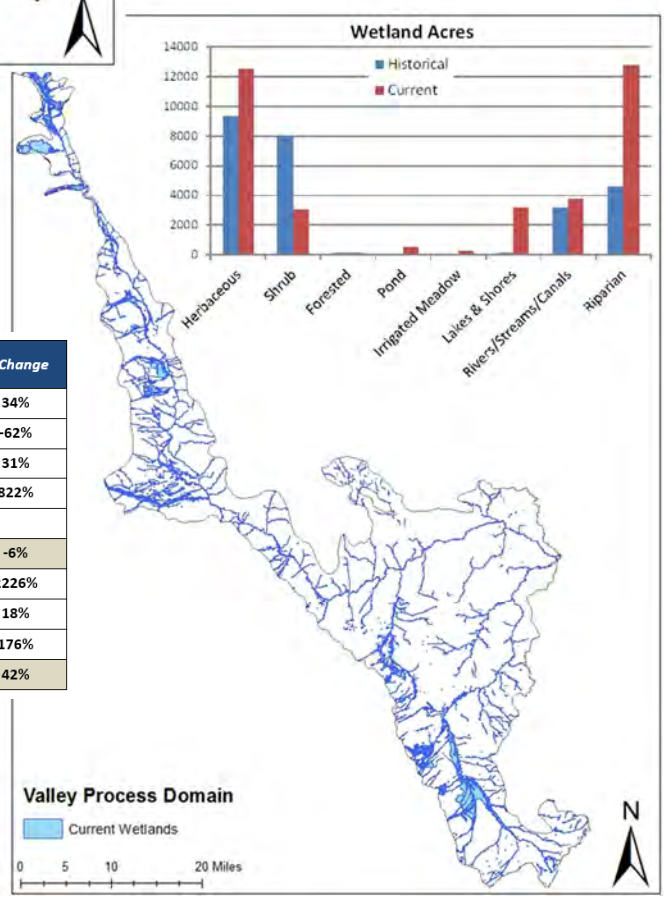


Fig. 11. Ecological regions or "process domains" within the Arkansas headwaters Sub-basin.

Fig. 12. A wetland profile of the "Valley" process domain in the Arkansas Headwaters Sub-basin that compares the estimated historical coverage of different wetland types with that calculated from a recent mapping of wetlands in the region. The adjacent table provides acreage values.



Wetland Type	*Historical Acres*	*Current Acres*	*Acreage Change*	*% Change*
Herbaceous	9,371	12,519	**3,148**	**34%**
Shrub	8,000	3,070	**-4,931**	**-62%**
Forested	125	164	**39**	**31%**
Ponds	57	529	**471**	**822%**
Irrigated Wet Meadows	0	292	**292**	
Total Wetlands (excl. Lakes & Rivers)	**17,553**	**16,573**	**-980**	**-6%**
Lakes and Shores	136	3,174	**3,038**	**2226%**
Rivers/Streams/Canals	3,176	3,749	**573**	**18%**
Riparian	4,646	12,820	**8,174**	**176%**
Total Wetlands & Waterbodies	**25,512**	**36,317**	**10,805**	**42%**

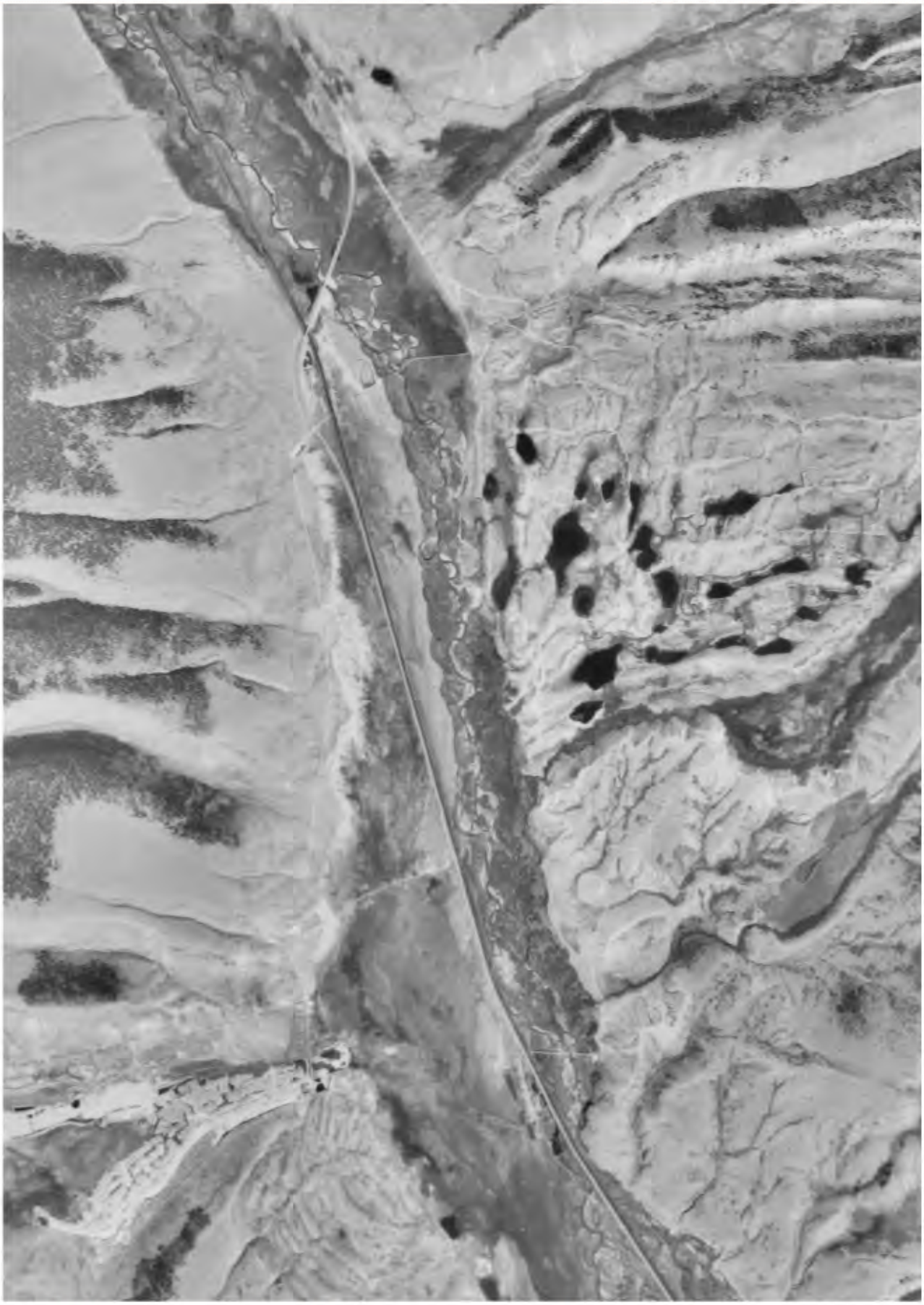


Fig. 13. An aerial photograph showing the proposed mitigation site in September 1955. The site is due west of the ponds near the center of the picture.

Attachment 1 – Wetland Delineation and Jurisdictional Determination

Alpine Ecological Resources, LLC

Wetland Delineation Report

Hayden Meadows
Lake County, Colorado

Prepared for: City of Aurora
May 22, 2012

Andy Herb, Ecologist/Owner
1127 Adams Street
Denver, CO 80206

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1.0 Introduction

1.1 Purpose of This Report

The purpose of this report is to formally document the wetlands and other water features present in the study area. The primary reason for this documentation is to assist with project planning and design, which is intended to maximize avoidance of these features wherever practicable. The wetland and other water features described in this report include all those present, not just those that may be considered jurisdictional under Section 404 of the Clean Water Act.

1.2 Project Description

The City of Aurora (City) is seeking to develop a wetland mitigation bank on property currently owned by the City along the Arkansas River in Lake County. The bank is envisioned as a collaborative, mutually-beneficial venture between local, state and federal governmental agencies, with the goal of improving compensatory mitigation in the State of Colorado while at the same serving the City's programmatic needs for high quality mitigation.

2.0 Site Description

The study area is located in Lake County, Colorado, approximately 6 miles south of Leadville, Colorado (**Figure 1**). It encompasses 29 acres and is situated just east of US Highway 24 (US 24), immediately west of the Arkansas River (**Figure 2**). The site is rather long and narrow, and is confined to the Arkansas River floodplain. It can be found on the Leadville South, Colorado US Geological Survey 7.5-minute quadrangle and has the following coordinates (datum is NAD 83):

- Township 10S; Range 80W; parts of Sections 27 and 34
- Universal Transverse Mercator (UTM):
    - North end: 13 386062E, 4334987N
    - South end: 13 386124E, 4333365N
- Latitude/Longitude:
    - North end: 39.1566°N, -106.3187°W
    - South end: 39.1420°N, -106.3177°W

The study area is approximately 9,300 feet above mean sea level and has a hydrologic unit code (HUC) of 11020001 (Arkansas Headwaters). It is surrounded by undeveloped lands comprised mostly of riparian habitat along the Arkansas River and historically irrigated grasslands to the west. It is situated near the interface of the Sedimentary Subalpine Forest and the Crystalline Mid-Elevation Forest of the Southern Rockies Ecoregion (EPA 2012). The subalpine forest areas are generally characterized as glaciated, with high mountains, steep slopes, and high-gradient perennial streams. The mid-elevation forest areas are mostly unglaciated, with low mountains, ridges, slopes, and outwash fans, and moderate to high-gradient perennial streams.

Although the site is not forested, it is more typical of the habitats found in or near mid-elevation forest areas. The Arkansas River flows through the site and cuts through numerous nearby low mountains and ridges. Dominant vegetation is mostly riparian, comprised of willows (*Salix* spp.) and shrubby cinquefoil (*Dasiphora fruticosa*), with very widely scattered lodgepole pine (*Pinus contorta*) and Engelmann spruce (*Picea engelmannii*). Surrounding areas are mostly historically irrigated grasslands to the west, and low hills dominated by sagebrush (*Artemisia* spp.) and rabbitbrush (*Ericameria* spp.) to the east.

3.0 Methods

3.1 Literature Review

Prior to conducting the field survey, numerous sources of data were reviewed to gain a general understanding of the ecology of the study area. These sources included National Wetlands Inventory (NWI) maps, aerial photographs, topographic maps, soil survey, and other relevant data.

3.2 Field Data Collection

Andy Herb (senior ecologist) surveyed the entire study area on September 6 and 27, 2011 to identify wetlands and other water features. These features were delineated within the defined study area using procedures outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps 2010). This involved a detailed examination of plants, soils, and hydrologic indicators present.

Generally, the detailed examination of each wetland or wetland complex involves the collection of vegetation, soil, and hydrology data at paired data points. These paired points include one point within the suspected wetland and one point in the adjacent upland. However, if numerous wetlands are in close proximity and surrounded by the same or similar upland plant community, then upland data points of nearby sites are often utilized, rather than creating a new upland data point for each wetland area.

All plants considered dominant in wetlands, as well as other observed species, were identified and are listed in this report. During field examinations, a list of dominant plants was documented for each potential wetland area and was compared to the *National List of Plant Species That Occur in Wetlands: for Colorado* (Reed 1988) to determine the "wetland indicator status" of each species. Generally, if at least 50 percent of those species had an indicator status of facultative (FAC) or wetter, the potential wetland area would satisfy the US Army Corps of Engineers (Corps) criterion for wetland vegetation. The botanical nomenclature presented in this report follows the Plants Database (NRCS 2012).

Soils were examined at various locations throughout the study area to identify the presence of hydric soil indicators. If indicators were found, multiple pits may have been dug along the gradient to identify the extent of hydric soils.

While recording plant species and identifying soil characteristics, potential wetlands within the study area were assessed for evidence and potential sources of wetland hydrology. This evidence included primary indicators such as the presence of surface water and saturation, and secondary indicators like surface soil cracks and drainage patterns.

Most surrounding uplands were not formally sampled or recorded on data forms, and were generally examined while attempting to identify wetland areas. Those uplands examined in more detail or recorded on data forms typically exhibited evidence of at least one wetland indicator (hydrophytic vegetation, hydric soils, or wetland hydrology). Data collected for all areas investigated and deemed non-wetland are not necessarily included in this report.

3.3 Mapping

After determining the approximate extent of the wetlands based on the presence of hydric soils, hydrophytic vegetation, and wetland hydrology, the wetland boundary was flagged and recorded using global positioning system (GPS) equipment. This equipment generally provides accuracy to less than one meter.

3.4 Wetland Classification

Wetlands in the study area were classified in accordance with the Hydrogeomorphic Method (HGM) (Brinson, et al. 1995) and the *Classification of Wetlands and Deep Water Habitats of the United States* (Cowardin, et al. 1979).

The only HGM classification applicable to the wetlands in the study area is riverine. Riverine wetlands are those that are associated with a stream channel, floodplain, or terrace and primarily supported by overbank flows or shallow subsurface flow associated with the channel.

There are two Cowardin wetland types that apply to wetlands in the study area, including palustrine emergent (PEM) and palustrine scrub-shrub (PSS). PEM wetlands are those dominated by herbaceous vegetation (grasses, grass-likes, and forbs) and PSS wetlands are those dominated by woody vegetation less than 20 feet tall (shrubs).

3.5 Jurisdictional Status

The jurisdictional status of wetlands and other water features is generally based on the *US Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (Corps 2007) and other Corps documents (Corps 2008a). In order for an aquatic feature to be considered a "water of the US" and jurisdictional under Section 404 of the Clean Water Act, it must be at least one of the following:

- A traditional navigable water (TNW)
- A wetland adjacent to a TNW
- A relatively permanent water (RPW), including tributaries that typically flow year-round or have a continuous flow at least seasonally, typically three months.
- A wetland that directly abuts a RPW
- A wetland adjacent to a RPW, but only if it can be shown that the feature has a "significant nexus" with a TNW
- A non-RPW or wetland adjacent to a non-RPW, if the feature has a "significant nexus" with a TNW

The significant nexus evaluation includes an assessment of the flow characteristics and functions of the feature to see if it has "more than an insubstantial or speculative effect on the chemical, physical, or biological integrity of TNWs (Corps 2007)." If it does, then it is considered jurisdictional.

4.0 Wetlands

The 29-acre study area contains 10.98 acres of wetlands (**Figure 2**). The wetlands are all part of the same complex and are shown on Figures 2.1, 2.2, and 2.3 by Area (A, B, and C) for discussion purposes only . All of these wetlands are located on the Arkansas River floodplain and are classified according to Cowardin, et al. (1979) as PEM, with very small pockets of PSS. They are all classified as riverine according to HGM (Brinson 1995). The NWI map for the study area shows a mosaic of PEM and PSS wetlands, with pockets of upland (USFWS 2012). Field surveys confirmed the presence of a mosaic, but it is mostly PEM wetland mixed with uplands. All wetlands in the study area are expected to be considered jurisdictional under Section 404 of the Clean Water Act as a result of connections to the Arkansas River, which may be considered a TNW and is certainly a RPW.

A summary of the vegetation, hydrology, and soils found in and near the wetlands follows, and detailed information can be found on the Data Forms in **Appendix A**. Photographs of the study area, including the wetlands, are in **Appendix B**.

4.1 Vegetation

Most of the wetlands in the study area are classified as PEM and are dominated by beaked sedge (*Carex rostrata*), water sedge (*Carex aquatilis*), Baltic rush (*Juncus balticus*), and tufted hairgrass (*Deschampsia caespitosa*). Beaked and water sedge dominate the lowest and wettest wetlands (**Photo 1**), which are generally found in meander scars or immediately along the channel of the Arkansas River. Baltic rush and tufted hairgrass are usually found in the highest densities in wetlands that are somewhat drier—maybe only seasonally saturated instead of permanently saturated (**Photo 2**). **Table 1** lists the common plants found in and near the wetlands.

