



STAFF REPORT

Agenda Item: 5.C

Report To: Open Space Advisory Committee
and Parks and Recreation Commission

Meeting Date: June 20, 2023

Staff Contact: Lyndsey Boyer, Open Space Manager, (lboyer@carson.org)

Agenda Title: FOR POSSIBLE ACTION: Discussion and a possible action regarding a recommendation to the Board of Supervisors for the Buzzy's Ranch Management Plan and authorization to direct staff to initiate due diligence for water rights acquisition for 491.48 acres of City-owned property known as Buzzy's Ranch Open Space, APNs 010-071-25, 010-071-26, 010-071-27, 010-071-21, and 010-021-47 ("Property"). (Lyndsey Boyer, lboyer@carson.org)

Staff Summary: In 2007 and 2010, Carson City acquired the Property without water rights due to limited funding available at the time of acquisition. Since 2019, staff have been working to identify strategies for water rights acquisition by the City to ensure the ranch and its agricultural heritage and natural resource values can be preserved for future generations. The Buzzy's Ranch Conservation Plan was developed as a management plan for the ranch, as well as to identify irrigation and restoration strategies under varying conditions of irrigation water availability.

Agenda Action: Other/Presentation

Time Requested: 20 minutes

Proposed Motion

I move to recommend to the Board of Supervisors approval of the Buzzy's Ranch Management Plan and to authorize staff to initiate due diligence for water rights acquisition.

Board's Strategic Goal

Quality of Life

Previous Action

N/A

Background/Issues & Analysis

The Buzzy's Ranch Open Space was purchased in 2007 and 2010 through two acquisitions, partially funded through State Question 1 funding. At the time of acquisition, the City and grantor did not have sufficient funds to support the both the acquisition of the Property and the water rights for the Property. One of the primary criteria for acquiring this property was to preserve the ranching history in Eagle Valley and to maintain the aesthetics of green, irrigated pastures throughout this property. To ensure the Property was irrigated and maintained, the City entered into a Purchase and Sale Agreement with the sellers of the Property granting them certain rights to use of the property as long as they owned the water rights and applied them to the land. Since 2019, staff have been working to identify strategies for water rights acquisition by the City. In 2020, staff applied for SNPLMA funding to support the Buzzy's Ranch Water Rights Acquisition and Wetland Enhancement Project. This project was awarded in 2021 and the City received funding awards in late 2022 and can now begin working on the project. The grant awarded \$1.8 million to Carson City to purchase 694 acre-feet annually (AFA) to support approximately 148 acres of wet meadow and irrigated pasture at Buzzy's Ranch. Specifically, the

water will be used to support the Ducks Unlimited Wetlands project site, as well as the NDOT Mitigation Wetlands that was transferred to Carson City through OPLMA in 2015. This will provide approximately 1/3 of the total water rights that are needed to keep the entire ranch irrigated. Additionally, staff have also been working with private partners to identify long-term lease or purchase options to acquire the remaining water rights needed to support the ranch. This process will include required due diligence, such as obtaining title reports, appraisals and other water rights acquisitions documents. This item includes a recommendation from OSAC to the Board of Supervisors to pursue the due diligence needed for a long-term lease to buy or purchase option of the remaining water rights needed.

Applicable Statute, Code, Policy, Rule or Regulation

N/A

Financial Information

Is there a fiscal impact? Yes No

If yes, account name/number: 2545047-500309

Is it currently budgeted? Yes No

Explanation of Fiscal Impact: Fiscal impact includes contracting with a water rights consultant and water rights attorney to complete necessary due diligence.

Alternatives

Do not recommend approval of the Buzzy's Ranch Management Plan to the Board of Supervisors and provide alternative direction to staff.

June 2023 – DRAFT

Buzzy's Ranch Management Plan



Prepared for:

Carson City Parks, Recreation & Open Space Department
3303 Butti Way, Building 9
Carson City, Nevada 89701

Prepared by:



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Introduction/Plan Purpose

Resource Concepts, Inc. (RCI) was retained by Carson City Parks, Recreation & Open Space to define resource objectives and management recommendations for Buzzy's Ranch, a Carson City owned property. Management is focused on operating Buzzy's Ranch for wildlife habitat, open space values, green pasture aesthetics (where possible), and preservation of agriculture in Carson City for the enjoyment of Carson City's public.

Buzzy's Ranch was acquired by Carson City in two purchases (2007 and 2010) from the Jarrard and Andersen families. When the property was purchased by Carson City, water rights were not included in the sale and the ranch is currently being irrigated by a series of temporary change applications filed with the Nevada Division of Water Resources. Carson City Parks, Recreation & Open Space Department is in active pursuit to secure long-term irrigation water rights on as many of the traditionally irrigated areas on the ranch as possible. The property is comprised of the headquarters/equipment yard (≈11 acres), irrigated pasture (≈292 acres), a Ducks Unlimited waterfowl forage enhancement project area/ adjacent pasture/wetland mitigation area (≈142 acres), and arid rangeland (wildlife pasture) (≈9 acres). See Figure 1 for a layout of Buzzy's Ranch. Acquisition of water rights to irrigate the property is important to maintain and improve wildlife habitat, green pasture aesthetics, floodplain function, and preservation of this remaining ranch agriculture in Carson City, all of which were principal reasons to purchase the Buzzy's Ranch property.

The ranch provides multiple ecological services to the community as well as recreational opportunities for the public. The *Carson River Trail System* extends along the Carson River, linking existing Riverview Park and Mexican Ditch Trails. Notably, the property also functions as critical floodplain for the Carson River and is specifically noted as such in Carson Water Sub-Conservancy District's Carson River Watershed Regional Floodplain Management Plan (CWSD, 2008). Furthermore, agricultural lands are recognized as being consistent with the living river approach to floodplain management. Provisions to protect and sustain wildlife habitat, agricultural land, and green pasture aesthetics, are a top priority of the plan. Non-agricultural activities on Buzzy's Ranch also includes test well drilling by the Carson City Public Works Department for future development of municipal water sources in the future.

This plan focuses on improved management and resource conditions at Buzzy's Ranch. All recommendations in this plan are meant to be adaptable to future conditions rather than being a concrete prescription. Buzzy's Ranch is managed by Carson City Parks, Recreation, & Open Space Department in coordination with a lessee. The lessee operates the property as part of an agricultural business. This plan is intended to help align lessee management within resource goals and objectives of Carson City when the property becomes available for future lease. Future lease agreements will stipulate the submittal of an Annual Operating Plan (AOP) from a lessee to the Carson City Parks, Recreation, & Open Space Board of Directors. AOPs will outline the lessee's planned management for the upcoming year regarding irrigation and grazing plans, along with planned maintenance and proposed new improvements. This management plan is intended to provide side boards to the lessee and Carson City staff reviewing and writing AOPs to ensure that management is flexible enough to be effective but is also within the bounds of management goals and objectives for the property. This plan also outlines conceptual infrastructure improvements to enhance the property as open space for the public and as a productive property for the lessee. See Appendix A for an AOP template.

Buzzy's Ranch – Management Plan

This plan assumes that enough water remains available long-term to irrigate all the land that has been historically irrigated which equates to approximately 1,895-acre feet of water annually. The plan also provides a contingency plan detailing priority pastures for irrigation if only partial water rights can be acquired or if limited water is available due to drought.

Management Objectives

The following objectives apply to each respective area of Buzzy's Ranch assuming water rights are restored to the historically irrigated portions of Buzzy's Ranch.

- **Ducks Unlimited Wildlife Habitat Improvement Project (BR-01)**

Management Objective: Manage BR-01 for waterfowl nesting habitat and seasonal migratory habitat with grazing exclusion during the growing season.

- **Irrigated Pasture Used for Livestock Grazing (BR-02-BR-09)**

Management Objective: Annually manage for 450 AUMs in BR-02 and 1,125 AUMs in BR-01, BR-03-BR-09 in irrigated pasture areas (Jarrard Sale Agreement 2010, Andersen Sale Agreement 2007). Utilization rates should not exceed more than 3-inch stubble height. Utilization will be measured using the stubble height protocol described in BLM Technical Reference 4400-3 (see the Monitoring Section for more information on stubble height measurements).

- **Irrigation and Irrigation Infrastructure**

Management Objective: Maintain irrigation ditches, headgate structures, and associated culverts in an operable fashion to deliver irrigation water to fields as clean and efficiently as possible.

- **Fencing and Ranching Infrastructure**

Management Objective: Fencing, other ranching infrastructure, and the headquarters are functioning to handle livestock and maintain in an aesthetically pleasing manner.

Recommended Management

With sufficient irrigation water long-term, multiple opportunities exist to improve resource conditions. Management recommendations described in this section are intended to be implemented as soon as possible without extensive infrastructure input. Infrastructure improvements detailed in the next section are intended to be implemented as funding is available. Management recommendations for immediate implementation are summarized by the list below.

1. BR-01: Ducks Unlimited Project, Waterfowl Nesting Habitat Management
2. Grazing Management
3. Maintenance and repair of existing fencing/Livestock Infrastructure
4. Irrigation/Irrigation Infrastructure
5. Improved stock watering practices

BR-01: Ducks Unlimited Project, Waterfowl Nesting Habitat

BR-01 will be managed to enhance waterfowl nesting habitat, as well as encourage public/wildlife interactions involving wildlife viewing. BR-01 (Figure 1) encompasses the NDOT mitigation wetland, the holding pond, and the Ducks Unlimited Wetland Enhancement project. For more background on infrastructure present within the Ducks Unlimited project, see Appendix B. In addition to the management described below, a short boardwalk may be installed in the future to increase wildlife viewing opportunities for the public. The unit receives water directly from the Mexican Ditch and water levels can be more easily manipulated when compared to other irrigation infrastructure on the ranch. Carson City Parks, Recreation & Open Space is in the process of acquiring water rights for all of BR-01 (142 acres) through a grant provided by Southern Nevada Public Land Management Act (SNPLMA).

