# Wetland Restoration Plan

**APN# 216-135-008**
**Harris Road**
**Garberville, CA**

**Prepared by:**

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**August 2019**

**For:**

**MAD RIVER PROPERTIES, INC.**
**MCKINLEYVILLE, CA.**

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**Appendix A**: USFWS Wetland Location Map, Humboldt County Parcel Map (Topo), Humboldt County Parcel Map (Ortho w/SMA), Wetlands and Waters Map (1993 photo), Wetlands and Waters Map (2019), Restoration Planting Map
**Appendix B**: CAL-IPC List of Invasive Plants, Wetland Planting List

# 1.0 INTRODUCTION AND PURPOSE

This report is intended to guide wetland restoration activities to be conducted on an approximately 80-acre parcel located on Harris Road, east of the City of Garberville, CA. (APN# 216-135-008). This parcel is partially developed for agricultural uses and is accessed by a rocked road which leaves Harris Road just east of where Harris Road crosses Perrington Creek.

The subject parcel is largely composed of open grassland which contains a mixture of native and non-native grasses dominated by Harding grass (*Phalaris aquatica*) and colonial bent grass (*Agrostis capillaris*). The remainder of the area is lightly wooded. Stands of mixed oaks and native hardwoods such as Oregon white oak (*Quercus garryana* var. *garryana*), black oak (*Quercus kelloggii*), live oak (*Quercus chrysolepis* and *Quercus wisliznii*), and tan oak (*Notholithocarpus densiflorus* var. *densiflorus*). Madrone (*Arbutus menziesii*) and California bay (*Umbellularia californica*) are found intermixed with the oaks. Some stands of pure madrone exist south and southwest of the pond. Manzanita chaparral (*Arctostaphylos* sp.) exists in small patches often subtending stands of hardwoods, often intermixed with coyote brush (*Baccharis pilularis*) and poison oak (*Toxicodendron diversilobum*). Occasional Douglas' fir trees (*Pseudotsuga menziesii*) can be found throughout. A single Oregon ash (*Fraxinus latifolia*) was found west of the pond near a small watercourse.

Site visits for orientation and assessment of onsite conditions and habitat characteristics were conducted on 15 June and 17 August 2019.

Within the subject parcel an approximately 68,829 $ft^2$ pond was constructed for irrigation purposes. This pond was constructed within the stream channels of several small creeks and over the footprint of a wetland area. At this time the landowner is required to reduce the size of the pond to approximately 58,000 $ft^2$. In addition to the pond reduction the landowner is proposing to complete compensatory mitigation for the spatial and temporal loss of historic wetlands and waters impacted by pond construction. The purpose of this report is to delineate and define the extent of the historic wetlands and waters, locate suitable areas for wetland restoration, and guide restoration activities.

This report is the result of surveys conducted on the dates above, reviews of relevant scientific literature, local, state, and federal ordinance, and professional knowledge. Mr. Regan holds a bachelor's degree in botany and has worked as a professional botanist in Northern California (Humboldt, Trinity, and Mendocino Counties) for the past 15 years and as a wetland delineator for the past 10 years.

# 2.0 METHODS

## 2.1 Assessment of Wetlands and Waters

Field survey for the delineation of watercourses and wetlands was conducted on 17 August 2019. An approximate 40 acre area surrounding the pond was surveyed to map the watercourses that could affect the pond and would have been part of the historic hydrologic system. Seasonal (Class III) and perennial (Class II) watercourses in the area are shown on the accompanying maps. Seasonal watercourses have intermittent flows and while they are capable of transporting water and sediment they do not often support significant wetland vegetation or aquatic animal species. Perennial watercourses generally flow for a large portion of the season and even when not flowing contain sub-surface flows or inundated substrates. Perennial watercourses are more likely to contain wetland vegetation and support aquatic animal species. These watercourses were identified using the ACOE "Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States" (Mercel, Licvar 2014). All mapped watercourses in the subject area showed at least two of the three primary indicators of OHWM which include a break in slope, a change in sediment profile, or a change in vegetation. Creeks within the parcel are generally characterized by a small change in slope from upland to the seasonally active channel and often show a change in sediment from fines and organics outside the OHWM and loose gravels and small cobble within (some larger rocks were present when creeks were down-cut or deeply incised). Creeks defined as perennial showed more defined bank and channel morphology, more developed riparian vegetation, and were flowing at the time of survey. Streams were considered "flowing" even if only occasional disrupted flow or pooled surface water was present. Many of the mapped streams showed signs of significant erosion in the form of deeply incised channels.