Table 1: Common Plants Found In and Near Wetlands[1]

Common Name	Scientific Name	Indicator Status[2]
Woody Plants		
Prairie sagewort	*Artemisia frigida*	UPL
Big sagebrush	*Artemisia tridentata*	UPL
Shrubby cinquefoil	*Dasiphora fruticosa*	FACW
Rubber rabbitbrush	*Ericameria nauseosa*	UPL
Engelmann spruce	*Picea engelmannii*	FACU
Lodgepole pine	*Pinus contorta*	FACU
Whitestem gooseberry	*Ribes inerme*	FAC
Shortfruit willow	*Salix brachycarpa*	FACW
Drummond's willow	*Salix drummondiana*	FACW
Narrowleaf willow	*Salix exigua*	OBL
Park willow	*Salix monticola*	OBL
Diamondleaf willow	*Salix planifolia*	OBL
Herbaceous Plants		
Common yarrow	*Achillea millefolium*	FACU
Redtop	*Agrostis gigantea*	NI
Rough bentgrass	*Agrostis scabra*	FAC
Creeping bentgrass	*Agrostis stolonifera*	FACW
Meadow foxtail	*Alopecurus pratensis*	NI
Littleleaf pussytoes	*Antennaria microphylla*	UPL
Silverweed cinquefoil	*Argentina anserina*	OBL
American sloughgrass	*Beckmannia syzigachne*	OBL
Bluebell bellflower	*Campanula rotundifolia*	FACU
Water sedge	***Carex aquatilis***	**OBL**
Nebraska sedge	*Carex nebrascensis*	OBL
Woolly sedge	*Carex pellita*	OBL
Beaked sedge	***Carex rostrata***	**OBL**
Fireweed	*Chamerion angustifolium*	FACU
Canada thistle	*Cirsium arvense*	FACU
Meadow thistle	*Cirsium scariosum*	NI
Scrambled eggs	*Corydalis aurea*	UPL
Tufted hairgrass	***Deschampsia caespitosa***	**FACW**
Slender wheatgrass	*Elymus trachycaulus*	FACU
Fringed willowherb	*Epilobium ciliatum*	FAC
Field horsetail	*Equisetum arvense*	FAC
Virginia strawberry	*Fragaria virginiana*	FACU
Largeleaf avens	*Geum macrophyllum*	OBL
Meadow barley	*Hordeum brachyantherum*	FACW
Foxtail barley	*Hordeum jubatum*	FAC
Rocky Mountain iris	*Iris missouriensis*	OBL
Baltic rush	***Juncus balticus***	**FACW**
Bellardi bog sedge	*Kobresia myosuroides*	FAC

Common Name	Scientific Name	Indicator Status[2]
Starry false lily of the valley	*Maianthemum stellatum*	FAC
Tall fringed bluebells	*Mertensia ciliata*	OBL
Mat muhly	*Muhlenbergia richardsonis*	FACU
Western wheatgrass	*Pascopyrum smithii*	FACU
Alpine timothy	*Phleum alpinum*	FAC
Canada bluegrass	*Poa compressa*	FACU
Kentucky bluegrass	*Poa pratensis*	FACU
Dock	*Rumex sp.*	--
Strict blue-eyed grass	*Sisyrinchium montanum*	FAC
Hooded lady's tresses	*Spiranthes romanzoffiana*	FACW
Felwort	*Swertia perennis*	FACW
Common dandelion	*Taraxacum officinale*	FACU
Intermediate wheatgrass	*Thinopyrum intermedium*	UPL
Alsike clover	*Trifolium hybridum*	FAC

[1] Nomenclature presented in this table follows the Plants Database (NRCS 2012); dominant species in wetlands are shown in bold.
[2] Indicator status is based on national indicators for Region 8 developed by Reed (1988). OBL = obligate wetland species, >99% probability of occurring in a wetland; FACW = facultative wetland species, 67-99% probability of occurring in a wetland; FAC = facultative species, 34-66% probability of occurring in a wetland; FACU = facultative upland species, <33% probability of occurring in a wetland; and UPL = <1% probability of occurring in a wetland. If the species is not included in Reed (1988) then the indicator status is assumed to be UPL. If insufficient data were available to determine the indicator status of a species, then NI, No Indicator, is shown.

Generally the wetland boundaries in the study area are not well-defined and are based on subtle differences in topography, which are exemplified by subtle changes in vegetation communities. In most locations, there is a shift from the hydrophytes discussed above (typically in meander scars) to non-hydrophytes like Kentucky bluegrass, slender wheatgrass, and mat muhly on adjacent terraces that may be situated 0.5 to 1.5 feet higher in elevation.

Much of the floodplain appears to have undergone a shift in vegetation in the recent years as a result of changes in water quality or the overall water regime, or both. This is evidenced by the presence of what appear to be relict wetland areas that contain dead and/or dying willow (*Salix* spp.) and dry peat layers on the surface (**Photo 3**). This overall reduction of wetland area is also evident when comparing the delineation to the NWI mapping.

These relict wetlands generally contain widely scattered willow (much of which is often dead or dying) with an upland understory comprised mostly of mat muhly, slender wheatgrass, and Kentucky bluegrass, with very widely scattered hydrophytes. Areas with dried and cracked peat on the surface contain widely scattered hydrophytes (usually Baltic rush and water sedge) but have been invaded by upland herbaceous plants like littleleaf pussytoes, scrambled eggs, common yarrow, and common dandelion (**Photo 4**). Other areas within or along the perimeter of wetlands contain dense stands of Baltic rush (which can often withstand drier conditions) among pockets of stressed water sedge.

Much of the floodplain has been impacted by the EPA's remediation of mine tailings. The study area contains six temporary roads that were installed across the floodplain to

access tailings that were deposited along the edge of the river channel (**Photo 5**). The tailings were treated in-place and revegetated. Several of the delineated wetlands abut the tailings areas and receive water that passes through or over the sites.

4.2 Hydrology

All wetlands in the study area are sustained by overbank surface flows or shallow (alluvial) groundwater associated with the Arkansas River. The wetlands at the northern end of the site (northern Area A) are the wettest of all wetland areas and appear to be discharging alluvial groundwater year-round in the lowest areas (meander scars).

During the field survey, only a few wetland areas (those in the deepest meander scars) were inundated—mostly in Area A (**Photo 6**). The majority of the wetlands was either saturated to within 12 inches of the surface or exhibited other indicators of recent saturation/inundation. Wetland hydrology indicators observed on the site during the fieldwork include: High Water Table (A2), Saturation (A3), Drift Deposits (B3), Algal Mat or Crust (B4), Surface Soil Cracks (B6), Hydrogen Sulfide Odor (C1), and Geomorphic Position (D2).

4.3 Soils

According to the Web Soil Survey (NRCS 2012a), the soils in the study area are mapped as either Marsh (Mh) or Wet Alluvial Land (Wa). Both of these map units are listed as hydric.

Marsh soils are generally associated with floodplains, are frequently flooded and poorly drained, and have alluvium as parent material. They have a depth to groundwater of less than 18 inches and a typical profile that includes 0 to 3 inches of peat on the surface and 3 to 60 inches of variable alluvium. The frost-free period is 40 to 80 days.

Wet Alluvial Land soils are associated with floodplains or stream terraces, are frequently flooded and poorly drained, and have alluvium as parent material. They have a depth to groundwater of 12 to 42 inches on floodplains and 0 to 24 inches on terraces. The profile is variable, but often includes peat at the surface and gravelly sand to sandy loam.

Soil pits excavated in and near wetlands in the study area generally confirmed the mapped soil types. Soils generally contained some peat at the surface with a variable profile below. The Hydrogen Sulfide (A4), Depleted Matrix (F3), Redox Dark Surface (F6), and Histic Epipedon (H2) hydric soil indicators were documented in the wetland soil pits of the study area during the fieldwork.

5.0 Other Water Features

There are no other water features found in the study area. The Arkansas River flows immediately east of the site, but it is not contained within the study area (**Figure 2**).

6.0 Literature Cited

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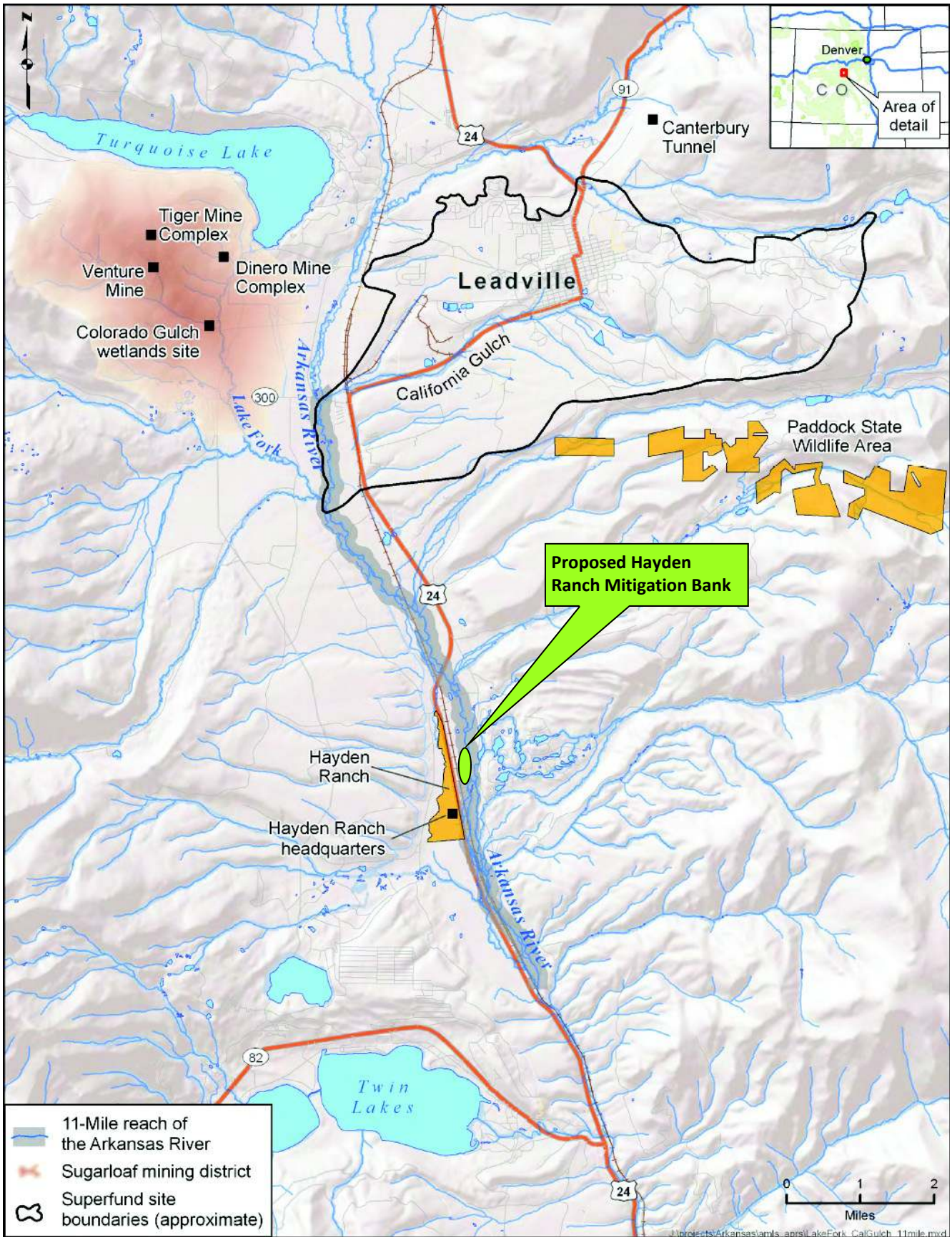


Fig.1. Area map showing the location of the proposed Hayden Ranch Mitigation bank. Modified form, the draft Upper Arkansas River Watershed Restoration Plant and Environmental Assessment, Stratus Consulting 2010.

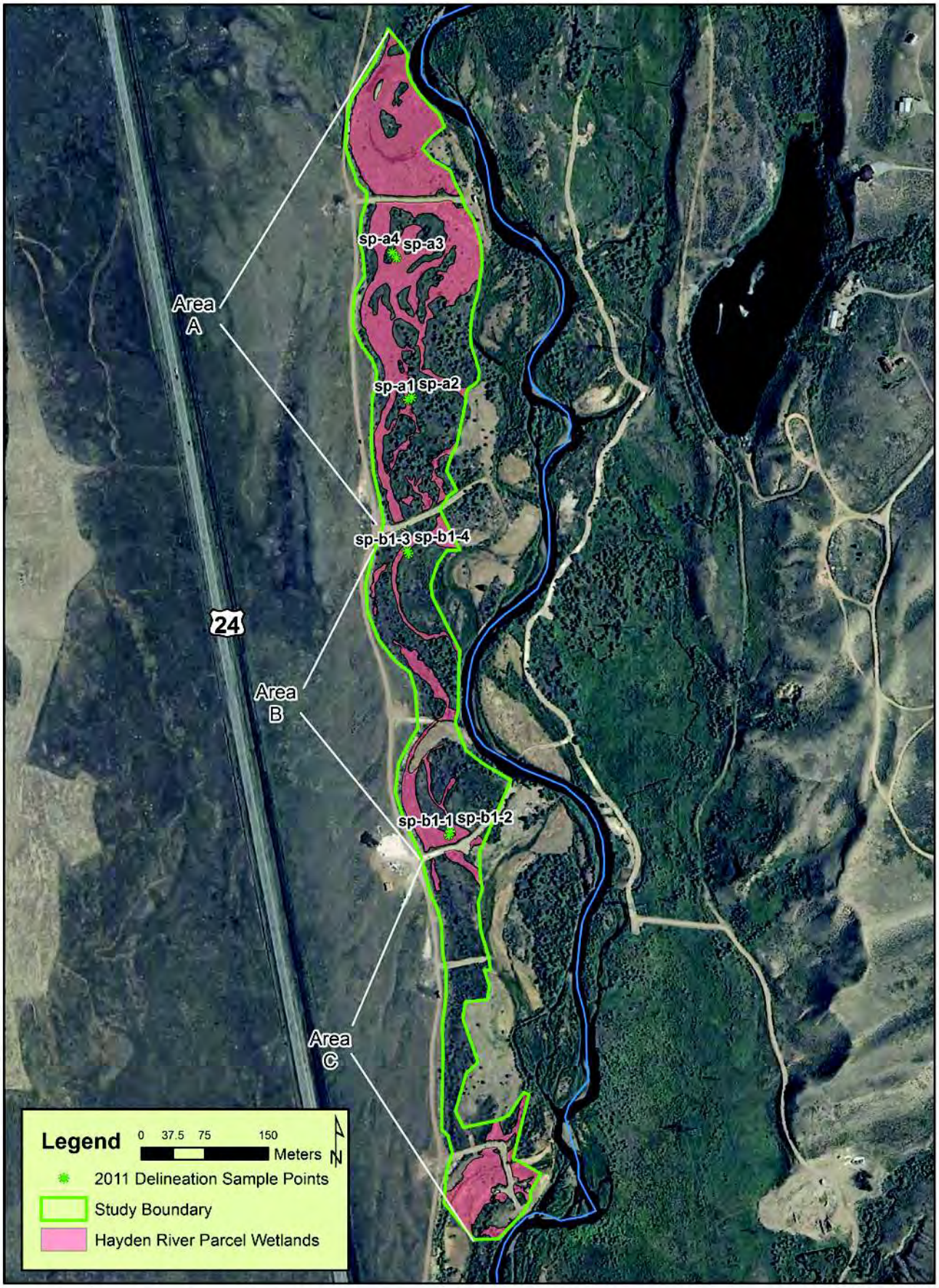

Area A
Area B
Area C
sp-a4
sp-a3
sp-a1
sp-a2
sp-b1-3
sp-b1-4
sp-b1-1
sp-b1-2
24
Legend
0 37.5 75 150
Meters
N
2011 Delineation Sample Points
Study Boundary
Hayden River Parcel Wetlands