BR-01 is extremely diverse in terms of wildlife habitat offered. It is comprised of open water ponds, wetland obligate vegetation, irrigated perennial grassland, upland sagebrush dominated fringes, and mature dispersed cottonwood and willow. 2019 bird population surveys at Buzzy's Ranch showed 34 unique bird species with a total of 429 individuals observed over a two day period. Waterfowl observed included Canada goose, great blue heron, mallard, gadwall, and wood duck. Each feature provides a unique habitat for a variety of bird species found on the ranch. To maintain and improve current habitat, the unit will continue to be irrigated from the Mexican Ditch. Water will be applied to the units as necessary to maintain perennial grasses, keep water in the ponds (seasonally at minimum) when water can be delivered in adequate amounts, and be maintained as green as possible for enhanced aesthetic perception from the public.

Grazing will be authorized as an important tool for vegetation management in BR-01. Properly timed grazing, considering plant phenology and wildlife cycles, can benefit habitat quality (Holechek et. al. 1982). As stated previously, multiple waterfowl species utilize habitat at Buzzy's Ranch, each with their own ecological niche. Broadly, mallards prefer tall nesting cover early in the spring, and short grassy habitats in the late summer and fall are preferred by Canada geese and cranes. (Chantelle et. al. 2007).

Waterfowl nesting season is April 15 to August 15, at which time grazing will be excluded during this period to avoid nest trampling and to allow for appropriate concealment cover for wildlife. Throughout the irrigation season, BR-01 will be irrigated on regular rotations while water is available in accordance with the Alpine Decree and other applicable Nevada State Water Law. Ponds will be filled with water throughout as much of the year as possible on most years; however, water loss from percolation, evaporation, and limited supply will dictate how full ponds can be maintained. During droughty conditions, ponds will be left dry. Dry conditions intermittently will regenerate submergent vegetation once ponds can be filled again. Grazing will occur after the nesting season (August 15) and will continue until grasses are at a 3-inch stubble height and will commence no later than March 15. Grazing BR-01 outside of the nesting season will stimulate new herbaceous growth and prevent excessive buildup of dead or decadent plant material.

Although grazing will be excluded from March 15 to August 15, cattle will be allowed to trail through BR-01 to access BR-02. Trailing will not exceed more than the time it takes to move cattle (approximately one hour) from BR-03-BR-09 to BR-02. The lessee will have flexibility to manage their livestock as they wish from August 15 to March 15 if specified utilization levels are not exceeded.

The above management practices will be required of the lessee (and overseen by Carson City staff) when water acquisition is complete and water right ownership is transferred to Carson City.

Grazing Management

A well-managed grazing system focused on *proper use* of forage promotes nutrient cycling, stimulates plant growth, and provides adequate rest for plant recovery. Plant recovery is defined as active regrowth during the growing season following a grazing event.

Planned grazing as defined by the lessee in submitted AOPs will require adjustments throughout implementation to adapt to varying climatic conditions. See Appendix A for an AOP template to be filled out by the lessee annually. Grazing will take place in irrigated pastures BR-02-B-09, and the wildlife pasture throughout the irrigation/growing season. Grazing in BR-01 will be excluded during the nesting season (April 15 to August 15). Grazing will not take place within the Carson River corridor east of the Buzzy's Ranch Trail to avoid interactions with the public.

Animals will graze one pasture at a time until the utilization trigger (3-inch stubble height) is met. Livestock will begin grazing when forage is approximately 4 to 8 inches tall, and animals may begin their rotation in any of the approved pastures in the spring. Rotating livestock according to utilization triggers allows forage species to recover, maintain, or increase ground cover and excessive dead plant material to be prevented from accumulating. A rotational grazing system relies on a series of fenced pastures to allow for concentrated and controlled grazing; these fences can be permanent or temporary. By concentrating where livestock graze, the remainder of the area can rest and recover, which will enhance forage production and quality. It is foreseeable that stocking capacity may increase after multiple years of a deferred rotation system.

Under Alternative 1, each pasture, except BR-01 (Figure 1), would be grazed at varying times from year to year until designated utilization triggers are met. BR-01 would consistently be grazed between August 15 and March 15 each year to promote waterfowl nesting habitat. By alternating grazing timing in each pasture, forage species complete their life cycles and store carbohydrates in root reserves for the next year's growth. Stocking rates in each pasture should be appropriate to uniformly, non-selectively graze forage. To achieve uniform use, pastures will likely have to be split into smaller paddocks using temporary fencing to effectively increase the stocking rate per acre. The size of these temporarily fenced paddocks will vary depending on forage conditions and the number of animals being grazed. Typically, when rotational grazing systems are initiated, 40-acre paddocks are a good starting point. The lessee's plans for internal fencing will be detailed in an AOP submitted to Carson City staff. Once temporary fencing has been used for multiple years and paddock size has been adjusted to average stocking rates and forage production, installation of permanent fences will occur in the same locations to save labor expenditures long-term.

Pasture moves will be directed by utilization levels (stubble heights), not rigid prescriptions that dictate head of livestock per acre. This allows flexibility in livestock management and promotes a healthy forage base. As stated in the Anderson and Jarrard Purchase and Sale Agreements, a total of 1,125 AUMs can be utilized in BR-01 and BR-03-9 and 450 AUMs in BR-02 annually. As necessary, livestock will be kept in dry or drying pastures to avoid soil compaction and plant damage under wet conditions.

Maintenance and repair of existing fencing

Fencing at Buzzy's Ranch consists of permanent barbed wire in various conditions and requires regular observation and maintenance by the lessee to adequately control livestock placement. Perimeter fencing needs to be checked routinely and repaired as needed by the lessee. Typical maintenance activities involve replacing broken wires, wire clips, posts, and tightening wire. Routine fence maintenance is especially important due to Buzzy's Ranch's proximity to trails, housing, and roadways. See Figure 1 for location of existing fences.

Well maintained interior fencing is vital to implement a rotational grazing system. Permanent fences are preferred due to their durability. However, in lieu of reliable permanent fencing, electric fencing can be used in the short-term to control cattle movement. A strong fence charger, proper grounding, and quality electric wire (high tensile or nine strand poly wire) are important to keep livestock where needed. Routine checking with a voltage tester is important to ensure adequate charge. All temporary electric fencing should be installed consistent with manufacturer guidelines. Temporary fence construction is the responsibility of the lessee. The lessee will maintain temporary and permanent fences and make minor repairs as needed, but permanent fence replacement and new permanent fence construction will be the responsibility of the Carson City Parks, Recreation & Open Space Department in cooperation with the lessee. Areas in need of fence reconstruction or new fence construction will be identified by the lessee and Carson City staff will be notified of needed actions. Locations of temporary fencing would be described in the lessee's AOP.

Corrals for working livestock are in the headquarters section (Figure 1). Regular maintenance and repair of corrals is important to handle livestock. Maintenance and upkeep will be the responsibility of the lessee. Major reconstruction of corrals and associated livestock handling equipment will be the responsibility of Carson City Parks, Recreation & Open Space in cooperation with the lessee.

Irrigation and Irrigation Infrastructure

All irrigation water is currently delivered to Buzzy's Ranch via the Mexican Ditch, which is diverted from the Carson River at the Mexican Dam about 2.2 miles upstream. Once water is transported to the property via Mexican Ditch, it is conveyed to the fields using a series of earthen irrigation ditches and concrete checks. An unmeasured amount of water is lost to natural percolation through the conveyance system (at Buzzy's Ranch and through Mexican Ditch) before water reaches the fields.

The Mexican Dam and Ditch Company (in coordination with the Buzzy's Ranch lessee) is responsible for maintaining the upstream portion of the Mexican Ditch, which requires periodic cleaning and inspections to ensure proper water delivery to downstream users. Upstream portions of Mexican Ditch are located on Carson City Parks, Recreation & Open Space property. During periodic cleaning, no excavated material will be placed in or adjacent to the river to comply with state and federal regulations, nor along the Mexican Ditch Trail, which is an important recreation site. Like the Mexican Ditch, most of the ranch's internal irrigation system is comprised of earthen ditches requiring routine maintenance and cleaning. Sediments fill irrigation ditches over time during the irrigation season; if left unmaintained water cannot be efficiently transferred throughout the property. Ditch cleaning and maintenance will occur primarily in the spring, excluding repairs needed during the irrigation season. When ditches are being cleaned with a backhoe or excavator, the depth of ditches should match the elevation of existing irrigation structures and should be narrowed where possible to match the width of existing irrigation structures. Excavated material from the Mexican Ditch and from the ranch must be

disposed of in a manner that does not detract from aesthetic values or inhibit access to the public. A portion of the excavated material will be used to buildup and repair roads and ditch banks within the ranch during the irrigation season and stored at Buzzy's Ranch Headquarters. Material stored at the headquarters must be kept in a neat and tidy fashion. If excess material is still present at the conclusion of the irrigation season, spoils will be hauled off site in cooperation with the lessee and Carson City staff. Culverts and other water conveyance structures like diversions will be maintained by the lessee by keeping structures clean of debris and routinely building up earthen material where needed. Replacement or installation of new structures will be the responsibility of the Carson City Parks, Recreation & Open Space Department in cooperation with the lessee.

Water will be rotated throughout the ranch, allowing previously irrigated pastures to dry while others are being irrigated. All irrigation rotations will be coordinated between the lessee and the Mexican Ditch Company.