Wetland areas were often closely associated with mapped watercourses and generally occurred where stream gradient was reduced and the topography was relatively flat. Some features appear to be created or exacerbated by cattle movement. Wetland assessment was conducted using guidelines outlined in the U.S. Army Corps of Engineers (ACOE) Wetland Delineation Manual Technical Report Y-87-1 (referred to as the 1987 manual) and the Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast Region. The 1987 manual provides technical guidelines for identifying wetlands, distinguishing them from non-wetlands, and provides methods for applying the technical guidelines. Key provisions of the ACOE wetland definition include:

i. Inundated or saturated soil conditions resulting from permanent or periodic inundation by ground or surface water.

ii. A prevalence of vegetation typically adapted for life in saturated soil conditions (hydrophytic vegetation).

Explicit in the ACOE definition is the consideration of three environmental parameters: Hydrology, Vegetation, and Soils. Positive wetland indicators of all three parameters are normally present in wetlands. The ACOE methodology requires one positive indicator from each parameter in order to make a positive wetland determination.

Although this assessment used ACOE guidance, formal ACOE wetland delineation plots were not used. Wetland delineation was based on vegetation, observable hydrology or indicators of hydrology, and topographic position. This method uses techniques from the hydrogeomorphic classification of wetlands technical manual (Brinson 1993) wherein wetlands are classified by land position and hydrologic regime. Areas with at least two positive indicators of wetland setting were delineated as wetlands. Wetland soils were not assessed.

Areas delineated as seasonal and perennial wetlands had vegetation communities dominated by hydrophytic plants. These plants are typically specially adapted to live in wetland situations. The ACOE curates a list of plant species ranked by wetland indicator status (Lichvar 2016), this list was queried for this investigation. The ACOE Manual (1987) directs that presence of a single individual of hydrophytic species does not mean that hydrophytic vegetation is present. However, hydrophytic vegetation is considered to be present if 50% of the dominant species have indicator status of OBL, FACW or FAC.

Vegetation in mapped wetlands was dominated by common bog rush (*Juncus effuses*, FACW), pennyroyal (*Mentha pulegium*, OBL), spreading rush (*Juncus patens*, FACW), small-fruited bulrush (*Scirpus microcarpus*, OBL), and flat nut sedge (*Cyperus eragrostis* FACW). This community is wholly hydrophytic and distinct from surrounding grassland vegetation. Adjacent grasses were not wetland indicator species. This wetland vegetation community was repeated often across the surveyed area and locations are provided on attached maps. Seasonal wetlands were found isolated or on seasonal creeks and had no observable water at the time of survey but showed evidence of seasonal inundation and were topographically suited to hold water (flat or slightly concave). Perennial wetlands had observable surface water or moist, saturated soil surfaces at the time of survey. These contemporary wetlands and watercourses will be used as reference sites for restoration activities including restoration plant selection.

Wetland areas are approximate and are recorded in square feet. Watercourse lengths are approximate and are recorded in feet.

## 2.2 Assessment of Historic Wetlands and Watercourses

Assessment of historic wetlands and waters impacted by pond creation was conducted by interpretation of historic aerial imagery and assessment of images in contrast with the current hydrologic regime (wetland and watercourse locations). While it is difficult to determine plant species by aerial photo, the stream courses are often visible as is a change in vegetation community (when present), by comparing the location of current wetlands to those locations on the historic image it is possible to extend the comparison to adjacent vegetation communities.