Figure 2

Figure 2.1
Area A

Figure 2.2
Area B

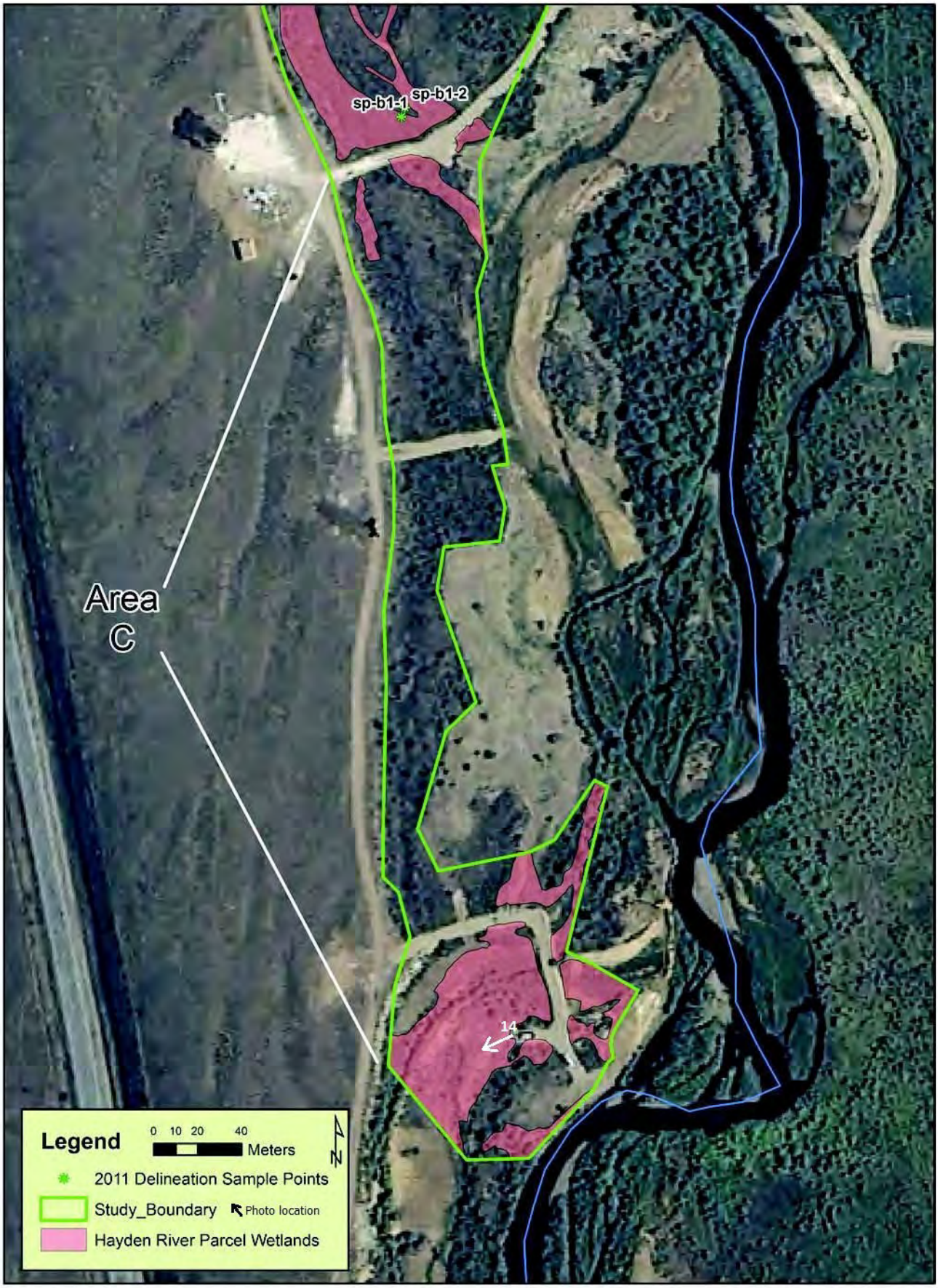


Figure 2.3
Area C

Appendix A
Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/27/11
Applicant/Owner: City of Aurora State: CO Sampling Point: SP-A1
Investigator(s): A. Herb Section, Township, Range: Sec 27, T10S, R80W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <1
Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.151989 Long: -106.318696 Datum: NAD 83
Soil Map Unit Name: Marsh (Mh) NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM wetland in meander scar

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 1×3m)			
1. Carex utriculata	70	Y	OBL
2. Juncus balticus	15	N	FACW
3. Deschampsia caespitosa	5	N	FACW
4. Achillea millifolium	5	N	FACU
5. Argentina anserina	2	N	OBL
6. Taraxacum officinale	1	N	FACU
7.			
8.			
9.			
10.			
11.			
	98 = Total Cover		49/20
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 2 2

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)
Total Number of Dominant Species Across All Strata: _____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
✓ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: Old meander scar wetland area; wetland perimeter mostly Elymus trachycaulus + Juncus balticus

SOIL

Sampling Point: SP-A1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/2	100	—	—	—	—	silty clay loam	lots of organics
8-12	10YR2/2	95	10YR5/6	5	C	M	silty clay loam	
12-16	10YR4/1	95	10YR5/6	5	C	M	sandy loam	
16+	cobble							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: —

Depth (inches): —

Hydric Soil Present? Yes ✓ No ___

Remarks: Lots of organics in upper 12"; cobble below 16"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: —

Remarks: Saturated to surface; likely high alluvial groundwater combined w/ overbank flows; meander scar ~ 2' v below surrounding grade.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/27/11

Applicant/Owner: City of Aurora State: CO Sampling Point: SP-A2

Investigator(s): A. Herb Section, Township, Range: Sec 27, T10S, R80W

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.152048 Long: -106.318602 Datum: NAD 83

Soil Map Unit Name: Marsh (Mh) NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Riparian area on terrace ~ 2'V above meander scar wetland (see SP-A1)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 1 x 3 m)			
1. Poa pratensis	40	Y	FACU
2. Elymus trachycaulus	20	Y	FACU
3. Antennaria microphylla	15	N	UPL
4. Cirsium scariosum	5	N	NI
5. Deschampsia caespitosa	2	N	FACW
6. Juncus balticus	2	N	FACW
7. Taraxacum officinale	2	N	FACU
8.			
9.			
10.			
11.			
	86 = Total Cover		43/17

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ~10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Terrace above meander scar; scattered salix nearby.

SOIL

Sampling Point: SP-A2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/3	100	–	–	–	–	Silty loam	
6-8	10YR 3/3	95	7.5YR 4/6	5	C	M	Silty loam	
8-14	10YR 3/2	90	10YR 4/6	10	C	M	Silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ___

Remarks: All layers dry; almost meets F6, but dark layer too deep (below 12")

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

—

Remarks: Dry; on terrace ~ 2' ↓ above meander scar wetland

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/27/11

Applicant/Owner: City of Aurora State: CO Sampling Point: SP-A3

Investigator(s): A. Herb Section, Township, Range: Sec 27, T10S, R80W

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.153421 Long: -106.318727 Datum: NAD 83

Soil Map Unit Name: Marsh (Mh) NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM wetland in meander scar

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 1 x 3m)			
1. Salix brachycarpa	1	Y	FACW
2.			
3.			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: 1 x 3m)			
1. Carex aquatilis	40	Y	OBL
2. Juncus balticus	25	Y	FACW
3. Deschampsia caespitosa	25	Y	FACW
4. Agrostis scabra	2	N	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	92 = Total Cover 46/18		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum ~5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: Hummocky; most of Caaq in low areas between hummocks w/ Juba and Deca on hummocks. Old meander scar.

SOIL

Sampling Point: SP-A3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR2/1	100	–	–	–	–	Silty clay loam	– lots of organics
8-18	10YR2/1	100	–	–	–	–	Silty clay loam	– H_2S

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✓ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: –

Depth (inches): –

Hydric Soil Present? Yes ✓ No ___

Remarks: H_2S in lower layer, saturated to surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ✓ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Nautral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Old meander scar – high groundwater + overbank flows seasonally

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/27/14
Applicant/Owner: City of Aurora State: CO Sampling Point: SP-A4
Investigator(s): A. Herb Section, Township, Range: Sec 27, T10S, R80W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <1
Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.153460 Long: -106.378807 Datum: NAD 83
Soil Map Unit Name: Marsh (Mh) NWI classification: —
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No ✓
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ✓	No ___	
Wetland Hydrology Present?	Yes ___	No ✓	

Remarks: Potential relict wetland; old peat layer on surface dry + cracked; appears to have had change in hydrology – invaded by upland plants

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ___)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ = Total Cover		

Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
	___ = Total Cover		

Herb Stratum (Plot size: 1 x 3m)			
1. Elymus trachycaulus	25	Y	FACU
2. Corydalis aurea	25	Y	UPL
3. Juncus balticus	15	Y	FACW
4. Poa pratensis	5	N	FACU
5. Argentina anserina	2	N	OBL
6. Cirsium scanosum	1	N	NI
7.			
8.			
9.			
10.			
11.			
	73 = Total Cover 36/14		

Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum ~25

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: May be relict wetland – adjacent to meander scar – appears to be transitioning to new veg community; ~1.5' higher than scar

SOIL

Sampling Point: SP-A4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	organic - fibric, but dry							
9+	Cobble							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ✓ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: —

Depth (inches): —

Hydric Soil Present? Yes ✓ No ___

Remarks: Appears to be old organic surface layer; now dry + cracked peat present; some salts on surface; invaded by upland plants

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: —

Remarks: Dry; ~ 1.5' V above meander scar wetland; relict wetland? Peat on surface dry + cracked

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/27/11
Applicant/Owner: City of Aurora State: CO Sampling Point: SP-B1
Investigator(s): A. Herb Section, Township, Range: Sec 27, T10S, R80W
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <1
Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.147277 Long: -106.319854 Datum: NAD 83
Soil Map Unit Name: Marsh (Mh) NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks: PEM wetland w/questionable hydric soils; clear evidence of wetland hydrology; meander scar of river

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 1 x 3 m)			
1. Juncus balticus	90	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ~10

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)
Total Number of Dominant Species Across All Strata: ____ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
✓ 1 - Rapid Test for Hydrophytic Vegetation
__ 2 - Dominance Test is >50%
__ 3 - Prevalence Index is ≤3.0[1]
__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ 5 - Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks: Dense monotypical stand of Juncus; virtually no other species present

SOIL

Sampling Point: SP-B1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	organics	–	–	–	–	–	–	roots
2-5	7.5YR 4/4	100	–	–	–	–	loamy sand	
5-16	10YR 3/1	60	7.5YR 4/6	40	C	M	silty clay loam, organics present	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks: No indicators observed but area may have been altered; soils are close to meeting F6, but redox layer runs too deep (>12").

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

—

Remarks: Soil damp; evidence of recent ponding, including drift deposits, algal mats + surface cracks; likely receives overbank flows + may have seasonally high groundwater

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/27/11

Applicant/Owner: City of Aurora State: CO Sampling Point: SP-B2

Investigator(s): A. Herb Section, Township, Range: Sec 27, T 10S, R 80W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.147365 Long: -106.317799 Datum: NAD 83

Soil Map Unit Name: Marsh (Mh) NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: Dry terrace between meander scars; no wetland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: 1 x 3 m)			
1. Muhlenbergia richardsonis	40	Y	FACW
2. Juncus balticus	10	N	FACW
3. Iris missouriensis	5	N	OBL
4. Carex aquatilis	2	N	OBL
5. Corydalis aurea	1	N	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	58 = Total Cover 29/12		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum ~40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ___ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: Upland edge of meander scar wetland; some dead Salix nearby

SOIL

Sampling Point: SP-B2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	organic	–	–	–	–	–	–	dry, cracked
5-16	7.5YR4/4	100	–	–	–	–	loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA** 1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: –

Depth (inches): –

Hydric Soil Present? Yes ___ No ✓

Remarks: No indicators; surface "O" layer very dry + cracked;

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

–

Remarks: No indicators; very dry; sample point ~1.0'V above wetland in meander scar

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/7/11

Applicant/Owner: City of Aurora State: CO Sampling Point: SP-B3

Investigator(s): A. Herb, J. Doran Section, Township, Range: Sec 27, T10S, R80W

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.150173 Long: -106.318653 Datum: NAD 83

Soil Map Unit Name: Marsh (Mh) NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: PEM wetland in meander scar; organic soil on surface (~5"); high groundwater

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 1 x 3 m)			
1. Salix planifolia	5	Y	OBL
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 1 x 3 m)			
1. Carex aquatilis	50	Y	OBL
2. Juncus balticus	20	Y	FACW
3. Cerastium sp.	5	N	?
4. Deschampsia cespitosa	3	N	FACW
5. Agrostis scabra	1	N	FAC
6. Achillea millefolium	1	N	FACU
7.			
8.			
9.			
10.			
11.			
	80 = Total Cover 40/16		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum ~15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: Dense PEM wetland in old channel/scar; scattered Salix along perimeter; lots of young Salix

SOIL

Sampling Point: SP-B3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	–	–	–	–	–	–	O	organic ; wet
5-14	2.5Y 3/1	100	–	–	–	–	Sandy loam ; wet	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✓ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: –

Depth (inches): –

Hydric Soil Present? Yes ✓ No ___

Remarks: Coarse sand mixed into profile (below 5")

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ✓ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): ~8

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: –

Remarks: High alluvial groundwater ; some overbank flows

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Hayden Meadows City/County: Leadville / Lake Sampling Date: 9/7/11

Applicant/Owner: City of Aurora State: CO Sampling Point: SP-B4

Investigator(s): A. Herb, J. Doran Section, Township, Range: Sec 27, T10S, R80W

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): <1

Subregion (LRR): Rocky Mtn Range + Forest Lat: 39.150174 Long: -106.378570 Datum: NAD 83

Soil Map Unit Name: Marsh (Mh) NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Riparian area adjacent to meander scar; relict hydric soils that appear to be covered by newer sediments

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		

Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		

Herb Stratum (Plot size: 1 x 3 m)			
1. Antennaria microphylla	40	Y	UPL
2. Trifolium hybridum	15	Y	FAC
3. Elymus trachycaulus	10	N	FACU
4. Deschampsia caespitosa	10	N	FACW
5. Carex aquatilis	5	N	OBL
6. Sisyrinchium montanum	3	N	FAC
7. Achillea millifolium	2	N	FACU
8. Taraxacum officinale	1	N	FACU
9. Solianthus romanzoffiana	1	N	FACW
10.			
11.			
	87 = Total Cover 44/17		

Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ~10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vascular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks: Diverse riparian area adjacent to meander scar; some very widely scattered young salix nearby

SOIL

Sampling Point: SP-B4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/2	50	10YR 4/6	50	C	M	silty clay loam;	roots present
5-8	10YR 2/1	100	—	—	—	—	organic;	former ground surface?
8-14+	10YR 4/2	95	10YR 5/6	5	C	M	loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: —

Depth (inches): —

Hydric Soil Present? Yes ✓ No ___

Remarks: Indicator F3; organic layer (5-8") may have once been on surface + buried during sedimentation event...