In summary, the following management is recommended to increase irrigation efficiency:

- Irrigation of BR-01 (Figure 1) will continue throughout the season despite the April 15 to August 15 grazing exclusion period.
- Annually and as needed, clean excess sediment and vegetation from ditch system to increase water capacity. As a rule of thumb, ditch width and depth should match openings in existing irrigation boxes. Dispose of excavated material at headquarters away from the Carson River and other wetland areas. Excess material that cannot be put to productive use at the headquarters will be hauled offsite at the conclusion of the irrigation season.
- During ditch cleaning, use excavated material to narrow ditches where prolonged erosion has made ditches excessively wide. Ensure that proper depth and slope is maintained to allow for adequate conveyance of water.
- As needed, repair headgates where water circumvents the structures. Replace headgates as needed where existing diversion structures are in disrepair.
- Control rate of irrigation water to reduce erosion and increase percolation as much as possible. Ponding of water should be avoided except in designated ponds within BR-01.
- Remove livestock from pastures being irrigated to prevent soil compaction and damage to plant species.
- After irrigation, fields should be dried between rotations to optimize production and stimulate root growth.

Under this management plan, the Mexican Ditch would continue to be the primary source of irrigation water to Buzzy's Ranch. Due to variability in precipitation, river flows will fluctuate year to year and within the season. In drought years, to make irrigation water more consistent, other sources of water should be explored, such as irrigation wells and effluent.

Carson City Well #47 is an unused municipal well located on the western edge of Buzzy's Ranch. The well's infrastructure has the capacity to supplement irrigation water or stock water needs. Currently, there are 611.7 acre-feet annually (AFA) of municipal water rights permitted in the well. If the water were to be used for irrigation, it would be enough to irrigate approximately 136 acres of land using the application rate of 4.5 AFA per acre as stipulated by the Carson River Decree. Coordination is needed

between Carson City Water Public Works and Carson City Parks, Recreation & Open Space Department regarding use of the well.

Other transferable water rights in the Carson River watershed should be considered for purchase or long-term lease agreements as they become available. Another opportunity for long-term irrigation is the use of municipal effluent. As Carson City expands in population, the amount of effluent water produced is expected to increase. Long-term effluent management planning is underway for the Carson City water system. If enough effluent is produced, Buzzy's Ranch may provide an opportunity to utilize effluent.

Improved stockwater practices

Stockwater is currently being supplied with earthen irrigation ditches. Stockwater quality is important to help maintain livestock production. Irrigation ditch banks have been eroded and partially filled in primarily due to constant hoof action from livestock.

Installation of water gaps using fencing to prevent livestock concentration within the ditches and designated hardened entries will limit bank erosion along the irrigation ditch system. Hardened entries or "aprons" can be constructed using gravel where livestock have access to water. Limiting where livestock can access the ditch system allows other segments of the ditch to become stabilized with perennial species. Restricting livestock access to ditches will reduce necessary maintenance of the ditch system due to active erosion. In areas where stockwater is not available in the ditch system, water can be hauled using a water truck and temporary portable troughs as needed.

Drought Contingency Plan:

It is important to modify annual plans to account for foreseen water shortages from year to year. The lessee's specific plan will be detailed in an AOP when shortages are expected. Water shortages could be caused by climatic drought or insufficient water rights to cover the ranch. If water shortages occur due to drought, all pastures will be irrigated as long as possible, but the irrigation season will be cut short. Other than routine maintenance to maximize water efficiency, no changes to irrigation management are needed during a drought. However, grazing rotations will likely need to be made more often to maintain a 3-inch stubble height. In this situation, it is foreseeable that the grazing season will be cut short when compared to a plentiful water year.

If sufficient water rights are not acquired, pastures have been ranked by priority using criteria in Table 1. Ranking is based on current condition and extent of irrigation/fencing infrastructure, proximity to residential development, soil characteristics, and the existing plant community. As long-term water rights are acquired, reference Table 1 to prioritize pastures for irrigation.

Table 1. Priority Pastures for Irrigation

| Pasture Name | Acreage | Priority Ranking/ Score | Notes |
|--------------|---------|-------------------------|---|
| BR-01 | 142 | 1/ (16) | The Ducks Unlimited portion of the pasture has extensive irrigation improvements. The holding pond responsible for irrigating most of Buzzy's Ranch is in the mid-section, and the mitigation wetland is in the southern portion of the pasture. Typically, the three areas would be viewed as individual pastures; using this approach, the Ducks Unlimited project would be prioritized. However, irrigation of the Ducks Unlimited project relies on water storage from the pond. Approximately ten percent of the pasture is not fenced, but livestock are kept out of neighboring residences, in large part due to the barrier caused by the Mexican Ditch. Fencing these areas may be required in the future. |
| BR-02 | 72.9 | 2/ (14) | The east and west portions of BR-02 are fenced. A portion of the pasture is bordered by the Ducks Unlimited project, which has a very strong fence. The pasture is easily irrigated directly from Mexican Ditch. Additionally, nearly a mile of the pasture's boundary directly borders residential development and the Mexican Ditch Trail System. |
| BR-03 | 16.5 | 3/ (14) | BR-03 is completely fenced. Irrigation infrastructure needs maintenance, typical of the rest of the property. The pasture directly borders Carson River Road and is easily viewed by the public. |
| BR-04 | 41.3 | 4/ (13) | BR-04 is completely fenced. Irrigation to this pasture is unique. A pipeline extends from Mexican Ditch to deliver a portion of the irrigation water. The pipeline needs to be repaired or replaced. The field is irrigated unevenly, and a decadent stand of alfalfa persists. The pasture directly borders Carson River Road and is easily viewed by the public. |
| BR-05 | 31.9 | 5/ (12) | BR-05 is fenced on two sides, both needing maintenance. Irrigation infrastructure also needs maintenance. BR-05 is rated above BR 6-9 due to its proximity to BR-01 and for the fact that tail water from BR-5 contributes to the water supply for the pastures to the north. |
| BR-08 | 39.2 | 6/ (12) | The pasture is fenced on the west side bordering the Ducks Unlimited project/BR-01, which is in good condition. The other sides of the pasture are unfenced. Irrigation infrastructure needs maintenance, typical of the rest of the property. BR-08 was given a score of 3 in the "Irrigation Infrastructure" category since it is near high priority pastures for irrigation and minimal additional maintenance will be required if BR-05 is irrigated. |
| BR-07 | 17.2 | 7/ (12) | The pasture is fenced on the eastern boundary, which has recently been replaced as part of the Buzzy's Ranch Trail construction and is in good condition. Irrigation infrastructure needs maintenance, typical of the rest of the ranch. BR-07 was given a score of 2 in the "Proximity to Residential Development" category, due to a large portion of the pasture being intersected by the newly constructed public trail. |
| BR-09 | 38.8 | 8/ (11) | The pasture is fenced on two sides, one bordering the Ducks Unlimited project, which is a well-kept fence. The fence bordering the return ditch on the north side needs extensive maintenance/replacement. BR-09 was given a score of 1 in the "Irrigation Infrastructure" category since irrigating the pasture would require considerable ditch maintenance to irrigate it and BR-06 only. Both pastures scored low in other priority criteria. |
| BR-06 | 33.8 | 9/ (11) | The pasture is fenced on two sides. The north fence needs maintenance. The east fence has been rebuilt partially to accommodate the new Buzzy's Ranch Trail. BR-06 was given a score of 1 in the "Irrigation Infrastructure" category since irrigating the pasture would require considerable ditch maintenance to irrigate both it and BR-09 only. Both pastures scored low in other priority criteria. |

If areas of Buzzy's Ranch can no longer be irrigated, vegetation management will be required to transition the plant community from irrigated species to arid species. Site stabilization will be focused on transitioning irrigated pasture to stable dryland perennial communities. Doing so, without temporary irrigation water for establishment, will be extremely difficult in several areas due to severe soil limitations. Wherever possible, seeding efforts are recommended to occur with limited or temporary irrigation to assure germination and establishment of seedlings.

Seeding in the fall (Late August to October) and irrigating after drilling or timed with a precipitation event is recommended to promote germination of seeded species prior to the first killing frost. If seedlings are germinated in the fall, they will be more likely to take advantage of early spring rains and snowmelt giving them an advantage over weedy species. One to two irrigations during the growing season will be conducted to fill voids in natural precipitation and substantially improve seedling establishment. Spring seeding is not suggested with limited irrigation due to seedlings being vulnerable to high soil temperatures.

The USDA Agricultural Research Service (ARS) Great Basin Rangelands Research Unit has been evaluating various revegetation techniques on Buzzy's Ranch if water becomes reduced or unavailable. Two, one-acre study plots have been established; one in an irrigated plant community in Buzzy's Ranch, Pasture 3 (BR-03), and one in a dry portion of BR-04. No-till drill seeding first occurred in fall of 2019. Seeding establishment in the irrigated plot was trace due to competition from existing established rhizomatous grasses and unregulated grazing pressure. No germination was observed in the dry plot, in large part due to very dry spring conditions. In fall of 2020, both plots were reseeded. In the irrigated plot, Paiute orchard grass, slender wheatgrass, tall wheat grass, and pubescent intermediate wheatgrass were seeded with a no-till drill. In the dry plot, Siberian wheatgrass and a mix of immigrant forage kochia and snowstorm forage kochia were broadcasted over the other half of the plot. These seedings were also largely unsuccessful due to grazing pressure and droughty conditions.

At Buzzy's Ranch, perennial forage species are currently established throughout the irrigated portions of the property. It is expected that the existing plant community will remain partially viable for one to two growing seasons without irrigation. While existing perennial species remain viable, establishing seedlings will be difficult. Efforts in the irrigated ARS study plot have shown that inter-seeding with a no-till drill is extremely difficult due to excessive competition from actively growing rhizomatous sod.