During this investigation aerial photos from 1965, 1988, 1993, and 1996 were used. The 1965, 1988, and 1996 images are courtesy of CDFW while the remainder are courtesy of GoogleEarth. Current extent of wetlands and waters was mapped on a GoogleEarth image from 1993 and 2019.

Wetland areas are approximate and are recorded in square feet. Watercourse lengths are approximate and are recorded in feet.

## 2.3 Proposed Restoration Area Selection

Restoration areas are selected based on several criteria including; suitable topography, availability of hydrologic input, and access by necessary equipment. Wetland restoration areas shall extend or connect existing wetlands, provide erosion control, and provide wetland function and value to the restoration area.

Wetland function and value is a partially objective way to view the importance of wetlands and can provide measurable criteria for evaluating the biological, physical, and social benefits of the subject wetlands in regard to their importance on the landscape. Wetland functions are the physical, chemical, and biological processes the can occur in wetlands. Wetland values are the true or perceived importance of those wetlands to society. Functional Capacity is the ability of the wetland ecosystem to perform or provide a function. Two publications were used during the evaluation of wetland value and function, the first is "Wetlands: Characteristics and Boundaries" compiled by the National Research Council in 1995. The second is "Wetland Evaluation Technique (WET); Volume II: Methodology." (Adamus 1987) which is an ACOE publication intended to provide technical guidance to wetland evaluators. I should note that I did not complete the WET technical evaluation but used the definitions and guidance to support my evaluation. Both publications provide similar measurable attributes to evaluate wetlands; I have listed those attributes in the table below with a brief summary of whether the wetlands that currently exist on site exhibit those attributes. Restoration areas should be created to provide at least the functions and values of existing wetlands.

**Table 1. Wetland Function and Value Assessment**

| Wetland Functions | Description | Functional Capacity/Evaluation |
|---|---|---|
| Groundwater recharge/discharge | The movement of external water into or out of the groundwater system | Wetlands identified do act as groundwater recharge areas (on flat topography), where precipitation settles and percolates into the groundwater system or where overbank streamflows inundate flood prone areas. Slope wetlands (seeps and springs) act as a groundwater discharge, where sub-surface water comes to the soil surface. |
| Flood Flow Attenuation | Wetlands along flood prone areas slow and store flood waters, preventing or reducing damage to surrounding areas. | Most of these wetlands are adjacent to or within streams. These features would likely help attenuate flood waters. |
| Sediment Stabilization | Wetlands provide a space for sediment laden water to slow and drop sediments. Along watercourses wetlands slow flows reducing erosive potential of stream banks. | These features are often connected to adjacent streams and have surface water connection during high stream flows. They do likely act as sediment traps and work to stabilize erosion prone areas. |
| Nutrient Removal/Transformation | Wetlands provide space and time for biotic metabolism of nutrients esp. nitrogenous compounds often generated by agricultural endeavors | The current land use for the parcels is agricultural but it is unlikely that the area is fertilized. Evidence of cattle grazing is present and the wetlands likely provide some nutrient cycling prior to the waters flowing into the current pond and later Perrington Creek. |
| Toxicant Retention | Wetlands and wetland plants can store toxins in a similar manner as above. | The wetlands in question likely retain little toxic materials, the area is not treated by herbicides or pesticides and there are no adjacent sources of significant toxic input. |

In addition to the functions and values listed above, wetlands provide essential habitat for hydrophytic plants and aquatic animals and insects. Wetlands often serve as habitat for sensitive plants and animals.

# 3.0 ASSESSMENT RESULTS

## 3.1 Assessment of Current Wetlands and Watercourses

Within the assessed area around the pond site a number of seasonal (CIII) and perennial (CII) watercourses were located as well as seasonal and perennially inundated wetland areas. All features are included in the accompanying map set. The features are overlain on both an aerial image from 1993 and an aerial image from 2019 for comparison. Lengths of stream channels and areas of wetlands were calculated by in the field mapping, by GPS, and interpretation of aerial images. Table 2 summarizes the findings. All current wetlands mapped may be categorized as Palustrine emergent wetlands.