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: —

Remarks: Dump from recent/current precipitation, but no wetland hydro indicators present

Appendix B
Site Photographs

Photo 1 — Area B meander scar dominated by beaked sedge and water sedge, looking south

Photo 2 — Large portion of Area B wetland that is dominated by Baltic rush, looking north

Photo 3 — Relict wetland with dry and cracked surface peat layer

Photo 4 — Relict wetland with dry and cracked surface peat layer invaded by littleleaf pussytoes and other non-hydrophytes

Photo 5—Access road across wetlands in Area B for EPA remediation work along the river, looking east

Photo 6—Inundated meander scar wetland in Area A, looking north

Photo 7— SP-A1 (wetland in foreground) and SP-A2 (upland in background) in Area A, looking northeast

Photo 8—SP-A3 (wetland) in Area A, looking south

Photo 9—SP-A4 (upland), looking northeast

Photo 10—SP-B1 (wetland in foreground) and SP-B2 (upland in background), looking northeast

Photo 11—SP-B3 (wetland in background) and SP-B4 (upland in foreground), looking northwest

Photo 12—Wetland in Area A with dead and dying willow along the perimeter, looking southwest

Photo 13—Meander scar wetland in Area A, looking southeast

Photo 14—Wetland in Area C that abuts mine tailings, looking southwest

Attachment 2 – Plant Species List

List of plant species Identified in Hayden Bank monitoring plots

Species Name	Indicator Status	Synonym	Species Name	Indicator Status	Synonym
Achillea millefolium	FACU		*Pedicularis crenulata*	FACW	
Antennaria microphylla	FAC		*Dasiphora fruiticosa*	FAC	*Pentaphylloides floribunda*
Arabis pycnocarpa	FACU	*Arabis hirsuta*	*Poa compressa*	UPL	
Artemisia frigida	UPL		*Poa pratensis*	FAC	
Astragalus leptaleus	OBL		*Bistorta vivipara*	FAC	*Polygonum viviparum*
Symphytotrichum spathulatum	FAC	*Aster occidentalis*	*Potentilla anserina*	OBL	
Bistorta vivipara	OBL		*Potentilla breweri*	FAC	*Potentilla plattensis*
Bromus secalinus	UPL		*Potentilla glaucophylla*	FACU	*Potentialla pulcherimma*
Calamagrostis canadensis	FACW		*Ribes lacustre*	FAC	
Calamagrostis stricta	FACW		*Salix brachycarpa*	FACW	
Campanula parryi	FACU		*Salix geyeriana*	FACW	
Cardomine cordifolia	FACW		*Salix monticola*	OBL	
Carex aquatilis	OBL		*Salix planifolia*	OBL	
Carex praegracilis	FACW		*Sisrynchium montanum*	FAC	
Carex sp.	NA		*Spiranthes romanzoffiana*	FACW	
Carex utriculata	OBL		*Stellaria longipes*	FACW	
Cirsium scariosum	FAC	*Cirsium coloradense*	*Taraxacum officinale*	FACU	
Conioselinum scopulorum	FACW		*Thalictrum alpinum*	FACW	
Chrysothamnus parryi	UPL		*Trifolium repens*	UPL	
Crepis runcinata	FACU		*Viola adunca*	FAC	
Deschampsia cespitosa	FACW				
Descurainia incana	FACU	*Descurainia richardsonii*			
Dodecatheon pullchellum	FACW				
Elymus glaucous	FACU				
Elymus trachycalus	FAC				
Equisetum arvense	FAC				
Equisetum hymale	FACW				
Erigeron vetensis	UPL				
Fragaria vesca	FACU				
Festuca sp.	NA				
Hordeum brachyantherum	FACW				
Juncus balticus	FACW				
Kobresia bellardii	FAC	*Kobresia myosuroides*			
Koleria macrantha	UPL				
Lepidium ramosissimum	UPL				
Lomatagonium rotatum	OBL				
Maianthemum stellatum	FAC				
Muhlenbergia richardsonis	FAC				

Attachment 3 – Performance Standards

Attachment 12505.2 Worksheet for SPD Uniform Performance Standards for Compensatory Mitigation Requirements

1	Date: 7/23/2014 DA no.: Project manager:	Mitigation site name: ***Hayden River Parcel Mitigation Bank*** Cowardin/HGM type: ***Riverine, Palustrine emergent and S-S*** ***Habitat type: Impacted R2 HGM subclass – formerly well-developed floodplain riparian zone with multi-channel flow and beaver ponds*** Site coordinates: Center: Lat: ***39º 09' 05"*** Lon: ***-106º 19' 05"***	Reference site name: ***East Fk. Arkansas and Lower Tennessee Creek above their confluence*** Site coordinates: ***Up valley of::*** Lat: ***39º 15' 49"*** Lon: ***-106º 20' 23"***
2	Mitigation objective(s) to improve: [ ] habitat conservation/biodiversity; [ ] water storage/flow attenuation; [ ] water quality; [ ] target population of special status biota; [ ] specific aquatic resource function(s); [***x***] other: ***Overall ecological functioning of the aquatic habitat.***		
3	Mitigation type (select one): [***x***] re-establishment; [ ] establishment; [***x***] rehabilitation; [ ] enhancement		
	If enhancement, indicate function(s) to be increased: function 1: function 2 (if applicable): function 3 (if applicable):		
4	Primary type(s) of site treatment: [***x***] introduction of plant materials; [ ] invasive species control; [***x***] hydrological re-establishment; [***x***] topographic/substrate manipulation		
5	Aquatic resource type (select one): [***x***] riverine; [ ] depressional wetland; [ ] tidal wetland; [ ] slope wetland; [ ] other:		
6	Performance standard categories (select all that apply): [***x***] physical; [***x***] hydrologic; [***x***] fauna; [***x***] flora; [***x***] water quality (ecological)		
7	Using selections from 2-6 above, insert applicable performance standards and targets from .12505.1-SPD Table of Uniform Performance Standards for Compensatory Mitigation Requirements into worksheet rows below. Add or remove rows for any category, as needed.		

Categories/FACWet Variable Performance Standards: Target FACWet Score or % of target criterion

		Year 1:	Year 2:	Year 3:	Year 4:	Year 5:
Hydrologic -1 *Water Source*	(PS#6) Overbank flooding into the bank will occur when flow in the Arkansas R. is approximately 1000 cfs. Floodwaters will have full access to the length and breadth of the floodplain habitats within the bank. A passively functioning floodplain ingress will supply the natural network of distributary channels existing on the floodplain to support wetland hydrology in low flow conditions.	80	87	87	87	87
Hydrologic -2 *Water Distribution*	The water table will vary across the site as is characteristic of type-specific reference wetlands. Bank habitats will include hydrologic situations ranging from small, seasonal or perennial open water ponds and surface channels through to upland riparian buffer. To qualify as wetland are-establishment an historical wetland area must be re-induced to support wetland hydrology and hydric soils.	80	85	85	85	85
Hydrologic -3 *Water Distribution*	The Bank's floodplain habitats will have surface water storage capacity in character with type specific reference wetlands. This includes natural fluctuations in capacity, such as those caused by beaver activity.	80	85	85	85	85
Hydrologic -4 *Water Outflow*	Water passing through the Bank will passively return to the Arkansas River and/or its alluvial aquifer.	80	87	87	87	87

		Year 1:	Year 2:	Year 3:	Year 4:	Year 5:
Physical-1 *Geomorphology*	The riverine floodplain will provide physical features of macrotopographic and microtopographic complexity capable of dissipating energy and retaining water and organic material. Specifically: a. Cross-sectionally, the floodplain surface will possess and maintain features characteristic of reference habitats including shallow depressions, relict and active beaver (or constructed "beaver starter") dams, swales, and natural levees. b. Longitudinally, the floodplain will possess and maintain a dynamic network of inter-connected swales that will serve as the water distribution mechanism for the floodplain wetland and riparian habitat. c. The floodplain habitats within the Bank will possess and maintain microtopography characteristic of type-specific reference sites, for instance, low to moderate level of hummock-hollow microtopography, willow coppices, ant mounds and beaver-created features.	85	93	93	93	93
WQ-1 *Water and Soil Chemical Environment*	Redox potential: Soils in areas credited as wetland re-establishment or rehabilitation will have reduced soils in at least 50% of monitoring seasons.	80	85	87	87	87
Fauna-1 *NA*	Keystone species habitat: The intent of treatments is to induce colonization of the floodplain by beaver. Floodplain habitats in the bank will have the capacity to support dam building beaver.	50%	55%	60%	65%	70%
Flora-1 *Vegetation structure and Diversity (VSD)*	Survivorship: A number not less than 85% of the original number of willows planted will be established and actively growing at the end of the monitoring period.	85%	90%	95%	100%	100%
Flora -2 *VSD*	Dominance of hydrophytes: All areas credited as wetland re-establishment or rehabilitation will have hydrophytic vegetation. Vegetation monitoring plots will have hydrophytic vegetation as determined by the Corps prevalence index. If a plot does not hydrophytic vegetation, it and its surrounding habitat patch will be treated as upland riparian buffer.	85%	90%	95%	100%	100%
Flora -3 *VSD*	Dominance of natives: Monitoring plots will have vegetation with at least 90% of the total cover comprised of native species.	85%	90%	95%	100%	100%
Flora -4 VSD	Species richness: As documented in monitoring plots, species richness will be at least 75% of that of comparable reference habitat.	85%	90%	95%	100%	100%
Flora -5 VSD	Spatial habitat heterogeneity: The Bank's habitats will possess and maintain vegetative habitat heterogeneity characteristic of riverine wetlands. Horizontally, habitats will be patchy, interspersed and/or possess characteristic zonation. Existing vertical structure will be maintained in areas that have retained mature willow canopies. In areas that have lost all or most of the willow canopy, a new shrub layer will be established and will be developing toward forming a new over story.	70	75	80	83	87

Attachment 4 – Warranty Deed and Property Survey

316674 04/22/1998 12:55P B532 P868 WD
1 of 9 R 0.00 D 0.00 N 0.00 Lake County Clerk

(3)
Exempt
Gov't Entity
is Grantee

STATE DOCUMENTARY FEE
EXEMPT
LAKE COUNTY, COLORADO

WARRANTY DEED

THIS WARRANTY DEED, is made this 15th day of APRIL, 1998, between Twin Ark Valley, Limited., a Colorado limited partnership, whose registered office address 8490 East Crescent Parkway, Suite 250, Greenwood Village, Arapahoe County, Colorado 80111 ("Seller"), and the City of Aurora, Colorado, a Colorado municipal corporation of the Counties of Adams, Arapahoe and Douglas, acting by and through its Utility Enterprise, whose address is 1470 South Havana Street, Suite 400, Aurora, Arapahoe County, Colorado 80012 ("Buyer").

WITNESSETH

For and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration to the Seller in hand paid by the Buyer, the receipt, adequacy and sufficiency of which are hereby confessed and acknowledged by the Seller, the Seller has sold and conveyed, and by these presents does, sell, convey and confirm unto the Buyer, its successors and assigns forever, the following described property situate in Lake County, Colorado:

The property described in Exhibit A, attached hereto.

Together with all and singular the hereditaments and appurtenances thereunto belonging or in any way appertaining, and the reversions and remainders, rents, issues and profits therefrom, and all the estate, right, title, interest, claim and demand whatsoever of the Seller either in law or in equity, of, in and to the above-bargained premises, with all hereditaments and appurtenances and the Seller **warrants the title to the same** except for those items set forth in Exhibit F, attached hereto.

SELLER:

TWIN ARK VALLEY, LIMITED,
a Colorado limited partnership

By: Moore Financial Services, Inc.,
a Colorado corporation, General Partner

By: William M. Moore
William M. Moore, President

3742 LCAC

316674 04/22/1998 12:55P B532 P869 WD
2 of 9 R 0.00 D 0.00 N 0.00 Lake County Clerk

STATE OF COLORADO)
) ss
COUNTY OF Arapahoe

The foregoing instrument was subscribed and sworn before me this 15 day of April, 1998, by William A. Moore, President of Moore Financial Services, Inc., a Colorado corporation, General Partner of Twin Ark Valley, Limited, a Colorado limited partnership, on behalf of the Limited Partnership.

Witness my hand and official seal.

Mary Jane Davies
Notary Public

MARY JANE DAVIES NOTARY PUBLIC STATE OF COLORADO
SEAL

My commission expires: 11-22-98

316674 04/22/1998 12:55P B532 P870 WD
3 of 9 R 0.00 D 0.00 N 0.00 Lake County Clerk

EXHIBIT A

The following described property in Lake County, Colorado:

Township 10 South, Range 80 West, 6th P.M.
Section 22: S/2NW/4, SW/4, W/2SE/4
Section 27: E/2NW/4, NW/4NW/4, W/2NE/4, E/2SW/4, W/2SE/4, SE/4SE/4
Section 34: ALL
Section 35: SW/4 less one acre occupied by school.

Township 11 South, Range 80 West, 6th P.M.
Section 2: S/2SW/4, NW/4SW/4
Section 3: E/2, E/2NW/4
Section 10: SW/4, E/2NE/4
Section 11: W/2, W/2NE/4, W/2SE/4, SE/4SE/4

LESS AND EXCEPT THE FOLLOWING DESCRIBED PORTIONS OF LAND:

1. That portion of Section Twenty-Seven (27), Township 10 South, Range 80 West of the 6th P.M., as described in Warranty Deed to Mount Massive Lakes, Inc., a corporation, recorded February 17, 1954 in Book 318 at Page 57 of the Lake County, Colorado records, to-wit:

Tract No. 1
All that part of the Northwest Quarter Northeast Quarter (NW/4NE/4) of Section 27, Township 10 South, Range 80 West of the 6th P.M. , and all that part of the Southwest Quarter Southeast Quarter (SW/4SE/4) of Section 22 of said Township and Range described as follows:

"Beginning at Witness Corner to Corner No. 22 of the Callahan Ranch, a steel rail set in concrete at 162 feet South of said Corner No. 22 which is identical with the Northeast Corner of the NW/4 of the NE/4 of said Section 27; and running thence along the East lines of said subdivision north 500 feet,; thence West 100 feet; thence South 500 feet; thence East 100 feet to the place of beginning, containing 1.15 acres."

Tract No. 2
All that part of the SW/4NE/4 of Section 27, Township 10 South, Range 80 West of the 6th P.M., described as follows:

"Beginning at a point on the East boundary of said subdivision N. 660 ft, from the Southeast corner of said subdivision and 1950 feet from Corner No. 23 of the Callahan Ranch; and running thence along the East boundary of said subdivision N. 450 ft.; thence W. 100 ft; thence S. 450 ft.; thence E. 100 ft. to the place of beginning. Containing 1.03 acres."

Tract No. 3
All that part of the SE/4SE/4 of Section 27, Township 10 South, Range 80 West of the 6th P.M. described as follows:

"Beginning at Corner No 24 of the Callahan Ranch, a steel rail set in concrete to mark the Northeast corner of said subdivision; and running thence along the East boundary of said subdivision S. 440 feet; thence W. 150 feet; thence N. 440 feet; thence E along North boundary of said subdivision 150 feet to the place of beginning. Containing 1.52 acres."

2. That portion conveyed by Warranty Deed to the Denver and Rio Grande Western Railroad Company, recorded in Book 335 at Page 165 of the Lake County, Colorado records, to wit:

A 75 foot wide strip of land near Kobe, Lake County, Colorado, lying between lines parallel with and 25 feet and 100 feet easterly at right angles from the center lines of the main track of the Denver and Rio Grande Western Railroad Company, as said track is presently constructed and operated over and across the SE/4 of Section 34, T10S, R80W, and the NE/4NE/4 of Section 3, T11S, R80W of the 6th P.M., containing 7.12 acres, more or less.