To establish new seedlings, tillage may be required to reduce competition from rhizomatous species. Tillage should occur in the fall to a depth of six to eight inches with a large disk or plow in small portions of the property at a time. Multiple passes with tillage equipment will be needed to break root clods. Following tillage, pastures will need to be leveled to some degree (using a pasture drag or land leveler) to allow for effective temporary irrigation. After the seed bed is prepared, arid land seedings should occur with a drill seeder. Plant species selection will vary based on soils capability and limitations and availability of irrigation water. Nitrogen and phosphate fertilizers are usually not essential for seeding establishment, but soil sampling should occur to confirm that soils are not lacking in macro or micronutrients. Fertilizers applied after stand establishment will likely increase production, but soil samples are necessary.

Although tillage increases chances of seedling germination and establishment, it is labor intensive and impacts soil structure, leaving soils vulnerable to erosion until root systems establish and stabilize the

soil. Seeding adapted dryland species accompanied by tillage should be implemented on small plots to test its success prior to large scale treatments.

No-till drill seeding presents considerably less risk but with lower chance of success due to established sod. No-till drills require less soil disturbance and use disks in front of seed tubes to open the top one inch of the soil surface. Seed tubes then drop seed into the disturbed areas. In dry crusted soil, it is difficult to accomplish proper seed to soil contact. If seeds are left on the soil surface, dragging with a harrow following drilling will increase seedling establishment.

If no water is available long-term, extremely drought resistant, robust species must be selected. Average natural precipitation in the area is approximately eight inches annually, most of which comes in the form of snow and early spring rain. An example of an arid species seeding can be reviewed in Table 2 below. Despite the species’ drought tolerance, temporary irrigation water would greatly increase chances of establishment.

Table 2. Example of Fall Seeding for Revegetation Efforts in Absence of Irrigation

| Species | Seeding Rate | Species Description |
|-------------------------|--------------|---|
| Russian Wildrye | 5 lbs./acre | Cool-season palatable bunch grass. Requires 7-12 inches of annual precipitation. |
| Siberian Wheatgrass | 8 lbs./acre | Cool-season very drought tolerant bunch grass. Requires a minimum of 5 inches of precipitation. |
| Immigrant Forage Kochia | 1 lb./acre | Cool-season drought tolerant semi-evergreen half-shrub. Requires a minimum of 6 inches of precipitation. Excellent for green fuel breaks. |
| Snowstorm Forage Kochia | 1 lb./acre | Cool-season drought tolerant semi-evergreen half-shrub. Large in stature compared to immigrant forage kochia. Requires a minimum of 6 inches of precipitation. Excellent for green fuel breaks. |

Application of preemergent herbicide may become necessary one year after seeding germination if weedy annual species show signs of increasing. Application may also be needed prior to seeding if annuals flush before seedings can be planted. In this case, seeding needs to be delayed one year after application, as preemergence herbicides kill germinating seeds, effectively diminishing the sprouting seedbank. Ideally, seedings will be properly timed and seedlings will establish, reducing the need for preemergent herbicides.

Preemergent herbicides primarily target short-lived, frequently germinating species. Perennial weedy species like hoary cress primarily rely on a robust root system that allows them to propagate without reliance on seed. Conversely, biennials like musk or bull thistle rely on a large tap root for extracting nutrients but rely on seed to propagate. In this case, preemergent herbicides would control germinating hoary cress and thistle seeds but not spreading roots or tap roots. If perennial weeds become persistent, herbicides like 2, 4-D or glyphosate can be used to kill green foliage and control spread.

Infrastructure Improvements

Culvert replacement

Water from the mitigation wetland in Pasture BR-01 flows to the holding pond and Ducks Unlimited project. The water is held in the mitigation wetland and released to the holding ponds south of the Duck's Unlimited project through one dilapidated culvert. The culvert is approximately 40 feet long and 24 inches in diameter. It is completely rusted and is the main source of water to the holding pond and Ducks Unlimited project. If the culvert failed, the holding ponds would not receive an adequate volume of water. The culvert should be replaced as soon as possible. The culvert has been approved for replacement through SNPLMA funding.

Bank stabilization: Carson River

The Carson River forms the eastern border of Buzzy's Ranch. In BR-07, approximately 3.6 acres of the pasture have been eroded from 1990 to present. Erosion has been severe and a portion of the eastern perimeter fence along Buzzy's Ranch Trail has been undermined. According to findings compiled by RCI's fluvial geomorphologist, Lynn Zonge, the western bank of the channel has moved approximately 118 feet from 1990 to 2012 following large episodic flood events. Erosion is continuing due to recent flood events expected to continue without intervention. The bank needs stabilization as soon as possible to avoid further soil loss and fence damage. This is a severe hazard and funding and resources should be directed to this project as a top priority. Considerable bank loss is occurring with high runoff this year.

Site specific planning is necessary to implement bank stabilization structures. Proper design and permitting will be completed by the Carson Valley Conservation District and the Carson City Parks, Recreation & Open Space Department cooperatively.

Additional interior fencing

Additional permanent barbed wire fencing will ease the implementation of the grazing system. Proposed fencing (Figure 2) generally follows alignments of historic fencing that was destroyed in the flood of 1997 (see Figure 2). Pastures would be divided into approximately 40-acre paddocks. Smaller paddocks allow the lessee to concentrate livestock for short periods while allowing other pastures to rest during the growing season.

Conceptual alignment of proposed fencing can be seen in Figure 2. Approximately 12,400 feet of fence are proposed. Many types of fencing exist, varying in design and purpose. Fencing specifications will be directed by NRCS standards if federal cost share is applied. Ultimately, fencing needs to be sturdy enough to withstand livestock pressure long-term while allowing for safe wildlife passage.

Permanent fencing will initially be costly to purchase materials and labor intensive to install. However, permanent interior fences will decrease the use of temporary fencing, allowing for well planned, less labor-intensive livestock rotations.

Installation of gravity fed irrigation pipelines with tailwater recovery

Most irrigation water is conveyed using earthen ditches and concrete headgates. BR-04 is the only pasture irrigated by an iron pipeline. The pipeline extends along Carson River Road from Mexican Ditch to the southeast corner of Buzzy's Ranch. The pipeline is aged and in need of repair or replacement to deliver adequate water flow.

To increase water efficiency within Buzzy's Ranch, converting the existing ditch system to a piped irrigation system may become viable, pending obtainment of long-term water rights. Low-head pipe (sized appropriately for the system) would divert water from Mexican Ditch. The pipeline would be gravity fed and flows would be controlled with valving. Pastures would be flood irrigated using risers.

Conceptual layout of pipelines is shown in Figure 2. Final design of the system will be directed by long-term water rights. For example, design of the pipeline will vary significantly depending on water being supplied by a well versus a surface source. After water rights are in place long-term for Buzzy's Ranch, the NRCS should be consulted with to aid in design and cost share. Once the system is installed, irrigation should occur as outlined by the Improved Irrigation Water Management section above.

To conserve irrigation water, a conceptual *tailwater recovery system* is proposed at the northern most border of Buzzy's Ranch. As shown in Figure 2, irrigation water is collected in a large earthen ditch averaging 10 to 20 feet wide, which returns water to the Carson River. To recover irrigation water, two headgates (i.e., poured concrete in place due to their size) would be installed in the return ditch to store water. Approximately two headgates would be installed to capture water being released from the Ducks Unlimited project and excess overland flow during irrigation of the other pastures. Once water is stored in the tailwater recovery ditch, it will be circulated back up to BR-06, 07, 08, and 09 using a lift pump located near the center of the tailwater return ditch. Having the ditch divided into two collection points will allow water to pool quickly for recirculation. The pump intake would be portable to draw out of either side of the headgate. The pump would discharge water in the southerly ditch along BR-07 and BR-08 to be used for additional irrigation(s).

Stockwater improvements

Permanent stockwater infrastructure will aid in implementing an effective, adaptive grazing rotation by lowering labor inputs and providing high quality water for livestock. Stockwater would be piped from available water sources, pending water right acquisition. Again, all alignments shown in Figure 2 are conceptual and are reliant on securing water rights.

Strategically placed stockwater developments improve livestock production while offering flexibility in grazing and pasture management. Under Alternative 1, two stockwater pipelines are proposed to supply the entire ranch with clean livestock water. Troughs on both pipelines would have a capacity of approximately 1,000 to 1,200 gallons. Each trough will be located on an interior fence boundary (proposed or existing) to service multiple pastures. Float valves would be installed to conserve water when troughs are filled at capacity or are not in use.

Two existing wells are candidates for supplying water to proposed pipelines and troughs depending on stockwater water rights. The first well is located at Buzzy's Ranch headquarters (Figure 2). It is equipped with a solar pump and is currently being pumped for domestic use. The line would be built with approximately 1,532 feet of small diameter (1.5 to 2 inch) polyethylene pipe. The pipeline extending from the domestic well would serve BR-03 and BR-04 under Alternative 1. Three troughs would be installed on the pipeline buried in the shoulder of the access road.

The second pipeline would extend from Carson City Well #47 serving BR-01, 02, 05, 06, 07, and 08 using small diameter (1.5 to 2 inch) polyethylene pipe. An estimated 5,700 feet of pipe will be used to service four troughs and seven pastures (once interior fences are constructed).

Vegetation Monitoring plan

Vegetation monitoring is necessary to measure trends in ecological status and guide management. Acting on resource conditions by adapting management is necessary for the success of this plan. Annual monitoring will be conducted by Carson City Parks, Recreation & Open Space staff.

Short-term monitoring measures the conformance to this management plan, highlights needed management alterations, and records weather conditions and unplanned events. Accumulated short-term monitoring records help interpret trends along with long-term monitoring. Short-term monitoring is meant to be quick, easy, and repeated on an (at minimum) annual basis.