**Table 2. Wetlands and Watercourses in the Assessment Area**

| Type of Water | Length (ft) | Area ($ft^2$) |
|---|---|---|
| Seasonal Watercourses | 6,272 | |
| Perennial Watercourses | 2,430 | |
| | | |
| Seasonal Wetlands | | 8,776 |
| Perennial Wetlands | | 10,243 |
| **Totals** | 8,702 | 19,019 |

## 3.2 Assessment of Pond

The pond at the center of this investigation is an approximately 68,829 $ft^2$ area of impounded water which is accessed by a rocked road that makes a complete circle around the pond. Current watercourses that enter the pond first encounter a depression on the outside of the access road and are then transported to the pond by culverts through the road prism. At the time of survey there was little if any surface water reaching the pond through the culverts and most were dry. Perennial wetlands mapped where seasonal and perennial creeks reach the pond are low areas, below the culvert inlets, impounded by the road and had wet soils and some overland flow from upstream at the time of survey. The perimeter of the pond is made up of compact road surface and the slopes leading into the water are also composed of hard packed gravels and fines. Little hydric vegetation exists along the road edge or between the road and the waterline. Some hydric vegetation exists along the waterline and is composed of cattails (*Typha latifolia*), rushes (*Juncus effuses* and *Juncus patens*), flat nut sedge (*Cyperus eragrostis*), bulrushes (*Scirpus microcarpus*), and some small patches of saw-tooth sedge (*Carex serratodens*). Non-hydric species such as coyote brush (*Baccharis pilularis*) also exist along the road edge and down to the waterline. Planned reduction of the pond area will result in approximately 10,000 $ft^2$ of surface area that was previously underwater to be exposed, some of this area is mapped as historic wetland. The outflow of the pond is an engineered structure and was not

flowing water at the time of survey. The outflow channel has been altered from the historic channel. The historic channel is still present below the constructed dam and outfall and consists of a rocky ravine that becomes a very steep-walled watercourse before entering Perrington Creek to the south. The outflow creek has little riparian vegetation and quickly enter a dense stand of tan oak (*Notholithocarpus densiflorus* var. *densiflorus*) and Douglas' fir (*Pseudotsuga menziesii*). The channel below the outflow had small sections of pooled water but little flow.

Bullfrogs and fish were noted in the pond. Both are likely non-native and in the case of the bullfrogs, highly invasive. No floating or matted vegetation was noted from the pond surface.

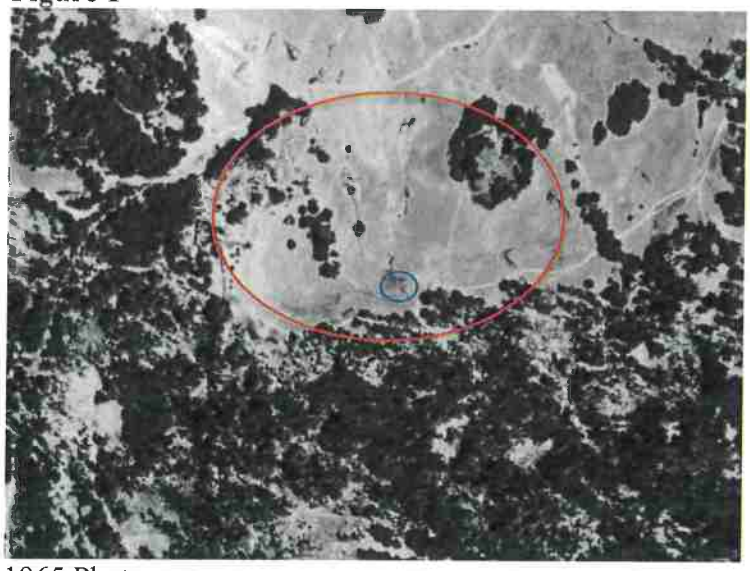
### 3.3 Assessment of Historic Wetlands and Watercourses