3. Those portions conveyed to Mt. Elbert Plamor Ranch, Inc., a Colorado corporation, by Warranty Deed and Correction Warranty Deed, recorded in Book 347 at Pages 349 and 350, Lake County, Colorado records, to-wit:

All of Twin Lakes Addition No. 1A of the Mt. Elbert Plamor Ranch; all of Twin Lakes Addition No. 1B of the Mt. Elbert Plamor Ranch; all of South Arkansas Addition No. 2A of the Mt. Elbert Plamor Ranch; all of the SE/4SE/4 Section 11 lying East of the Arkansas River; all of the SE/4SW/4 and all of the NW/4SW/4 of Section 2 lying East of the Arkansas River; and all of the NE/4 of Section 3 lying East of the Arkansas River, all in T11S, R80W of the 6th P.M.; all of the E/2 of Section 34 lying East of the Arkansas River; all of the W/2NE/4 and all of the SE/4 of Section 27, except the NE/4SE/4 of said Section 27; lying East of the Arkansas River; all of the W/2SE/4 of Section 22 lying East of the Arkansas River, and all of the SW/4 Section 35, all in T10S, R80W of the 6th P.M.

Excepting therefrom and expressly reserving to the said grantors a strip of land 20 feet in width adjacent to any land which is subject to the control and supervision of the United States Bureau of Land Management as

conveyed by Deed from Twin Lakes Corporation to Mt. Elbert Plamor Ranch dated 8/31/67 and recorded 9/8/67 in Book 373 at Page 10.

4. That portion conveyed by Warranty Deed, recorded February 20, 1963, in Book 350 at Page 440 of the Lake County, Colorado records to the Mt. Elbert Plamor Ranch, Inc., a Colorado corporation, described as follows:

> That strip of land 20 feet in width adjacent to all lands subject to the control and supervision of the Bureau of Land Management as the same is described and reserved to the grantors in that certain deed between Robert S. Erickson, Helen G. Erickson, Clayton Hill and Mt. Elbert Plamor Ranch, Inc., a Colorado corporation, recorded March 7, 1962, Reception No. 232637 in Book 347 at Page 349, Lake County, Colorado records.

5. That portion conveyed by Quitclaim Deed to Lake County, Colorado dated July 21, 1908 and recorded July 22, 1908 in Book 210 at Page 510 of the Public Records of Lake County, Colorado, described as follows:

> A strip of ground sixty (60) feet wide being a part of Section 22, Township 10 South, Range 80 West of the 6th P.M. extending thirty (30) feet on each side of a line beginning at a point on the county road between Leadville, Colorado, and Granite, Colorado, whence the East quarter-corner (E 1/4 corner) to said Section 22, Twp. 10 S., Rge. 80 W of the 6th P.M. bears N 88°45'E 1375.3 ft. Running thence West 1245 feet to a point. Thence South 22°25' West 221 feet to a point, thence South 54°49' West 127.8 feet to a point; thence South 62°48' West 1510 feet to a point; thence South 50°43' West 96.15 feet to a point on the County road from Leadville, Colorado to Twin Lakes, Colorado, containing 5.28 acres, exclusive of right-of-way of Denver and Rio Grande and Colorado Midland and Aspen Shortline Railroads.

6. That portion conveyed by Warranty Deed, recorded June 10, 1964, in Book 355 at Page 255 of the Lake County, Colorado records from the Twin Lakes Corporation, a Colorado corporation, to Pan-Ark Lodges, Inc., a Colorado corporation, described as follows:

> Commencing at a point on the South Section line at a point 1394.2 feet West of the Southeast corner of Section thirty-four (34), Township 10 South, Range 80 West of the 6th P.M., Lake County, Colorado, thence West 600 feet; thence Northwest and parallel to the West limits of Highway 24, 1,000 feet; thence East with an inside angle of 68°10' and parallel with the South Section line 600 feet to the West Right-of-Way limit of Highway 24; thence Southeast along Right-of-Way of Highway 24, 1,000 feet to the place of beginning.

Including with all of the above described property all oil, gas and minerals except that which is listed in Exhibit F attached.

EXHIBIT F

EXCEPTIONS TO TITLE CONCERNING LAND

1. Rights or claims of parties in possession, not shown by the public records.

2. Easements, or claims of easements, not shown by the public records.

3. Discrepancies, conflicts in boundary lines, shortage in area, encroachments, and any facts which a correct survey and inspection of the premises would disclose and which are not shown by the public records.

4. Any lien, or right to a lien, for services, labor or material heretofore or hereafter furnished, imposed by law and not shown by the public records.

5. Taxes and assessments which are a lien or due and payable; and any tax, special assessments, charges or lien imposed for water or sewer service, or for any other special taxing district, any unredeemed tax sales.

6. All existing roads, ditches, reservoirs, utilities, canals, pipe lines, power, telephone, sewer or water lines and rights of way and easements therefor.

7. Right-of-way for ditches and canals constructed by the authority of the United States upon portions of the subject property as reserved by Patents of record.

8. Right-of-way for Western Slope Gas Company 50 feet in width for the construction, operation and maintenance of its pipe lines to transport oil and gas and appurtenances as granted by instruments recorded October 5, 1962 in Book 349 at Page 381; October 5, 1962 in Book 349 at Page 382 and November 16, 1964 in Book 357 at Page 312.

9. Right-of-way for the Henderson and DeLappe Ditch as disclosed by Map and Statement filed June 14, 1987 in Book W2 at Page 558.

10. Right-of-way for Public Service Company of Colorado to construct, operate and maintain its electric transmission lines and appurtenances, as granted by instruments recorded October 9, 1962 in Book 349 at Page 392; August 10, 1949 in Book 296 at Page 556; August 10, 1949 in Book 296 at Page 557 and May 29, 1979 in Book 436 at Page 169.

11. Right-of-way for Mountain States Telephone and Telegraph Company to construct, operate and maintain its communication system consisting of buried cable and wires and appurtenances upon Section 22, Township 10 South, Range

80 West as granted by instrument recorded December 15, 1950 in Book 308 at Page 483.

12. One-fourth of any and all minerals within the S½ of Section 31 and the W ½ W ½ SW ¼ of Section 32, Township 9 South, Range 80 West of the 6th P.M. and N ½ N ½ of Section 6 and W ½ NW ¼ NW ¼ of Section 5, Township 10 South, Range 80 West as reserved to Agnes Zilmer, Charles M. Irwin and Flow Irwin by deed recorded July 30, 1952 in Book 314 at Page 196.

13. Water and water rights and priorities for the use of water appurtenant to said described premises; ditches and ditch rights.

14. Quit Claim Deed to the County of Lake for road purposes conveying a tract 30 feet wide connecting U.S. Highway 24 to old County Road, in Sections 34 and 35, Township 10 South, Range 80 West of the 6th P.M. and Sections 2 and 3, Township 11 South, Range 80 West of the 6th P.M., as recorded July 6, 1960 in Book 340 at Page 296.

15. Decree Changing Point of Diversion of the Henderson-DeLappe Ditch and Joseph Dunn Ditch as recorded May 15, 1967 in Book 371 at Page 59, Lake County, Colorado records.

16. Reservations, conditions and stipulations contained in the Patents, if any, for the subject property.

17. Contracts and Grants of Easements as given by Twin Ark Valley, Ltd., a Colorado Limited Partnership, to the United States of America recorded August 19, 1976 in Book 417 ate Page 589; September 15, 1976 in Book 418 at Page 411 and March 16, 1976 in Book 414 at Page 501.

18. Any question, dispute or adverse claims as to any loss or gain of land as a result of any change in the river bed location by other than natural causes, or alteration through accretion, reliction, erosion or avulsion of the center thread, bank, channel or flow of waters in the Arkansas River lying within subject land; and any question as to the location of such center thread, bed, bank or channel as a legal description monument or marker for purposes of describing or locating subject lands. NOTE: There are no documents in the land records of the office of the Clerk and Recorder of Lake County accurately locating past or present location of the center thread, bank, bed or channel of the above river or indicating any alterations of the same as from time to time may have occurred.

19. Any rights, interest or easements in favor of the State of Colorado, the United States of America or the general Public, which exist or are claimed to exist in and over the waters and present and past bed and banks of the Arkansas River.

20. Affidavit concerning Public Road filed for Henry H. Blake, Jr., et al. affecting part of Sections 34, Township 10 South, Range 80 West and Sections 1, 2 and 11,

Township 11 South, Range 80 West of the 6th P.M. recorded August 10, 1988 in Book 486 at Page 599 and re-recorded in Book 486 at Page 683 on August 16, 1988.

21. Right-of-way for U.S. Highway 24 as it affects the subject property.

22. Ruling and Order, Case No. 6510, filed March 8, 1956 in Book 324 at Page 152 regarding access to rights of ways owned by the Colorado State Highway Department.

23. Property is situate within the Upper Arkansas Soil Conservation District and Lake County Soil Conservation District, and, therefore, is subject to the liens and assessments levied or to be levied by reason of inclusion within said Districts, and certain portions of the subject property have been included in the description shown on Certificate of Addition by Transfer from Upper Arkansas Soil Conservation District to the Lake County Soil Conservation District recorded May 12, 1977 in Book 422 at Page 480.

24. Private Way License Agreement given by the Denver and Rio Grande Western Railroad Company for a tract situate within the SW ¼ of Section 22, Township 10 South, Range 80 West of the 6th P.M. as evidenced by instrument recorded October 6, 1982 in Book 461 at Page 819.

25. Ruling of Referee issued to Parkville Water District, Applicant filed for record January 5, 1995 in Book 512 at Page 817.

CITY OF AURORA (HAYDEN RANCH) BOUNDARY SURVEY

A PORTION OF SECTION 2, SECTION 3, SECTION 10 AND SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN
AND A PORTION OF SECTION 22, SECTION 27 AND SECTION 34,
TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN
LAKE COUNTY, COLORADO

LEGAL DESCRIPTION AS RECORDED IN LAKE COUNTY
BOOK 532, PAGE 868

EXHIBIT A

THE FOLLOWING DESCRIBED PROPERTY IN LAKE COUNTY, COLORADO:

TOWNSHIP 10 SOUTH, RANGE 80 WEST, 6TH P.M.
SECTION 22: S/2NW/4, SW/4, W/2SE/4
SECTION 27: E/2NW/4, NW/4NW/4, W/2NE/4, E/2SW/4, W/2SE/4, SE/4SE/4
SECTION 34: ALL
SECTION 35: SW/4 LESS ONE ACRE OCCUPIED BY SCHOOL

TOWNSHIP 11 SOUTH, RANGE 80 WEST, 6TH P.M.
SECTION 2: S/2SW/4, NW/4SW/4
SECTION 3: E/2, E/2NW/4
SECTION 10: SW/4, E/2NE/4
SECTION 11: W/2, W/2NE/4, W/2SE/4, SE/4SE/4

LESS AND EXCEPT THE FOLLOWING DESCRIBED PORTIONS OF LAND:

1. THAT PORTION OF SECTION TWENTY-SEVEN (27), TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M., AS DESCRIBED IN WARRANTY DEED TO MOUNT MASSIVE LAKES, INC., A CORPORATION, RECORDED FEBRUARY 17, 1954 IN BOOK 318 AT PAGE 57 OF THE LAKE COUNTY, COLORADO RECORDS, TO-WIT:

TRACT NO. 1
ALL THAT PART OF THE NORTHWEST QUARTER NORTHEAST QUARTER (NW/4NE/4) OF SECTION 27, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M., AND ALL THAT PART OF THE SOUTHWEST QUARTER SOUTHEAST QUARTER (SW/4SE/4) OF SECTION 22 OF SAID TOWNSHIP AND RANGE DESCRIBED AS FOLLOWS:

"BEGINNING AT WITNESS CORNER TO CORNER NO. 22 OF THE CALLAHAN RANCH, A STEEL RAIL SET IN CONCRETE AT 162 FEET SOUTH OF SAID CORNER NO. 22 WHICH IS IDENTICAL WITH THE NORTHEAST CORNER OF THE NW/4 OF THE NE/4 OF SAID SECTION 27; AND RUNNING THENCE ALONG THE EAST LINES OF SAID SUBDIVISION NORTH 500 FEET; THENCE WEST 100 FEET; THENCE SOUTH 500 FEET; THENCE EAST 100 FEET TO THE PLACE OF BEGINNING, CONTAINING 1.15 ACRES."

TRACT NO. 2
ALL THAT PART OF THE SW/4NE/4 OF SECTION 27, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M., DESCRIBED AS FOLLOWS:
"BEGINNING AT A POINT ON THE EAST BOUNDARY OF SAID SUBDIVISION N. 660 FT. FROM THE SOUTHEAST CORNER OF SAID SUBDIVISION AND 1950 FEET FROM CORNER NO. 23 OF THE CALLAHAN RANCH; AND RUNNING THENCE ALONG THE EAST BOUNDARY OF SAID SUBDIVISION N. 450 FT.; THENCE W. 100 FT; THENCE S. 450 FT.; THENCE E. 100 FT. TO THE PLACE OF BEGINNING. CONTAINING 1.03 ACRES."

TRACT NO. 3
ALL THAT PART OF THE SE/4SE/4 OF SECTION 27, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M. DESCRIBED AS FOLLOWS:

"BEGINNING AT CORNER NO 24 OF THE CALLAHAN RANCH, A STEEL RAIL SET IN CONCRETE TO MARK THE NORTHEAST CORNER OF SAID SUBDIVISION; AND RUNNING THENCE ALONG THE EAST BOUNDARY OF SAID SUBDIVISION S. 440 FEET; THENCE W. 150 FEET; THENCE N. 440 FEET; THENCE E ALONG NORTH BOUNDARY OF SAID SUBDIVISION 150 FEET TO THE PLACE OF BEGINNING. CONTAINING 1.52 ACRES."

2. THAT PORTION CONVEYED BY WARRANTY DEED TO THE DENVER AND RIO GRANDE WESTERN RAILROAD COMPANY, RECORDED IN BOOK 335 AT PAGE 165 OF THE LAKE COUNTY, COLORADO RECORDS, TO WIT:

A 75 FOOT WIDE STRIP OF LAND NEAR KOBE, LAKE COUNTY, COLORADO, LYING BETWEEN LINES PARALLEL WITH AND 25 FEET AND 100 FEET EASTERLY AT RIGHT ANGLES FROM THE CENTER LINES OF THE MAIN TRACK OF THE DENVER AND RIO GRANDE WESTERN RAILROAD COMPANY AS SAID TRACK IS PRESENTLY CONSTRUCTED AND OPERATED OVER AND ACROSS THE SE/4 OF SECTION 34, T10S, R80W, AND THE NE/4NE/4 OF SECTION 3, T11S, R80W OF THE 6TH P.M., CONTAINING 7.12 ACRES, MORE OR LESS.

3. THOSE PORTIONS CONVEYED TO MT. ELBERT PLAMOR RANCH, INC., A COLORADO CORPORATION, BY WARRANTY DEED AND CORRECTION WARRANTY DEED, RECORDED IN BOOK 347 AT PAGES 349 AND 350, LAKE COUNTY, COLORADO RECORDS, TO-WIT:

ALL OF TWIN LAKES ADDITION NO. 1A OF THE MT. ELBERT PLAMOR RANCH, ALL OF TWIN LAKES ADDITION NO. 1B OF THE MT. ELBERT PLAMOR RANCH; ALL OF SOUTH ARKANSAS ADDITION NO. 2A OF THE MT. ELBERT PLAMOR RANCH; ALL OF THE SE/4SE/4 SECTION 11 LYING EAST OF THE ARKANSAS RIVER, ALL OF THE SE/4SW/4 AND ALL OF THE NW/4SW/4 OF SECTION 2 LYING EAST OF THE ARKANSAS RIVER; AND ALL OF THE NE/4 OF SECTION 3 LYING EAST OF THE ARKANSAS RIVER, ALL IN T11S, R80W OF THE 6TH P.M.; ALL OF THE E/2 OF SECTION 34 LYING EAST OF THE ARKANSAS RIVER, ALL OF THE W/2NE/4 AND ALL OF THE SE/4 OF SECTION 27, EXCEPT THE NE/4SE/4 OF SAID SECTION 27; LYING EAST OF THE ARKANSAS RIVER, ALL OF THE W/2SE/4 OF SECTION 22 LYING EAST OF THE ARKANSAS RIVER, AND ALL OF THE SW/4 SECTION 35, ALL IN T10S, R80W OF THE 6TH P.M.