- **Short-term monitoring:** To be completed by the appropriate Carson City representative in coordination with permittee using the Stubble Height method (BLM 1999b). Stubble height would be monitored by Carson City Parks, Recreation & Open Space staff at the end of the growing/grazing season, whichever occurs last to determine compliance with the 3-inch stubble height standard. Stubble height monitoring will also be taking place during grazing by the lessee to ensure that proper use and rest on forage species are being achieved. Stubble height monitoring during grazing will trigger pasture rotations. During grazing, stubble height may be monitored at any time by Carson City staff as well.
- In addition to short-term resource monitoring, continual observation and photo documentation of infrastructure improvements and maintenance should be documented by Carson City Parks, Recreation & Open Space staff and the lessee to ensure proper, active management.

Long-term monitoring measures changes over time in plant and soil resources and measures the accomplishment of long-term objectives. It also helps determine the effectiveness of short-term management. Long-term monitoring is more time consuming and usually occurs every three to five years; however, monitoring can occur more often to help set initial baselines. Over time, with multiple years of monitoring at permanent sampling locations, ecological trends can be identified to assess species diversity, plant production, and progress toward meeting management objectives. Photos will be taken with all long-term monitoring methods.

- **Long-term monitoring:** To be completed by the appropriate Carson City representative in coordination with permittee using the production (double weight sampling) and Daubenmire method (BLM 1999a).

Production monitoring would be measured during the peak of growing season throughout representative areas, and production would be compared to exclusion cages or comparable un-grazed areas. Production monitoring determines pounds of plant production per acre per species. Production per acre ultimately helps land managers adjust stocking rates to match forage supply.

The Daubenmire method would also be implemented during the peak of growing season. Daubenmire protocol measures canopy cover, frequency, and plant composition by canopy cover to track trends in the plant community. This method is more rapid compared to production and is a great way to determine if desirable species are increasing or decreasing.

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Figure 1. Buzzy's Ranch Overview Map

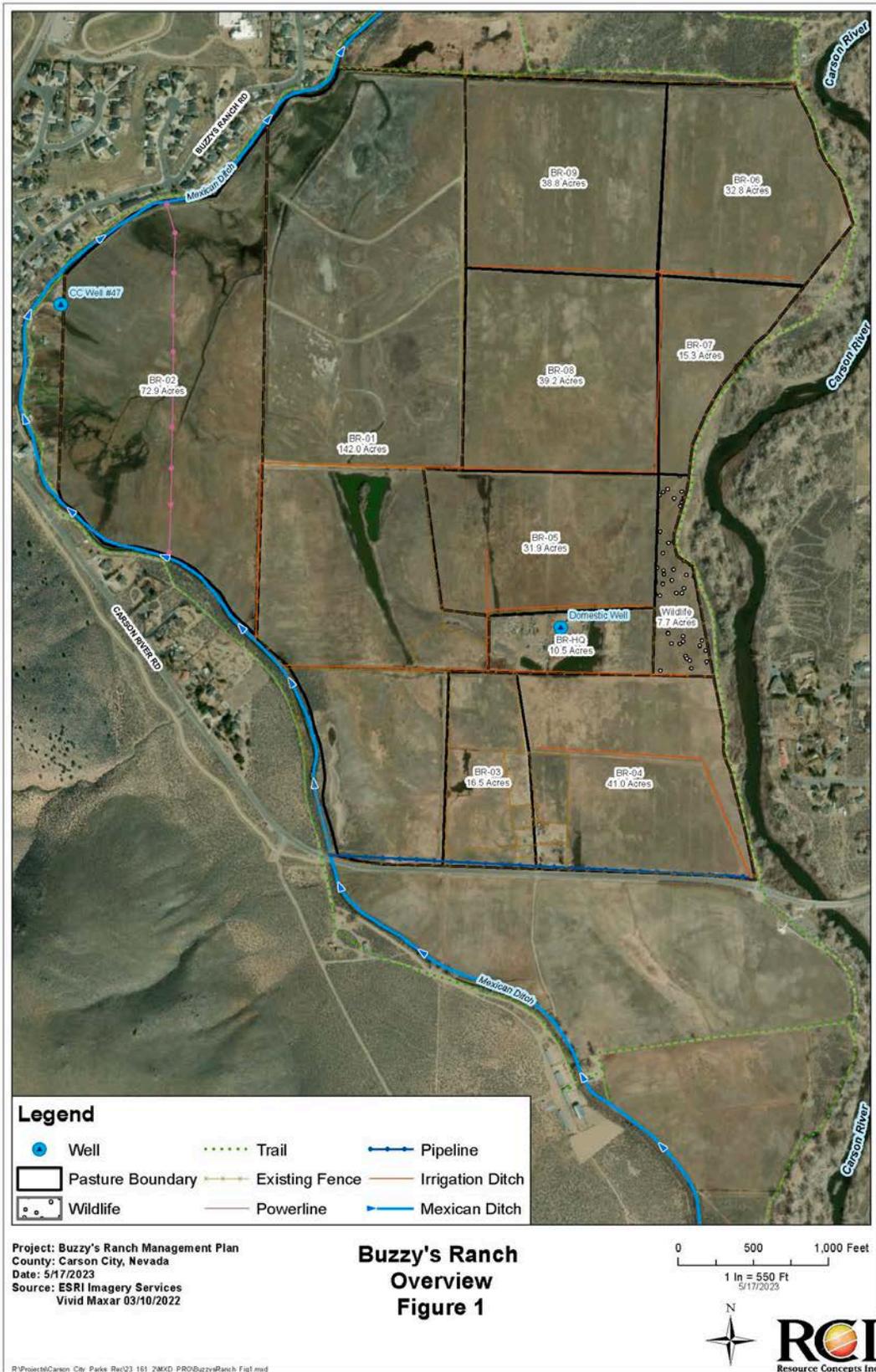
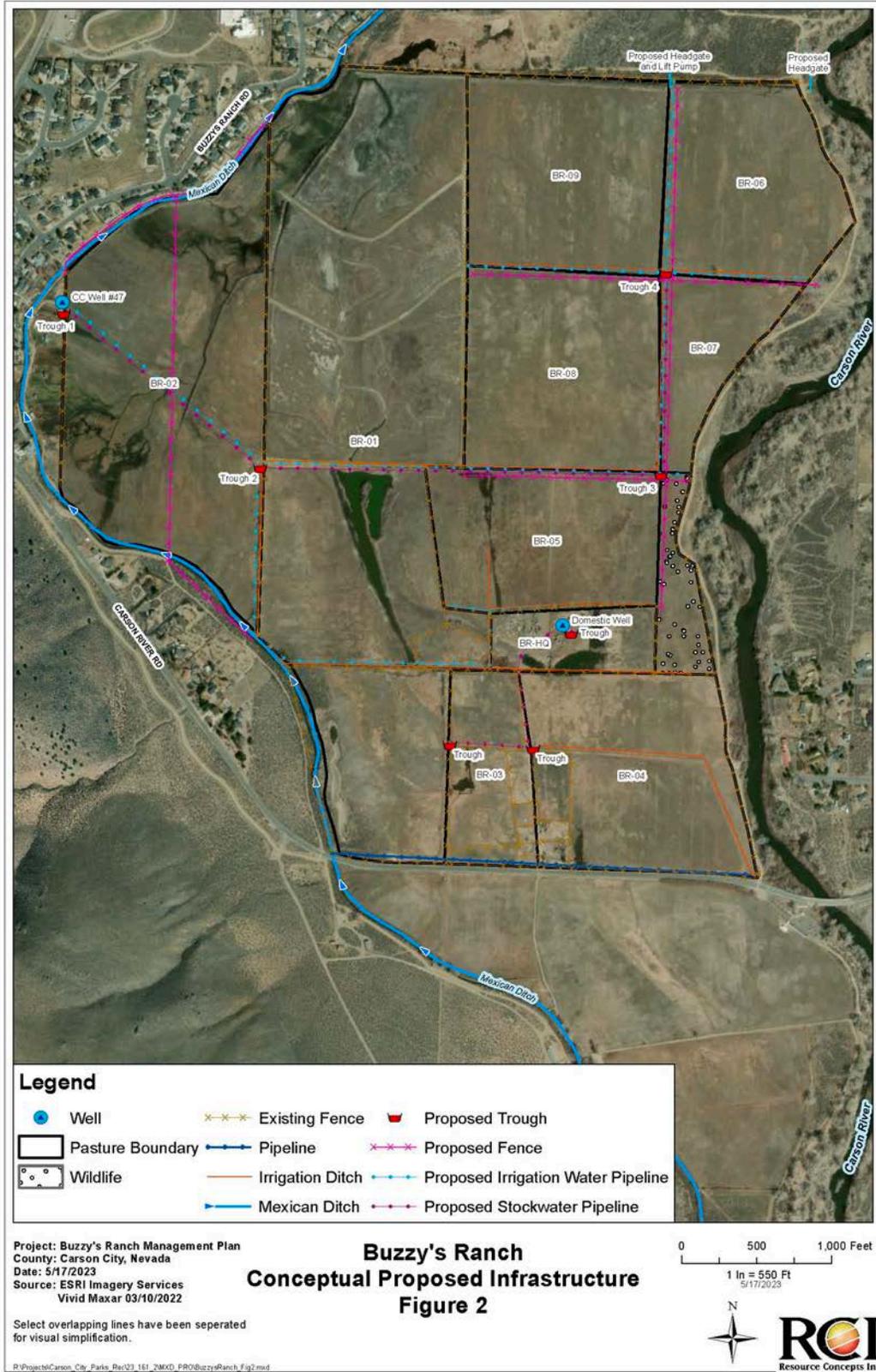


Figure 2. Buzzy's Ranch Proposed Infrastructure Map



Appendix A

Buzzy's Ranch Project Operations Plan: Authored by Ducks Unlimited

Appendix B

Annual Operating Plan (AOP) Template

Appendix C

Irrigation Priority Ranking

Annual Operating Plan (AOP) Template

The AOP below represents the lessee's plans for the upcoming grazing season. The AOP will be reviewed and approved by Carson City Parks, Recreation & Open Space staff prior to plan implementation. This plan is intended to communicate the lessee's intentions for management to Carson City (lessor). At minimum, the lessee's plans for the upcoming year will be described as they relate to grazing, irrigation management, and fencing/corral maintenance/improvement projects.