Assessment of historic wetlands and watercourses impacted by pond creation was achieved by interpretation of historic aerial imagery and comparison to current wetland and waters. Historic watercourses are visible on the imagery and extend from watercourse features that are still present and contemporary. Historic wetland areas are interpreted from aerial images that appear to be consistent in texture and shade to areas with known contemporary wetland settings. Table 3 contains details on historic wetlands and watercourses. These features are wholly contained within the footprint of the constructed pond. Historic watercourses labelled as seasonal are extensions of current seasonal channels while historic watercourses labelled as perennial extend from contemporary perennial watercourses. Historic wetlands were not labelled as seasonal or perennial. Figures 1-3 included below are cropped from the aerial photos used for the assessment and show the project assessment area and the current pond location.

**Table 3. Historic Wetland and Watercourses**

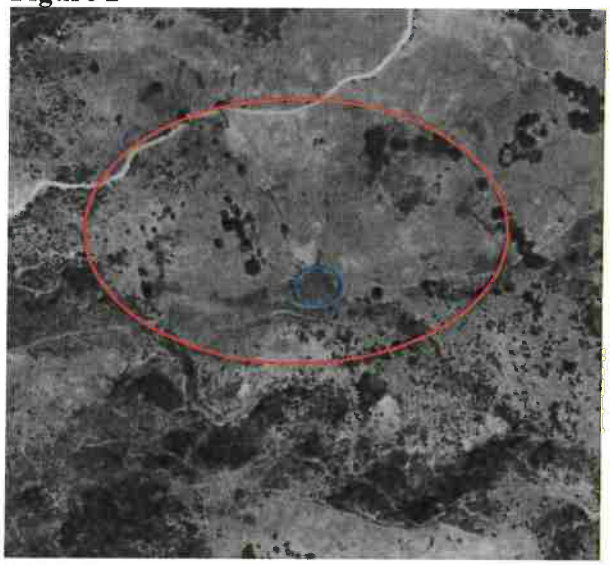
| Type of Water | Length (ft) | Area ($ft^{2)}$ |
|---|---|---|
| seasonal watercourse | 607 | |
| perennial watercourse | 536 | |
| | | |
| wetlands | | 12,454 |
| **Totals** | 1,143 | 12,454 |

**Figure 1**



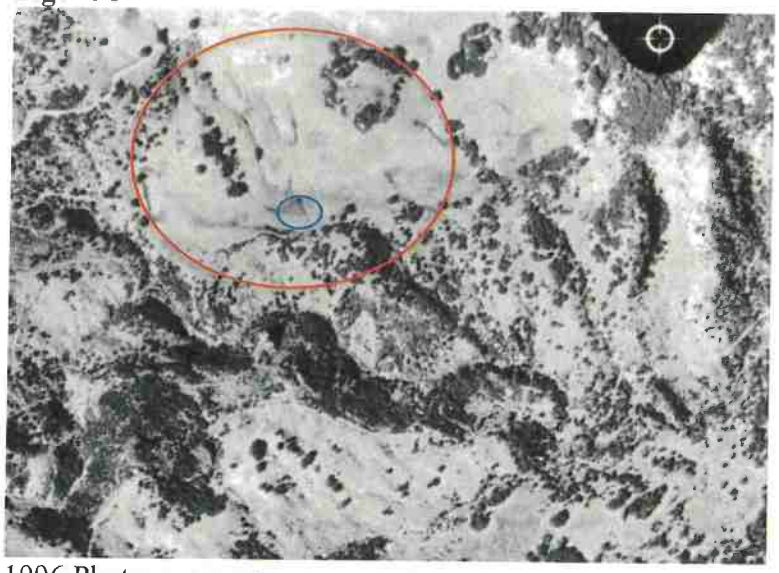
1965 Photo: Red circle is assessment area, blue circle shows pond location

**Figure 2**



1988 Photo: Red circle is assessment area, blue circle shows pond location

Figure 3



1996 Photo: Red circle is assessment area, blue circle shows pond location

# 4.0 PROPOSED RESTORATION ACTIVITIES

## 4.1 Selected Restoration Sites

In order to offset the impacts to the approximately 12,454 $ft^2$ historic wetland area and mitigate for the temporal and spatial loss of that wetland habitat the creation and restoration of at least 24,908 $ft^2$ of wetland shall be installed on the subject parcel. Restored or created wetlands shall be planned and constructed to provide wetland function and value as well as provide habitat connectivity between existing wetlands on site. Two sites were chosen for restoration activities and are shown on the attached Restoration Site Map.