EXCEPTING THEREFROM AND EXPRESSLY RESERVING TO THE SAID GRANTORS A STRIP OF LAND 20 FEET IN WIDTH ADJACENT TO ANY LAND WHICH IS SUBJECT TO THE CONTROL AND SUPERVISION OF THE UNITED STATES BUREAU OF LAND MANAGEMENT AS CONVEYED BY DEED FROM TWIN LAKES CORPORATION TO MT. ELBERT PLAMOR RANCH DATED 8/31/67 AND RECORDED 9/8/67 IN BOOK 373 AT PAGE 10.

4. THAT PORTION CONVEYED BY WARRANTY DEED, RECORDED FEBRUARY 20, 1963, IN BOOK 350 AT PAGE 440 OF THE LAKE COUNTY, COLORADO RECORDS TO THE MT. ELBERT PLAMOR RANCH, INC., A COLORADO CORPORATION, DESCRIBED AS FOLLOWS:

THAT STRIP OF LAND 20 FEET IN WIDTH ADJACENT TO ALL LANDS SUBJECT TO THE CONTROL AND SUPERVISION OF THE BUREAU OF LAND MANAGEMENT AS THE SAME IS DESCRIBED AND RESERVED TO THE GRANTORS IN THAT CERTAIN DEED BETWEEN ROBERT S. ERICKSON, HELEN G. ERICKSON, CLAYTON HILL AND MT. ELBERT PLAMOR RANCH, INC., A COLORADO CORPORATION RECORDED MARCH 7, 1962, RECEPTION NO. 232637 IN BOOK 347 AT PAGE 349, LAKE COUNTY, COLORADO RECORDS.

5. THAT PORTION CONVEYED BY QUITCLAIM DEED TO LAKE COUNTY, COLORADO DATED JULY 21, 1908 AND RECORDED JULY 22, 1908 IN BOOK 210 AT PAGE 510 OF THE PUBLIC RECORDS OF LAKE COUNTY, COLORADO, DESCRIBED AS FOLLOWS:

A STRIP OF GROUND SIXTY (60) FEET WIDE BEING A PART OF SECTION 22, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M. EXTENDING THIRTY (30) FEET ON EACH SIDE OF A LINE BEGINNING AT A POINT ON THE COUNTY ROAD BETWEEN LEADVILLE, COLORADO, AND GRANITE, COLORADO, WHENCE THE EAST QUARTER CORNER (E ¼ CORNER) TO SAID SECTION 22, TWP. 10S, RGE. 80 W OF THE 6TH P.M. BEARS N 88° 45' E 1375.3 FT. RUNNING THENCE WEST 1245 FEET TO A POINT. THENCE SOUTH 22° 25' WEST 221 FEET TO A POINT THENCE SOUTH 54° 49' WEST 127.8 FEET TO A POINT; THENCE SOUTH 62° 48' WEST 1510 FEET TO A PONT; THENCE SOUTH 50° 43' WEST 96.15 FEET TO A POINT ON THE COUNTY ROAD FROM LEADVILLE, COLORADO TO TWIN LAKES, COLORADO, CONTAINING 5.28 ACRES, EXCLUSIVE OF RIGHT-OF-WAY OF DENVER RIO GRANDE AND COLORADO MIDLAND AND ASPEN SHORTLINE RAILROADS.

6. THAT PORTION CONVEYED BY WARRANTY DEED, RECORDED JUNE 10, 1964, IN BOOK 355 AT PAGE 255 OF THE LAKE COUNTY, COLORADO RECORDS FROM THE TWIN LAKES CORPORATION, A COLORADO CORPORATION, TO PAN-ARK LODGES, INC., A COLORADO CORPORATION, DESCRIBED AS FOLLOWS:

COMMENCING AT A POINT ON THE SOUTH SECTION LINE AT A POINT 1394.2 FEET WEST OF THE SOUTHEAST CORNER OF SECTION THIRTY-FOUR (34), TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M., LAKE COUNTY, COLORADO, THENCE WEST 600 FEET; THENCE NORTHWEST AND PARALLEL TO THE WEST LIMITS OF HIGHWAY 24, 1,000 FEET; THENCE EAST WITH AN INSIDE ANGLE OF 68° 10' AND PARALLEL WITH THE SOUTH SECTION LINE 600 FEET TO THE WEST RIGHT-OF-WAY LIMIT OF HIGHWAY 24; THENCE SOUTHEAST ALONG RIGHT-OF-WAY OF HIGHWAY 24, 1,000 FEET TO THE PLACE OF BEGINNING.

INCLUDING WITH ALL OF THE ABOVE DESCRIBED PROPERTY ALL OIL, GAS AND MINERALS EXCEPT THAT WHICH IS LISTED IN EXHIBIT F.

GENERAL NOTES:

1) THE BASIS OF BEARING FOR THIS BOUNDARY SURVEY IS GEODETIC NORTH ESTABLISHED FROM G.P.S. OBSERVATIONS ALONG THE WEST LINE OF THE NORTHWEST QUARTER OF SECTION 3, TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE SIXTH PRINCIPAL MERIDIAN HAVING A BEARING OF SOUTH 00°04'08" EAST BEING MARKED AT EACH END BY B.L.M. BRASS CAPS AS SHOWN AND DESCRIBED HEREON.

2) THE PURPOSE OF THIS SURVEY IS TO ESTABLISH THE BOUNDARY OF A PARCEL OF LAND FORMERLY KNOWN AS THE HAYDEN RANCH.

3) THE HIGHWAY RIGHT OF WAY DEPICTED HEREON IS TAKEN FROM A MAP ENTITLED "COLORADO STATE HIGHWAY DEPARTMENT PLAN AND PROFILE OF PROPOSED FEDERAL AID PROJECT NO. 152-B STATE HIGHWAY NO. 4, LAKE COUNTY" DATED MARCH 25, 1936.

4) ALL SET MONUMENTS TO CONFORM TO B.L.M. STANDARDS AND COLORADO REVISED STATUTES.

5) LEGAL DESCRIPTION OF PROPERTY DEPICTED HEREON IS BASED UPON TITLE POLICY NUMBER 06-3053-106-1389 ISSUED BY LAKE COUNTY ABSTACT.

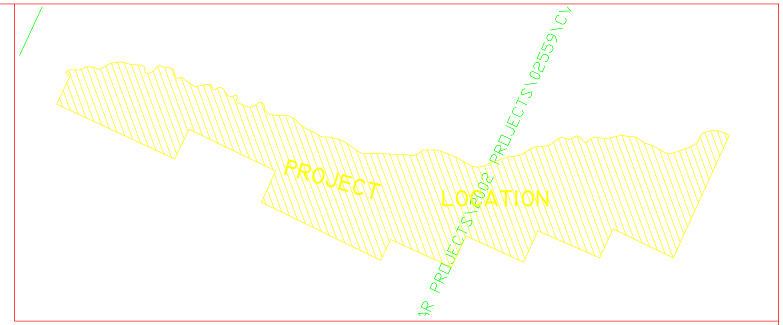
LEGEND

Symbol	Description
▲ (yellow triangle)	SET 5/8" REBAR W/ 1 1/2" ALUM. CAP LS 31544
⊕	FOUND MONUMENTATION AS NOTED
FND-STONE	FOUND STONE MONUMENT
FNDRBST	FOUND REBAR WITH STEEL TAG
FNDBC	FOUND B.L.M. BRASS CAP
FNDRBAC	FOUND REBAR WITH ALUMINUM CAP
—— GAS ——	GAS LINE MARKERS
┼┼┼┼┼┼┼┼┼	RAILROAD TRACKS
—— x ——	FENCE
— · · — · · —	RIVER EDGE
— · — · —	RAILROAD RIGHT OF WAY
—— OHE ——	OVERHEAD ELECTRIC LINES
▲ WC	WITNESS CORNER

I, CHARLES E. BEAR, A REGISTERED LAND SURVEYOR, LICENSED TO PRACTICE IN THE STATE OF COLORADO, DO HEREBY STATE THAT THIS LAND SURVEY WAS PREPARED UNDER MY DIRECT SUPERVISION, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

____
CHARLES E. BEAR PLS 31544

NOTICE:
ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.



VICINITY MAP

N.T.S.

EXHIBIT F

EXCEPTIONS TO TITLE CONCERNING LAND

1. RIGHTS OF CLAIMS OF PARTIES IN POSSESSION, NOT SHOWN BY THE PUBLIC RECORDS.

2. EASEMENTS, OR CLAIMS OF EASEMENTS, NOT SHOWN BY THE PUBLIC RECORDS.

3. DISCREPANCIES, CONFLICTS N BOUNDARY LINES, SHORTAGE IN AREA, ENCROACHMENTS, AND ANY FACTS WHICH A CORRECT SURVEY AND INSPECTION OF THE PREMISES WOULD DISCLOSE AND WHICH ARE NOT SHOWN BY THE PUBLIC RECORDS.

4. ANY LIEN, OR RIGHT TO A LIEN, FOR SERVICES, LABOR OR MATERIAL HERETOFORE OR HEREAFTER FURNISHED, IMPOSED BY LAW AND NOT SHOWN BY THE PUBLIC RECORDS.

5. TAXES AND ASSESSMENTS WHICH ARE A LIEN OR DUE AND PAYABLE; AND ANY TAX, SPECIAL ASSESSMENTS, CHARGES OR LIEN IMPOSED FOR WATER OR SEWER SERVICE, OR FOR ANY OTHER SPECIAL TAXING DISTRICT, ANY UNREDEEMED TAX SALES.

6. ALL EXISTING ROADS, DITCHES, RESERVOIRS, UTILITIES, CANALS, PIPE LINES, POWER, TELEPHONE, SEWER OR WATER LINES AND RIGHTS OF WAY AND EASEMENTS THEREFORE.

7. RIGHT-OF-WAY FOR DITCHES AND CANALS CONSTRUCTED BY THE AUTHORITY OF THE UNITED STATES UPON PORTIONS OF THE SUBJECT PROPERTY AS RESERVED BY PATENTS OF RECORD.

8. RIGHT-OF-WAY FOR WESTERN SLOPE GAS COMPANY 50 FEET IN WIDTH FOR THE CONSTRUCTION, OPERATION AND MAINTENANCE OF ITS PIPE LINES TO TRANSPORT OIL AND GAS AND APPURTENANCES AS GRANTED BY INSTRUMENTS RECORDED OCTOBER 5, 1962 IN BOOK 349 AT PAGE 381; OCTOBER 5, 1962 IN BOOK 349 AT PAGE 382 AND NOVEMBER 16, 1964 IN BOOK 357 AT PAGE 312.

9. RIGHT-OF-WAY FOR THE HENDERSON AND DeLAPPE DITCH AS DISCLOSED BY MAP AND STATEMENT FILES JUNE 14, 1887 IN BOOK W2 AT PAGE 558

10. RIGHT-OF-WAY FOR PUBLIC SERVICE COMPANY OF COLORADO TO CONSTRUCT, OPERATE AND MAINTAIN ITS ELECTRIC TRANSMISSION LINES AND APPURTENANCES, AS GRANTED BY INSTRUMENTS RECORDED OCTOBER 9, 1962 IN BOOK 349 AT PAGE 392; AUGUST 10, 1949 IN BOOK 296 AT PAGE 556; AUGUST 10, 1949 IN BOOK 296 AT PAGE 557 AND MAY 29, 1979 IN BOOK 436 AT PAGE 169.

11. RIGHT-OF-WAY FOR MOUNTAIN STATES TELEPHONE AND TELEGRAPH COMPANY TO CONSTRUCT, OPERATE AND MAINTAIN ITS COMMUNICATION SYSTEM CONSISTING OF BURIED CABLE AND WIRES AND APPURTENANCES UPON SECTION 22, TOWNSHIP 10 SOUTH, RANGE 80 WEST AS GRANTED BY INSTRUMENT RECORDED DECEMBER 15, 1950 IN BOOK 308 AT PAGE 483.

12. ONE-FOURTH OF ANY AND ALL MINERALS WITHIN THE S ½ OF SECTION 31 AND THE W ½ W ½ SW ¼ OF SECTION 32, TOWNSHIP 9 SOUTH, RANGE 80 WEST OF THE 6TH P.M. AND N ½ N ½ OF SECTION 6 AND W ½ NW ¼ NW ¼ OF SECTION 5, TOWNSHIP 10 SOUTH, RANGE 80 WEST AS RESERVED TO AGNES ZILMER, CHARLES M. IRWIN AND FLOW IRWIN BY DEED RECORDED JULY 30, 1952 IN BOOK 314 AT PAGE 196.

13. WATER AND WATER RIGHTS AND PRIORITIES FOR THE USE OF WATER APPURTENANT TO SAID DESCRIBED PREMISES; DITCHES AND DITCH RIGHTS.

14. QUIT CLAIM DEED TO THE COUNTY OF LAKE FOR ROAD PURPOSES CONVEYING A TRACT 30 FEET WIDE CONNECTING U.S. HIGHWAY 24 TO OLD COUNTY ROAD, IN SECTIONS 34 AND 35, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M. AND SECTIONS 2 AND 3, TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH P.M., AS RECORDED JULY 6, 1960 IN BOOK 340 AT PAGE 296.

15. DECREE CHANGING POINT OF DIVERSION OF THE HENDERSON-DeLAPPE DITCH AND JOSEPH DUNN DITCH AS RECORDED MAY 15, 1967 IN BOOK 371 AT PAGE 59, LAKE COUNTY, COLORADO RECORDS.

16. RESERVATIONS, CONDITIONS AND STIPULATIONS CONTAINED IN THE PATENTS, IF ANY, FOR THE SUBJECT PROPERTY.

17. CONTRACTS AND GRANTS OF EASEMENTS AS GIVEN BY TWIN ARK VALLEY, LTD., A COLORADO LIMITED PARTNERSHIP, TO THE UNITED STATES OF AMERICA RECORDED AUGUST 19, 1976 IN BOOK 417 AT PAGE 589; SEPTEMBER 15, 1976 IN BOOK 418 AT PAGE 411 AND MARCH 16, 1976 IN BOOK 414 AT PAGE 501.

18. ANY QUESTION, DISPUTE OR ADVERSE CLAIMS AS TO ANY LOSS OR GAIN OF LAND AS A RESULT OF ANY CHANGE IN THE RIVER BED LOCATION BY OTHER THAN NATURAL CAUSES, OR ALTERATION THROUGH ACCRETION, RELICTION, EROSION OR AVULSION OF THE CENTER THREAD, BANK, CHANNEL OR FLOW OF WATERS IN THE ARKANSAS RIVER LYING WITHIN SUBJECT LAND; AND ANY QUESTION AS TO THE LOCATION OF SUCH CENTER THREAD, BED, BANK OR CHANNEL AS A LEGAL DESCRIPTION MONUMENT OR MARKER FOR PURPOSES OF DESCRIBING OR LOCATING SUBJECT LANDS. NOTE: THERE ARE NO DOCUMENTS IN THE LAND RECORDS OF THE OFFICE OF THE CLERK AND RECORDER OF LAKE COUNTY ACCURATELY LOCATING PAST OR PRESENT LOCATION OF THE CENTER THREAD, BANK, BED OR CHANNEL OF THE ABOVE RIVER OR INDICATING ANY ALTERATIONS OF THE SAME AS FROM TIME TO TIME MAY HAVE OCCURRED.