Livestock Type/ Head Numbers

Instructions: Please provide planned number of livestock along with approximate use dates.

Applicable Restrictions

- 450 AUMs cannot be exceeded in BR-02
- 1,125 AUMs cannot be exceeded in BR-01, BR-03-BR-09

| Livestock Type/ No. of Head | Target Season of Use | Estimated AUMs | Notes |
|--------------------------------|----------------------|----------------|-------|
| | | | |
| | | | |
| | | | |
| | | | |

*Note: Animal Unit X No. of head X No. of days grazed = No. of Animal Unit Months (AUMs)
A 1,000 lb cow/cow-calf pair equals one animal unit.*

Planned Livestock Rotation

Instructions: Please describe the planned grazing rotation for the upcoming year along with contingencies to adjust plans. Also, indicate who will be the point of contact for managing livestock.

Applicable Restrictions

- BR-01 cannot be grazed March 15 to August 15 to promote waterfowl nesting habitat.
- Livestock must be kept in one herd or in large enough groups to allow for rest on previously grazed pastures.
- Livestock must be moved to a new pasture when average stubble height is 3 inches.
- Forages will not be grazed until growth of grasses reaches 4 to 8 inches in any pasture.
- Livestock will be kept out of recently irrigated or otherwise saturated pastures until conditions dry to avoid soil compaction.

Please describe planned management as it relates to grazing rotations in this text box or attach as a separate document.

Irrigation/Irrigation Maintenance-Improvements

Instructions: Please describe plans for irrigating throughout the season as well as planned maintenance activities, infrastructure Improvements, and provisions for stockwater. Please also indicate who will be the point of contact for irrigating and maintenance.

Applicable Restrictions/Actions

- Excess excavated material from irrigation ditches must be hauled to headquarters in coordination with Carson City.
- BR-01 must be irrigated throughout the year as long as water is available despite applicable grazing restrictions.
- Coordination with the Mexican Dam Company and Carson City is required for maintenance on the Mexican Ditch.
- Irrigation ditches and diversion structures must be maintained annually at minimum to deliver water to Buzzy's Ranch as efficiently as possible.

Please describe planned management as it relates to irrigation in this text box or attach plan as a separate document.

Fencing maintenance/Replacement/Installation

Instructions: Please describe plans for routine fencing maintenance as well as plans and locations for temporary fencing and areas of permanent fencing in need of replacement or new installation.

Applicable Restrictions/Actions

- All fences, especially perimeter fences, and corrals must be checked and maintained routinely to appropriately control livestock.
- Plans for new permanent fence construction must be described to carry out implementation in coordination with Carson City.

Please describe planned management as it relates to fencing in this text box or attach as a separate document.

Other Planned Management

Instructions: Please describe plans for other management including weed management, plans monitoring stubble heights, ability to react to changing forage/water availability, and other maintenance activities not captured in the sections above.

Please describe "other" planned management not captured in the sections above in this textbox or in a separate document.

Management Concerns/New Suggestions

Instructions: Please describe concerns experienced or foreseen as they relate to future management at Buzzy's Ranch. Also describe new suggestions for implementation if not previously discussed in this AOP.

Please describe concerns or new suggestions as it relates to the overall direction of management at Buzzy's Ranch in this text box or attach as a separate document.

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Buzzy's Ranch Project Operations Plan

Background

Ducks Unlimited (DU) and Carson City Parks, Recreation, & Open Space Department (CCPROSD) recently collaborated on a conjunctive use project at Buzzy's Ranch that reconstructed pasture irrigation and drainage infrastructure in three pastures on the property. The goals of the project were to improve pasture management capabilities (e.g., the ability to irrigate and drain the three pastures) while also enhancing the existing wet meadow pasture habitat for the benefit of waterfowl and other wetland-associated species. Working with CCPROSD and Mickey Andersen, the long-time grazing lessee of Buzzy's Ranch, DU prepared an engineering design focused on reconstructing irrigation and drainage infrastructure to improve the ability to effectively irrigate and drain the three pastures on the project site, as well as enhance the pastures' wet meadow habitat for a variety of wetland-associated species. **Figure 1** shows the project design. Funding for the project came from a North American Wetlands Conservation Act (NAWCA) grant focused on the Lahontan Valley and Carson Valley areas that recently was awarded to DU. Great Basin wetlands such as those in Carson and Lahontan Valleys provide continentally important spring migration stopover areas for waterfowl to feed and rest before continuing their migration journeys to breeding grounds in the Prairie Pothole Region of the Dakotas and prairie Canada, and the western Boreal Forest Region of Western Canada and Alaska.

Construction of the project has enhanced the three wet meadow pastures by improving water delivery and drainage capabilities to the three pastures. Project improvements, as shown on **Figure 1**, included constructing new levees, re-grading existing levees, grading new swales and potholes, replacing worn-out water control structures (WCSs) with new flashboard riser-type WCSs and associated culverts plus installing new WCSs in several locations, and constructing new pasture fences. According to Mr. Andersen, these three pastures are located in a topographical low area on the property with irrigation tail water from pastures on the south portion of Buzzy's Ranch and sub-irrigation flows from Silver Saddle Ranch draining to these pastures and also to the stock water pond located immediately to their south. Poor drainage capabilities in these pastures led to a build-up of hardstem bulrush (*Schoenoplectus acutus*) in some of the low areas in the pastures and accumulation of surface salts in others. The constructed features provide for improved pasture irrigation and drainage, which should improve pasture grass and forb production. For example, the reconstructed levees with new WCSs linked by new swales provide the ability to manage irrigation water within a specific pasture by setting flashboards in the WCSs; this provides the ability to shallowly flood irrigate nearly the entirety of each of the three pastures. Once a specific pasture is irrigated, flashboards can then be pulled to pass irrigation water to the next pasture or allow irrigation water to drain off of the site. In late winter and early spring, these constructed features can be used to shallowly flood the pastures to provide spring migration habitat for waterfowl. Existing

pasture ponds and constructed potholes will also provide brood-rearing and migration habitat for waterfowl and wetland-associated species, as well as watering sites for livestock.

The purpose of this Operations Plan is to provide an overview of use of the constructed features to improve pasture management for livestock forage production that simultaneously provides habitat for waterfowl and wetland-associated species.

Objectives for Habitat

As mentioned above, in its current grazed and flood-irrigated state, the wet meadow habitat on the site provides migration and nesting habitat for a variety of waterfowl and wetland-associated species. While some DU projects are entirely waterfowl-centric, the goal for the Buzzy's Ranch project was to rebuild the site's irrigation and drainage infrastructure so that it could continue to function as a cattle-based operation that concurrently supports waterfowl and other wetland species. In 2012, when DU was first collaborating with CCPROSD staff, several meetings with Juan Guzman (CCPROSD staff), Mr. Andersen, and Chris MacKenzie (attorney representing Mr. Andersen) were convened to discuss the concepts and goals so that Mr. Andersen could feel comfortable with the project moving forward. DU's task was to develop the project engineering design to reconstruct the irrigation and drainage infrastructure so that Mr. Andersen could better manage the pastures to grow livestock forage as well as manage the cattle grazing of the pastures; the outcome of his management of water and cattle was anticipated to also be a benefit to waterfowl and wetland species. DU never discussed grazing rotations or irrigation practices with CCPROSD staff or Mr. Anderson. A concern for DU was that the site not be stocked too heavily to avoid overutilization of site forage, excessive compaction of pasture soils, and degradation of the habitat.

Irrigation Water Delivery System

Overview

Irrigation water for the three pastures originates in the stock water pond located immediately south of Pasture 3, and gravity flows from south to north (**Figure 1**). Water supply for the stock pond comes from irrigation tailwater flows from within Buzzy's Ranch and from sub-surface flows of irrigation tailwater from Silver Saddle Ranch. Each pasture and the stock pond have a new or reconstructed levee located on its north side into which one or two precast concrete flashboard riser WCSs (**Figure 2a**) and associated high density polyethylene (HDPE) culverts have been installed. A swale has been excavated through the center of each pasture and is linked to each pasture's central flashboard riser. **Figure 3**, a Google Earth image from June 2018, shows the as-built features of the project and includes WCS locations and numbering sequence. Placement of flashboards into the flashboard risers is used to regulate the flow of water out of the stock water pond and into Pasture 3, then into Pasture 2, and finally into

Pasture 1, after which water can be drained off of the site into a drainage ditch that flows out to the Carson River.

Each pasture has a specific design water surface elevation (WSE). When flashboards are installed to the specific elevation, nearly the full extent of each pasture can be flood irrigated to depths of approximately one foot; **Figure 4** shows the extent of pasture flooding that can be achieved by placement of flashboards to the prescribed elevation. With irrigation to this elevation, there is one foot of elevational difference (known as freeboard) between flood irrigation levels and the top of the associated levees; irrigation to depths greater than the design WSE would place water higher on the levees and could lead to erosion issues on the levees. **Figure 5**, a Google Earth image from August 11, 2017, shows an in-progress irrigation of Pasture 3.