Restoration Area 1 is currently composed of a portion of the current pond, the access road, and the portions of the area outside of the access road that are not currently classified as wetland areas. This area covers approximately 18,140 $ft^2$ and partially overlays the historic wetland area.

Restoration Area 2 is currently composed of a mix of native and non-native range grasses with a small perennial watercourse running down the length. This approximately 6,770 $ft^2$ area will extend on both sides of the watercourse between two existing wetland areas.

In addition, the confluences where seasonal and perennial creeks enter Restoration Area 1, as well as portions of the slopes on the north and west boundaries of the site shall be included in the restoration activities.

### 4.2 Proposed Restoration Activities

Restoration Area 1: Activities in this area will include the altering of the current pond outlet to reduce the size of the pond. This action will expose a portion of the ponded area (approximately 10,000 $ft^2$). The road that makes up the current bank of the pond shall be decommissioned and spoils either incorporated into the wetland design or moved offsite. Restoration Area 1 shall be shaped and graded as necessary and potentially ripped and prepped for planting. Final site shape should be shallowly concave and allow for water inputs to be retained before moving on to fill the new pond. The site will be planted with a mix of appropriate native plants suited for wetland habitats in the region (see Wetland Plant List, Appendix B).

Restoration Area 2: Activities in this area will include the grading off of current grassland vegetation, shaping the site to a shallow concave topography while allowing the current stream channel to persist, and planting the area with a mix of appropriate native plants suited for wetland habitats in the region. The area may be ripped to facilitate planting.

Additional areas planned for restoration planting include the confluences of mapped creeks entering Restoration Area 1 and the berm along the northern and western boundaries of the site. Within this area willow (*Salix* sp.), Oregon ash (*Fraxinus latifolia*), and California bay laurel (*Umbellularia californica*) may be planted in strategic locations to provide bank stability, aid in erosion control, and provide additional habitat structure and diversity.

# 5.0 IMPLEMENTATION

## 5.1 Wetland Creation/Restoration

### I. Restoration Site Preparation

1. Restoration Area 1: Pond levels shall be lowered by modification of the outflow structure. The access road shall be removed within the restoration area bounds. Measures to ensure that soils or spoils do not enter the waterway must be taken during and after site preparation activities. A small berm may be placed adjacent to the new waterline for the pond separating the pond from the restoration area. This berm shall serve to allow water to remain in the wetland area longer before passing on to the pond. The berm will also reduce the potential for sediment entering the pond. The restoration area will be graded and shaped to create a shallow concave area with a low gradient slope towards the ponded area.

2. Restoration Area 2: Site preparation activities shall include the removal of current rangeland vegetation. The site shall be graded and shaped to form a shallow

concave area complementing the topography of the current wetlands at either end of the restoration area. Care will be taken to maintain the integrity of the existing watercourse and allow stream flow to pass through the site.

In stream activities will require a Lake and Streambed Alteration (LSA) permit from California Department of Fish and Wildlife (CDFG). All applicable rules contained in those permits must be followed during site preparation or restoration activities. After grading and shaping the soils shall be "ripped" to relieve compaction and allow easier digging and planting. The soil will likely need to be broken down further by hand or small equipment (such as a rototiller) as "ripping" may leave the site too rough and coarse for planting.