19. ANY RIGHTS, INTEREST OR EASEMENTS IN FAVOR OF THE STATE OF COLORADO, THE UNITED STATES OF AMERICA OR THE GENERAL PUBLIC, WHICH EXIST OR ARE CLAIMED TO EXIST IN AND OVER THE WATER AND PRESENT AND PAST BED AND BANKS OF THE ARKANSAS RIVER.

20. AFFIDAVIT CONCERNING PUBLIC ROAD FILED FOR HENRY H. BLAKE, JR. ET AL. AFFECTING PART OF SECTIONS 34, TOWNSHIP 10 SOUTH, RANGE 80 WEST AND SECTION 1,2 AND 11, TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH P.M. RECORDED AUGUST 10, 1988 IN BOOK 486 AT PAGE 599 AND RE-RECORDED IN BOOK 486 AT PAGE 683 ON AUGUST 16, 1988.

21. RIGHT-OF-WAY FOR U.S. HIGHWAY 24 AS IT AFFECTS THE SUBJECT PROPERTY.

22. RULING AND ORDER, CASE NO. 6510, FILED MARCH 8, 1956 IN BOOK 324 AT PAGE 152 REGARDING ACCESS TO RIGHTS OF WAYS OWNED BY THE COLORADO STATE HIGHWAY DEPARTMENT.

23. PROPERTY IS SITUATE WITHIN THE UPPER ARKANSAS SOIL CONSERVATION DISTRICT AND LAKE COUNTY SOIL CONSERVATION DISTRICT, AND THEREFORE, IS SUBJECT TO THE LIENS AND ASSESSMENTS LEVIED OR TO BE LEVIED BY REASON OF INCLUSION WITHIN SAID DISTRICTS, AND CERTAIN PORTIONS OF THE SUBJECT PROPERTY HAVE BEEN INCLUDED IN THE DESCRIPTION SHOWN ON CERTIFICATE OF ADDITION BY TRANSFER FROM UPPER ARKANSAS SOIL CONSERVATION DISTRICT TO THE LAKE COUNTY SOIL CONSERVATION DISTRICT RECORDED MAY 12, 1977 IN BOOK 422 AT PAGE 480.

24. PRIVATE WAY LICENSE AGREEMENT GIVEN BY THE DENVER RIO GRANDE WESTERN RAILROAD COMPANY FOR A TRACT SITUATE WITHIN THE SW 1/4 OF SECTION 22, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH P.M. AS EVIDENCED BY INSTRUMENT RECORDED October 6, 1982 IN BOOK 461 AT PAGE 819.

25. RULING OF REFEREE ISSUED TO PARKVILLE WATER DISTRICT, APPLICANT FILED FOR RECORD JANUARY 5, 1995 IN BOOK 512 AT PAGE 817.

EXHIBIT B

LEGAL DESCRIPTION OF THE EXCLUDED PARCEL

THAT PORTION OF THE WEST HALF OF SECTION 22, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN LAKE COUNTY, COLORADO, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE CENTER QUARTER CORNER OF SAID SECTION 22, A
FOUND 2 ½ ALUMINUM CAP.

THENCE N00 09' 00" W ALONG THE EAST LINE OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUATER OF SAID SECTION 22, A DISTANCE OF 1,318.33 FEET TO THE CENTER – NORTH ONE SIXTEENTH CORNER OF SAID SECTION 22, A 2 INCH ALUMINUM CAP.

THENCE S89° 14' 37" W ALONG THE NORTH LINE OF SAID SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 22, A DISTANCE OF 1,122.96 FEET TO THE EAST LINE OF COLORADO STATE HIGHWAY 24 RIGHT-OF-WAY AS SHOWN ON COLORADO STATE HIGHWAY DEPARTMENT PROJECT 152-B APPROVED MARCH 25, 1936 AND THE RIGHT-OF-WAY PLANS OF PROJECT BRF 024(29) DATED MARCH 1993;

THENCE S 24° 25' 52" W ALONG SAID EAST LINE OF COLORADO STATE HIGHWAY 24 RIGHT-OF-WAY, A DISTANCE OF 1,113.56 FEET TO THE EASTERLY RIGHT-OF-WAY OF THE DENVER AND RIO GRANDE RAILROAD AS SHOWN ON SAID COLORADO STATE HIGHWAY PLANS AND THE RIGHT-OF-WAY AND TRACK MAP OF THE DENVER AND RIO GRANDE RAILROAD SHEET 14 OF 24 AND THE BEGINNING OF NON-TANGENT CURVE HAVING A RADIUS OF 4,934.85 FEET OF WHICH THE CHORD BEARS S 13° 35' 14" E, A DISTANCE OF 383.75 FEET.

THENCE ALONG SAID EASTERLY RIGHT-OF-WAY OF THE DENVER AND RIO GRANDE RAILROAD AND THE ARC OF SAID CURVE, A DISTANCE OF 383.85 FEET THROUGH A CENTRAL ANGLE OF 4° 27' 24";

THENCE S 11° 24' 59" E ALONG SAID EASTERLY RIGHT-OF-WAY OF THE DENVER AND RIO GRANDE RAILROAD, A DISTANCE OF 864.45 FEET TO THE FENCE ALONG THE SOUTHERLY SIDE OF THE ACCESS ROAD.

THENCE N 60° 38' 47" E ALONG SAID FENCE PROJECTED A DISTANCE OF 1,406.37 FEET TO THE CENTER OF THE ARKANSAS RIVER;

THENCE N 25° 12' 39" W ALONG SAID CENTERLINE OF THE ARKANSAS RIVER, A DISTANCE OF 96.29 FEET;

THENCE N 06° 01' 17" E ALONG SAID CENTERLINE OF THE ARKANSAS RIVER, A DISTANCE OF 119.88 FEET;

THENCE N 22° 14' 40" W ALONG SAID CENTERLINE OF THE ARKANSAS RIVER, A DISTANCE OF 35.53 FEET TO THE SOUTH LINE OF SAID SOUTHWEST QUARTER OF SECTION 22;

THENCE N 89° 09' 16" E, ALONG SAID SOUTH LINE OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 22, A DISTANCE OF 141.72 FEET TO SAID CENTER QUARTER CORNER OF SECTION 22 AND THE TRUE POINT OF BEGINNING

SAID PARCEL CONTAINS 60.35 ACRES MORE OR LESS

SUBJECT TO EXISTING RIGHTS-OF-WAY AND EASEMENTS

SPECIFICALLY EXCLUDING ANY AND ALL WATER, WATER RIGHTS, DITCHES AND EASEMENTS OR RIGHTS-OF-WAY THEREFORE.

CLERK AND RECORDER'S CERTIFICATE

THIS PLAT WAS ACCEPTED AND FILED FOR RECORD IN THE OFFICE OF THE CLERK AND RECORDER OF LAKE COUNTY, COLORADO, AT__________A.M. ON THIS____________DAY OF__________________, 2003.

RECEPTION NUMBER __________________________________

____
LAKE COUNTY CLERK AND RECORDER

BEAR SURVEYING SERVICES
P.O. Box 4311, Buena Vista, Colorado
Ph. 719-395-3453

CITY OF AURORA (HAYDEN RANCH) BOUNDARY SURVEY

A PORTION OF SECTION 2, SECTION 3, SECTION 10 AND SECTION 11, TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN AND A PORTION OF SECTION 22, SECTION 27 AND SECTION 34, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN LAKE COUNTY, COLORADO

CITY OF AURORA (HAYDEN RANCH) BOUNDARY SURVEY

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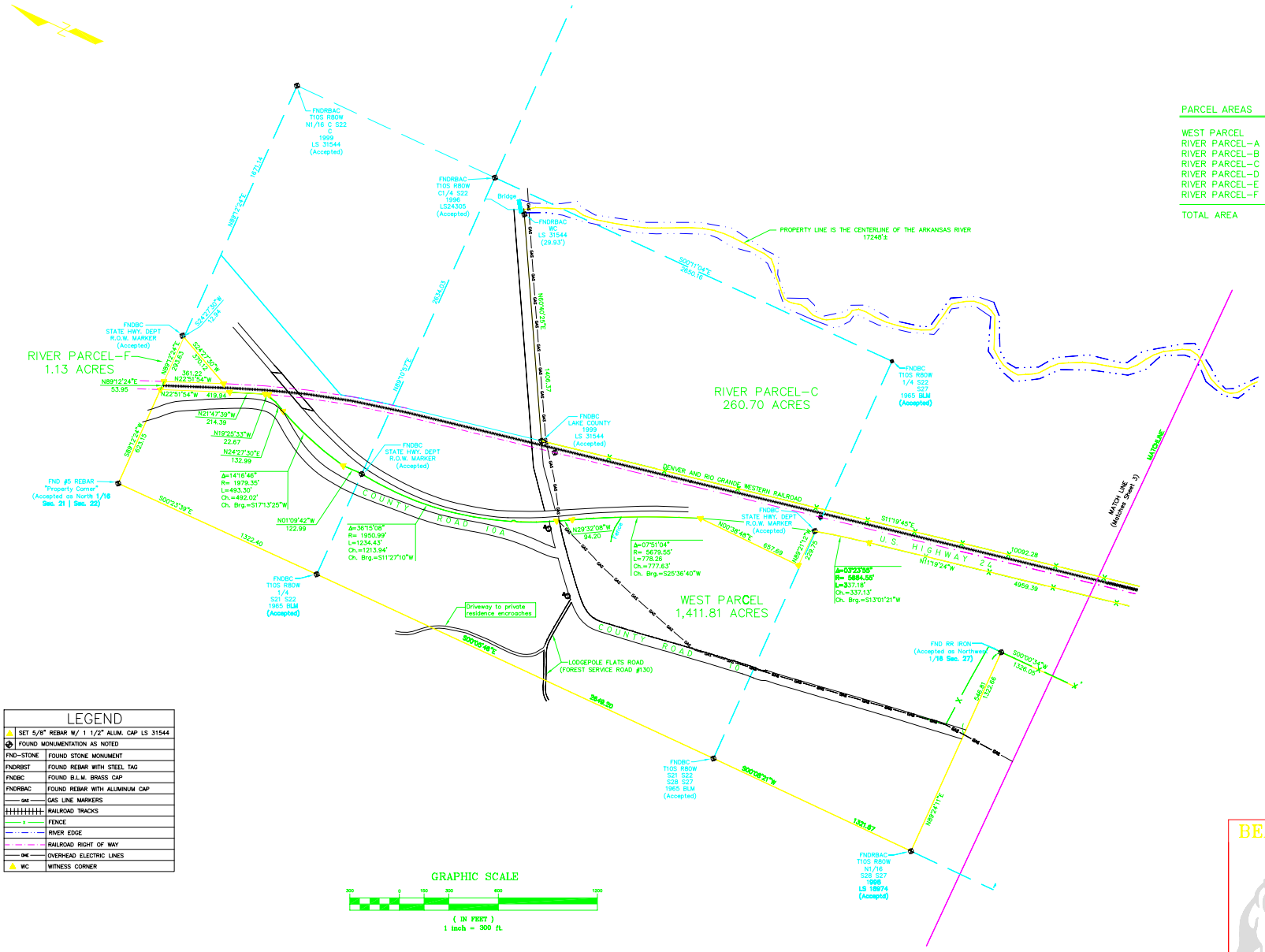
LAKE COUNTY, COLORADO



PARCEL AREAS

WEST PARCEL	1,411.81 ACRES
RIVER PARCEL-A	9.07 ACRES
RIVER PARCEL-B	89.58 ACRES
RIVER PARCEL-C	260.70 ACRES
RIVER PARCEL-D	36.15 ACRES
RIVER PARCEL-E	9.82 ACRES
RIVER PARCEL-F	1.13 ACRES
TOTAL AREA	1,818.26 ACRES

LEGEND

SET 5/8" REBAR W/ 1 1/2" ALUM. CAP LS 31544	
FOUND MONUMENTATION AS NOTED	
FND-STONE	FOUND STONE MONUMENT
FNDRBST	FOUND REBAR WITH STEEL TAG
FNDBC	FOUND B.L.M. BRASS CAP
FNDRBAC	FOUND REBAR WITH ALUMINUM CAP
GAS	GAS LINE MARKERS
	RAILROAD TRACKS
X	FENCE
	RIVER EDGE
	RAILROAD RIGHT OF WAY
OHE	OVERHEAD ELECTRIC LINES
WC	WITNESS CORNER

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

NOTICE:
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UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER
SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY
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LAKE COUNTY, COLORADO

PROJECT: 02559 SHEET 2 of 6 Date:JAN.07, 2003

CITY OF AURORA (HAYDEN RANCH) BOUNDARY SURVEY

A PORTION OF SECTION 2, SECTION 3, SECTION 10 AND SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN
AND A PORTION OF SECTION 22, SECTION 27 AND SECTION 34,
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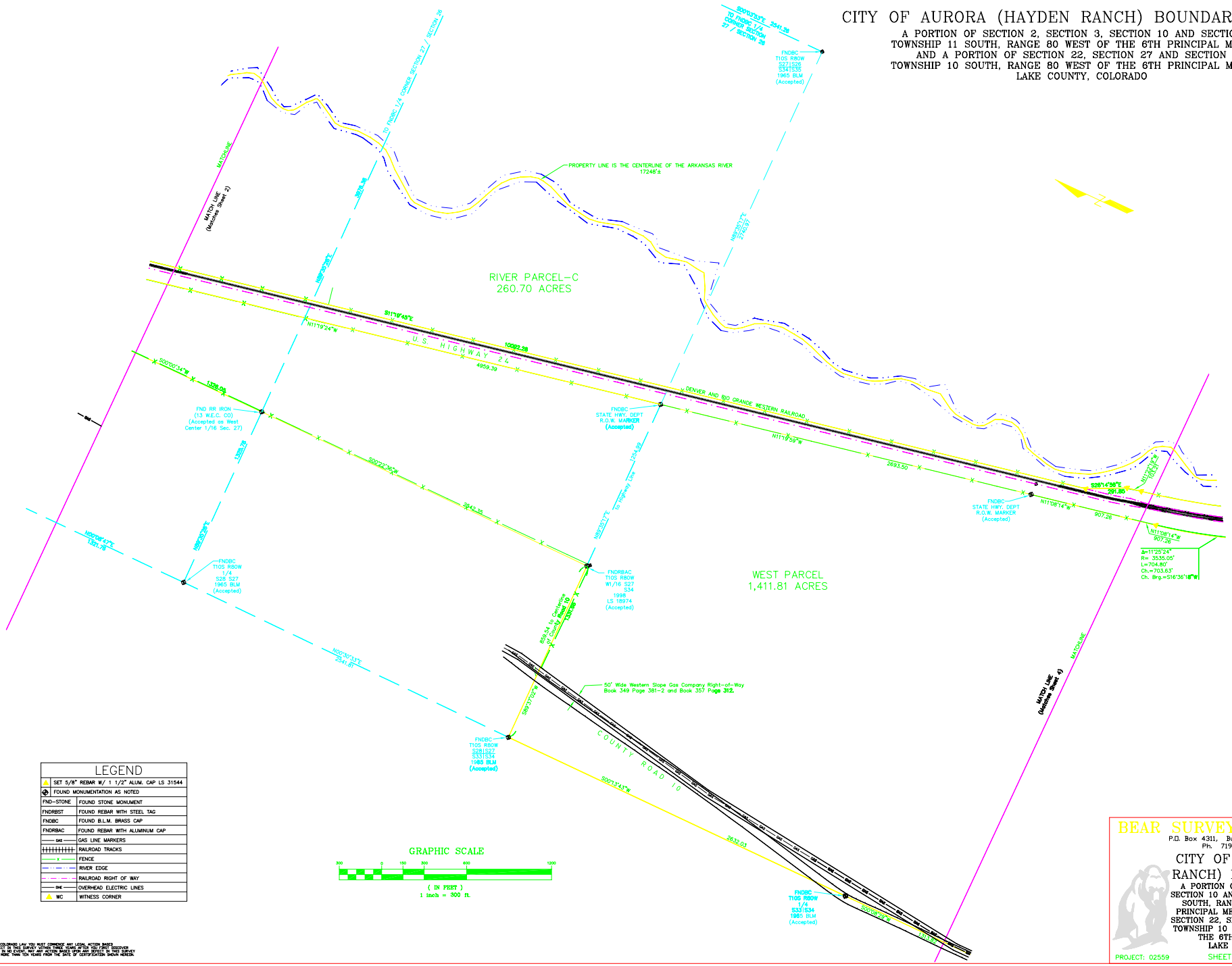
LAKE COUNTY, COLORADO