System Operation

Pasture 3

Water delivery and circulation for the pastures begins with gravity flow from the stock water pond into Pasture 3. The flashboard riser installed into the stock water pond's north levee (WCS #1) includes an HDPE culvert that provides the ability to gravity flow irrigation water into Pasture 3. The excavated swale begins at this HDPE culvert and runs north to WCS #3 located in the north levee of Pasture 3; from there, the swale continues into and through Pasture 2 and then Pasture 1. Placement of flashboards into WCS #3 (see Figure 2b) manages the retention and spreading of irrigation water into Pasture 3. The design WSE for Pasture 3 is 4,602.0 feet. Placement of flashboards to this level provides for approximately one foot of water depth across the pasture; the excavated swale, borrow cuts, and existing ditch segments will contain slightly deeper water levels. Once the swale is full of water, water then spreads out of the swale and across the pasture. If a shallower depth of irrigation is desired, flashboards in WCS #3 can be installed to elevations less than the 4,602.0 feet level. After the desired duration of irrigation of Pasture 3 is completed, all but the bottom flashboard should be pulled from WCS #3 to allow water to flow into Pasture 2. If the bottom board is removed, sediments and other debris will settle out into the flashboard riser's bottom slot leading to difficulty in obtaining proper flashboard seating the next time flashboards are installed. **Figure 6** shows a WCS with the bottom board retained as well as debris accumulations in front of the structure that could accumulate in the flashboard riser's bottom slot if the bottom flashboard was removed. In Pasture 3, note that a second WCS (WCS #4) is located at the west end of Pasture 3's north levee. During irrigations, flashboards need to be placed in this WCS; after irrigation, they can be left in this WCS to retain water in the existing ditch that is associated with it to provide residual open water areas for wildlife and cattle use, or removed to more fully drain the pasture.

Pasture 2

The design WSE for Pasture 2 is 4,600.5 feet. Placement of flashboards into WCS #7 and WCS #8 to this level provides for approximately one foot of water depth across the pasture; the excavated swale, borrow cuts, and existing ditch segments will contain slightly deeper water levels. See **Figure 4** for extent of flood irrigation coverage if water is held at the 4,600.5-foot level. After the irrigation of Pasture 2 is completed, all flashboards, except the bottom board, should be pulled from WCS #7 and #8 to allow water to flow from Pasture 2 into Pasture 1.

Pasture 1

The design WSE for Pasture 1 is 4,599.0 feet. Placement of flashboards into WCS #5 to this level provides for approximately one foot of water depth across the pasture; the excavated swale, borrow cuts, and existing ditch segments and existing pond will contain slightly deeper water levels. See **Figure 4** for extent of flood irrigation coverage if water is held at the 4,599.0-foot level. After the irrigation of Pasture 1 is completed, all flashboards except the bottom board should be pulled from WCS #5 to allow water to flow from Pasture 1 into the adjacent drainage ditch and out to the Carson River.

Miscellaneous

At the end of the irrigation season, all flashboards, except the bottom board, should be removed from the flashboard risers and put into storage until needed in the next irrigation season. Retention of the bottom boards will prevent debris from accumulating in the flashboard risers' bottom slots.

Table 1 contains summary information for each WCS installed on the DU Project site.

The depth, duration, and frequency of flood irrigations will play a role in determining the species of grasses and forbs that will grow in the pastures. These irrigation factors will need to be determined collaboratively by CCDROS staff and the lessee. These may vary from year to year based on the snow pack and available water for irrigation.

Following construction of the project, Mr. Andersen has been able to effectively irrigate and drain water from the pastures. With these improvements, he has observed the composition of vegetation in the pastures changing. For example, he has stated that better forage grasses are becoming established in the pastures and that bulrush is less abundant. He also has mentioned that alkali-affected areas appear to be declining now that irrigation water is able to saturate/flood soils and then be drained away, pulling salts out with the water as it drains away. Noting that bulrush is now less abundant, if CCPROSD desires more coverage by this plant species to provide habitat cover for waterfowl and wetland-associated species, discussions of pasture and habitat goals with Mr. Andersen (and future grazing lessees) could take place, with a product of these discussions being a pasture and habitat-based irrigation plan. For example, it may be desirable to retain pasture irrigation water longer in Pasture 1 to help expand coverage by bulrush in this pasture, but manage Pastures 2 and 3 under a similar

irrigation regime as is now being employed by Mr. Andersen. Construction of the project has provided the infrastructure with which to accomplish this type of conjunctive use management.

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Table 1. Water Control Structure Table

| WCS# and Type (See Figure 3 for locations.) | Width (ft) | Height (ft) | Culvert Diameter (inches) | Culvert Invert Elevation | Specific Pasture; Design WSE; Levee Top Elevation | Notes |
|--|---------------|----------------|---------------------------------|--------------------------------|---|---|
| 1. twin-track flashboard riser with culvert | 3 | 6 | 24 | 4,598.5' | Not Applicable (NA) | Water flow into the pastures begins at this WCS. |
| 2. culvert | 4 | 4 | 30 | 4,601.5 | NA | This culvert passes Mexican Ditch irrigation water to eastern pastures. |
| 3. twin-track flashboard riser with culvert | 3 | 4 | 24 | 4,598.0' | Pasture 3; 4,602.0'; 4,603.0' | Levee freeboard is 1 foot at Design WSE. |
| 4. twin-track flashboard riser with culvert | 3 | 4 | 24 | 4,598.0' | Pasture 3; 4,602.0'; 4,603.0' | Levee freeboard is 1 foot at Design WSE. |
| 5. twin-track flashboard riser with culvert | 4 | 6 | 36 | 4,595.0' | Pasture 1; 4,599.0'; 4,600.0' | Levee freeboard is 1 foot at Design WSE. |
| 6. twin-track flashboard riser with culvert | 3 | 6 | 24 | 4,595.0' | NA | Located in adjoining pasture to east, and allows drainage of this pasture complex into associated drainage ditch. |
| 7. twin-track flashboard riser with culvert | 3 | 5 | 24 | 4,596.5' | Pasture 2; 4,600.5'; 4,601.5' | Levee freeboard is 1 foot at Design WSE. |
| 8. twin-track flashboard riser with culvert | 3 | 5 | 24 | 4,596.5' | Pasture 2; 4,600.5'; 4,601.5' | Levee freeboard is 1 foot at Design WSE. |
| 9. twin-track flashboard riser with culvert | 3 | 4 | 24 | 4,597.5' | NA | Water from pasture to west drains onto site through this WCS. |
| 10. culvert | 4 | 4 | 30 | 4,601.0' | NA | Culvert passes Mexican Ditch irrigation water to eastern pastures. |

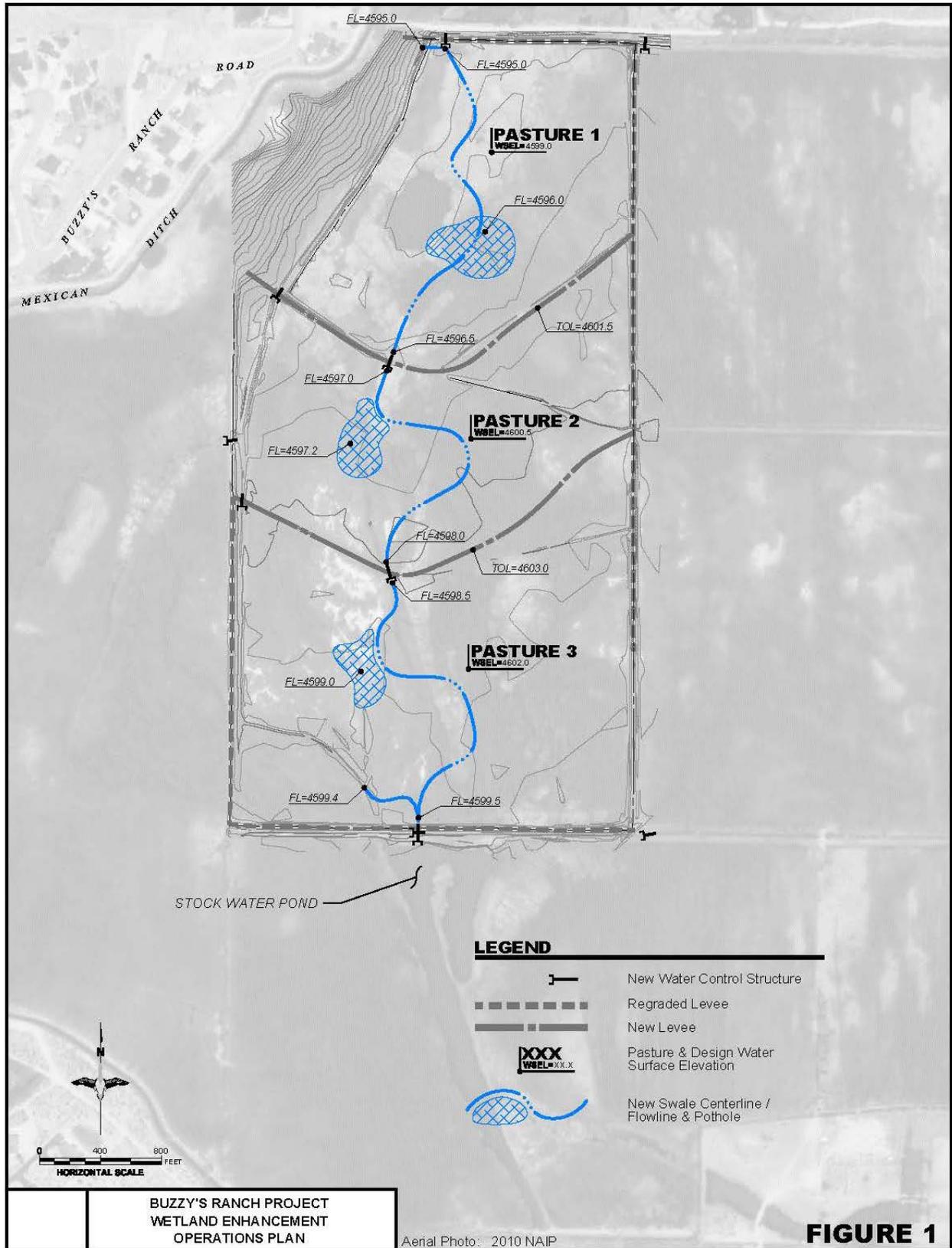


Figure 1. Project Design / Construction Plan overview.