LEGEND

▲	SET 5/8" REBAR W/ 1 1/2" ALUM. CAP LS 31544
⊕	FOUND MONUMENTATION AS NOTED
FND-STONE	FOUND STONE MONUMENT
FNDRBST	FOUND REBAR WITH STEEL TAG
FNDBC	FOUND B.L.M. BRASS CAP
FNDRBAC	FOUND REBAR WITH ALUMINUM CAP
GAS	GAS LINE MARKERS
++++++++	RAILROAD TRACKS
X	FENCE
	RIVER EDGE
	RAILROAD RIGHT OF WAY
OHE	OVERHEAD ELECTRIC LINES
▲ WC	WITNESS CORNER

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

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LAKE COUNTY, COLORADO

PROJECT: 02559 SHEET 3 of 6 Date:JAN.07, 2003

CITY OF AURORA (HAYDEN RANCH) BOUNDARY SURVEY

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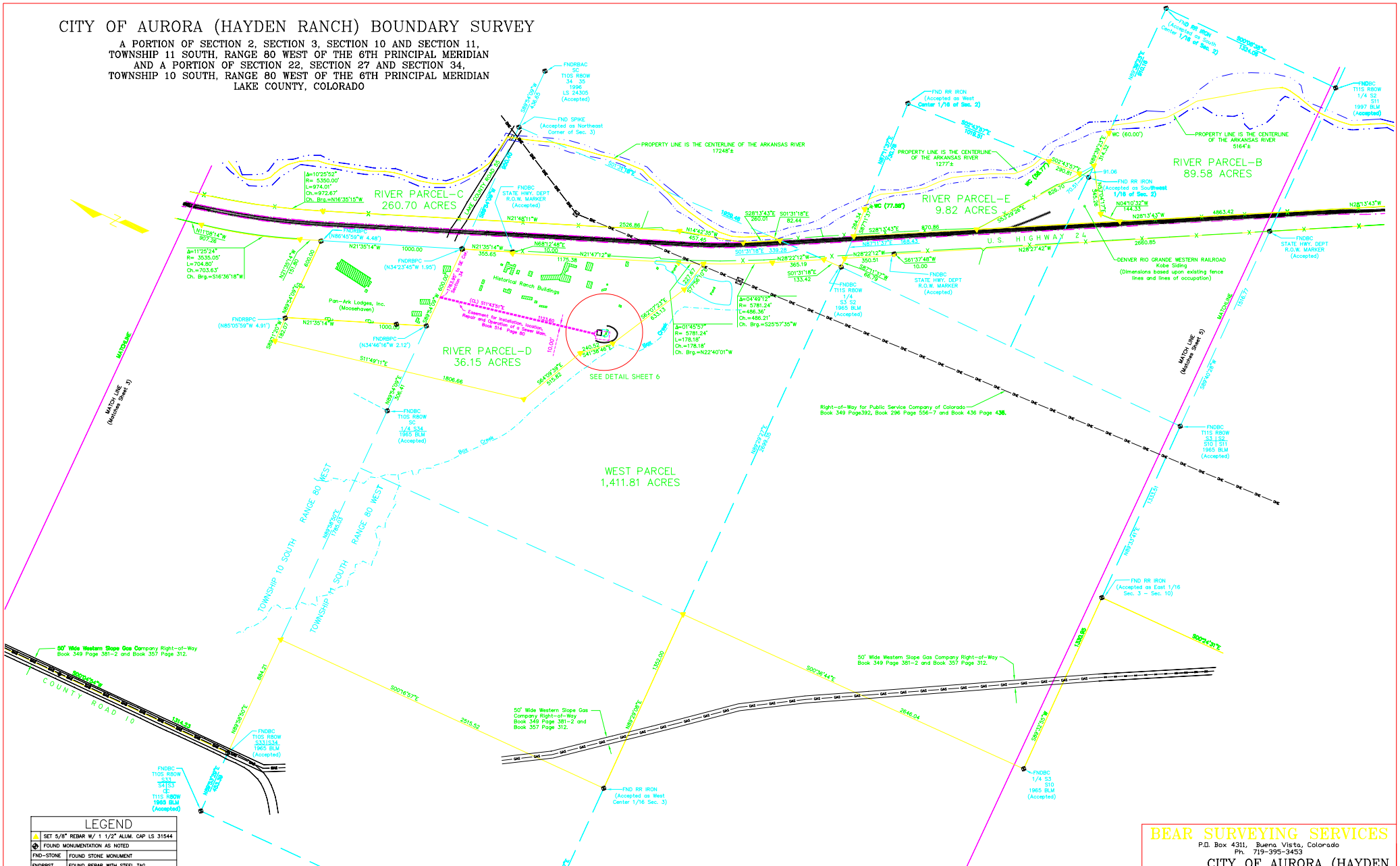
LAKE COUNTY, COLORADO



LEGEND

▲	SET 5/8" REBAR W/ 1 1/2" ALUM. CAP LS 31544
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GAS	GAS LINE MARKERS
	RAILROAD TRACKS
x	FENCE
	RIVER EDGE
	RAILROAD RIGHT OF WAY
OHE	OVERHEAD ELECTRIC LINES
▲ WC	WITNESS CORNER

NOTICE:
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event, may any action based upon any defect in this survey be commenced more than ten years from the date of certification shown hereon.

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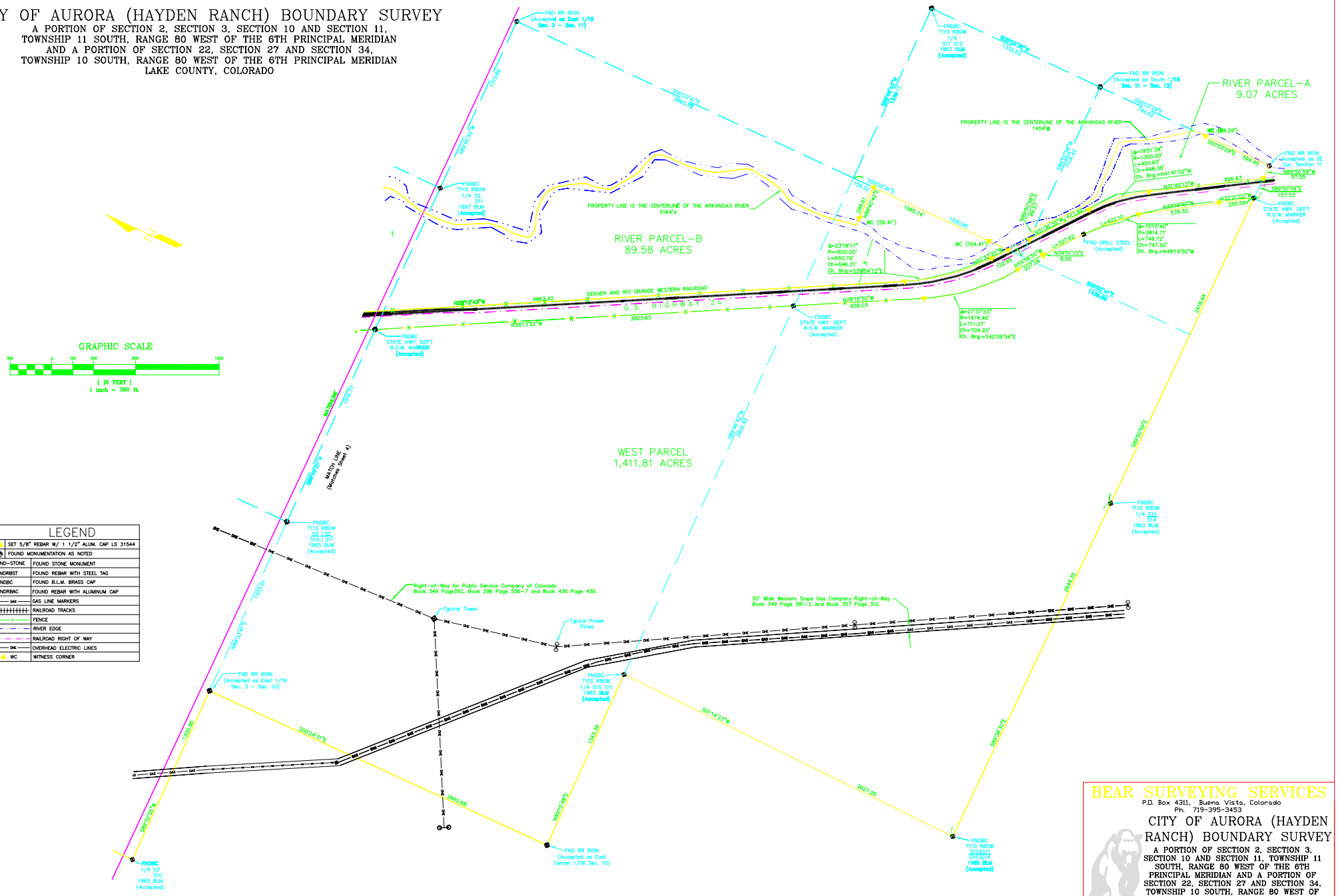
A PORTION OF SECTION 2, SECTION 3, SECTION 10 AND SECTION 11, TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN AND A PORTION OF SECTION 22, SECTION 27 AND SECTION 34, TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN
LAKE COUNTY, COLORADO

PROJECT: 02559 | SHEET 4 of 6 | Date:JAN.07, 2003

CITY OF AURORA (HAYDEN RANCH) BOUNDARY SURVEY

A PORTION OF SECTION 2, SECTION 3, SECTION 10 AND SECTION 11,
TOWNSHIP 11 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN
AND A PORTION OF SECTION 22, SECTION 27 AND SECTION 34,
TOWNSHIP 10 SOUTH, RANGE 80 WEST OF THE 6TH PRINCIPAL MERIDIAN
LAKE COUNTY, COLORADO



LEGEND

SET 5/8" REBAR W/ 1 1/2" ALUM. CAP LS 31544	
FOUND MONUMENTATION AS NOTED	
FND-STONE	FOUND STONE MONUMENT
FNDRBST	FOUND REBAR WITH STEEL TAG
FNDBC	FOUND B.L.M. BRASS CAP
FNDRBAC	FOUND REBAR WITH ALUMINUM CAP
GAS	GAS LINE MARKERS
	RAILROAD TRACKS
	FENCE
	RIVER EDGE
	RAILROAD RIGHT OF WAY
OHE	OVERHEAD ELECTRIC LINES
WC	WITNESS CORNER

NOTICE:
ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED
UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER
SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY
BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

BEAR SURVEYING SERVICES
P.O. Box 4311, Buena Vista, Colorado
Ph. 719-395-3453

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PROJECT: 02559 | SHEET 5 of 6 | Date:JAN.07, 2003

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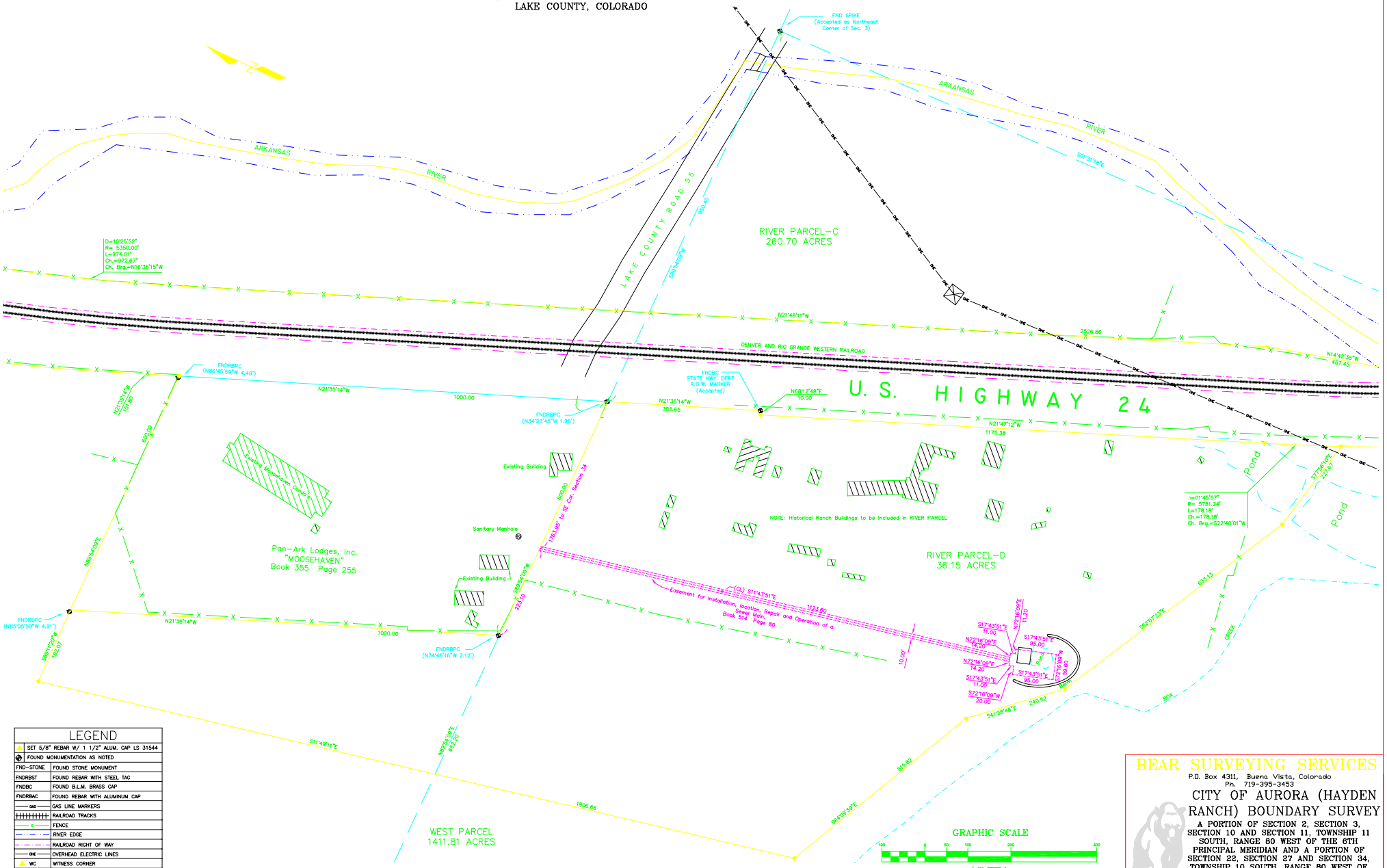

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