Figure 2a. Precast concrete flashboard riser WCS with flashboards.



Figure 2b. WCS#3, located on north side of Pasture 3, with flashboards installed at the time of this irrigation. Note the shallow flood irrigation of this pasture. Full irrigation level is approximately two to four more inches of water against flashboards.

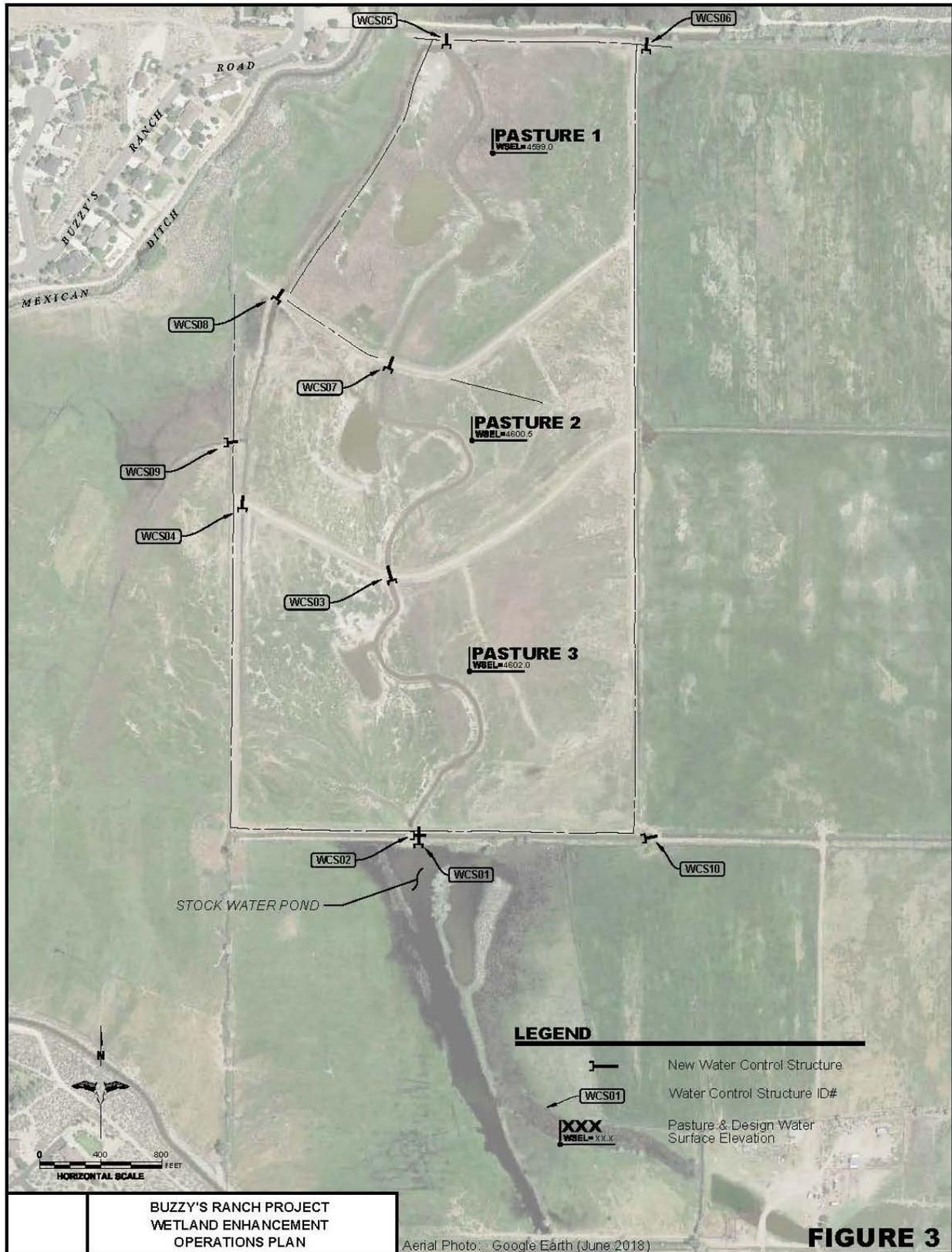


Figure 3. 2018 Google Earth image showing as-built features with WCS #s and locations.

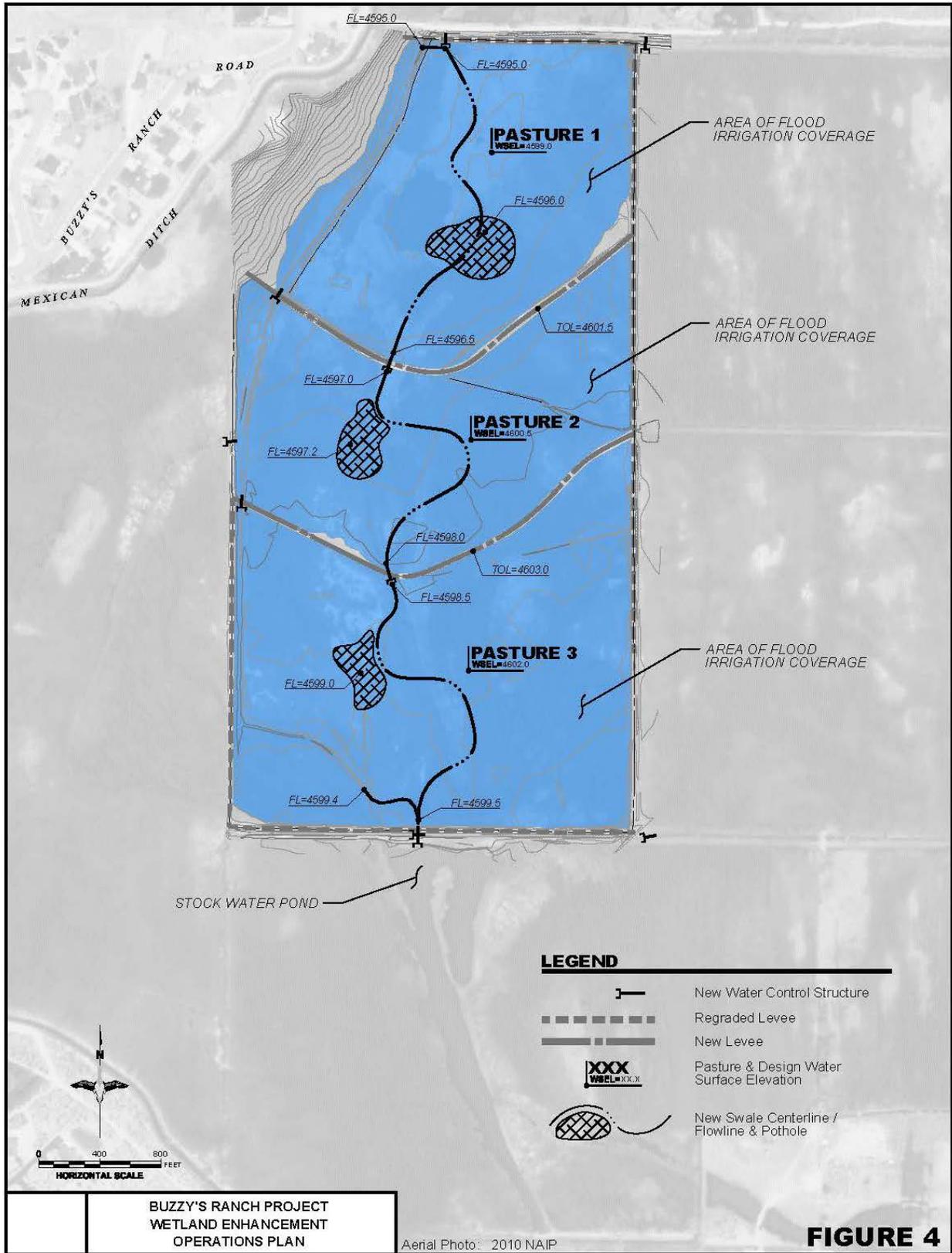


Figure 4. Flood irrigation extents when flashboards are installed to design water surface elevation.



Figure 5. Google Earth image, August 2017, showing irrigation of Pasture 3.



Figure 6. WCS with lowest flashboard retained, and debris in front of structure.

DRAFT

| Irrigation Priority Ranking | | |
|--|---|----------|
| Number/Name: | Priority Ranking: | Acreage: |
| Dominant Soil: | | |
| Category | Site Condition | Rank |
| Current Status of Irrigation Infrastructure | 1 = Infrastructure is in disrepair | |
| | 2 = Infrastructure needs maintenance | |
| | 3 = Infrastructure is in functional condition | |
| Current Status of Fencing | 0 = The pasture is unfenced | |
| | 1 = One pasture boundary is fenced | |
| | 2 = Two pasture boundaries are fenced | |
| | 3 = Three boundaries are fenced | |
| | 4 = The majority of the pasture is fenced >90% | |
| Proximity to Residential Development | 1 = Pasture is greater than 300 feet from residences | |
| | 2 = Pasture is within 300 feet of residences | |
| | 3 = Pasture is directly bordering residences | |
| Dominant Soil Characteristics | 1 = Dominant soils are loamy with a depth to water table of greater than 12 inches | |
| | 2 = Dominant soils are loamy with a depth to water table of less than 12 inches | |
| | 3 = Dominant soils are classified as prime farmland | |
| Flooding Frequency | 1 = No floods expected | |
| | 2 = Rare | |
| | 3 = Occasional | |
| | 4 = Frequent | |
| Current Plant Community | 1 = Annual species dominate | |
| | 2 = Perennial tap root species dominate | |
| | 3 = Rhizomatous species dominate | |
| TOTAL: | | |