## II. Planting Stock

1. Appendix B contains a list of appropriate plants for inclusion in this restoration.

2. Planting stock may be acquired in several ways;

    a. On site collection of seeds or propagation materials for growth in containers prior to planting in the next season. This method requires time, space, and effort but affords a high success rate and allows for quality control and selection of stronger plants prior to out planting. This method assures that the planted stock is genetically appropriate for the site and the will most likely be able to tolerate the existing site conditions and be reproductively compatible with vegetation on site. A qualified native plant nursery should be contracted to collect and grow plants for restoration plantings.

    b. Purchase of established plants from native plant nursery or other source for out planting on site. Care must be taken to find propagation materials that are sourced from the appropriate area and will be compatible with the restoration site conditions. Not all species will be commercially available.

## III. Planting Methods

1. Planting should take place in the first fall following site preparation, after the beginning of the wet season.

2. Planting holes shall be prepped prior to placing stock, holes should be wide enough to accommodate the roots, or with several inches on each side of sprouted plants. Hole depth should be at least deep enough to hold roots on rooted stock and soils should be dug and loosened a few inches deeper to allow root growth.

3. Planted stock should be identified by pin flag or stake for initial counting and location during monitoring visits.

4. Restoration areas should be fenced to exclude cattle if present.

5. Planting density shall be consistent with the natural distribution of similar species in existing wetlands within the assessment area. Areas of bare soil within the restoration areas, especially those that have the potential to deliver sediment to downstream waters shall be treated with a weed and seed free (preferably organic) mulch to aid in moisture retention, weed prevention, and erosion control.

## IV. Maintenance

1. The restoration areas should be visited several times each year to access the condition of the restoration effort.

2. Planting will occur after the onset of the first fall rains. The time of planting, seasonal and perennial streams adjacent to the site, existing runoff patterns, and natural ponding should eliminate the need for irrigation, however, irrigation of plantings shall be conducted as necessary to ensure adequate growth and establishment of wetland plantings.

3. If continued irrigation appears necessary the hydrology of the site should be evaluated for potential remedial action to improve water inputs and attenuation within the site.

4. Additional plants may be installed to replace lost or damaged individuals or to meet restoration goals.

5. Natural regeneration of native hydrophytic plants within the restoration areas will be allowed and may be counted toward restoration goals.

6. Any areas, outside of the wetland restoration areas, needing treatment for erosion control shall be seeded with native grass seed (perennial bunch grasses such as California oatgrass (*Danthonia californica*), blue wildrye (*Elymus glaucus*), or California brome grass (*Bromus carinatus*) would be ideal) and mulched with a weed and seed free mulch.

# 6.0 MONITORING

## 6.1 Restoration Area Monitoring

### I. Responsible Parties

Monitoring visits and subsequent reporting shall be done by a qualified biologist or wetland delineator.

### II. Timing

Two monitoring visits shall be conducted in the first season of restoration activities. One visit during or immediately after site prep activities while equipment is still on site, this will allow small corrections to be done while equipment is present. The second visit will be scheduled to coincide with the initial planting. At this time a final count of planted materials shall be recorded and used as a baseline for monitoring success criteria for restoration activities. Site preparation and planting shall be evaluated and recorded by photograph and details included in yearly monitoring reports.

The monitoring period shall commence at the start of restoration activities and shall extend for at least five (5) years pending the successful completion of restoration activities and the achievement of restoration goals.

Following the first year, monitoring visits shall occur each year in May-June.

### III. Restoration Goals

Success criteria for this project is the establishment of at least 24,908 $ft^2$ of palustrine emergent wetland within the delineated restoration areas. These areas shall exhibit a dominance of native hydrophytic vegetation and show sufficient indicators of wetland hydrology to provide wetland habitat, function, and value comparable to adjacent wetlands in the assessment area.

In addition, restoration goals will include 80% survival rate on planted stock.

## IV. Monitoring Data

The monitoring protocol shall consist of a modified ACOE routine wetland delineation method which will include an examination of vegetation and hydrology but will exclude an examination of soils.

Using a one-meter square plot frame, species cover will be estimated in not less than fifteen (15) plots, randomly located, ten (10) in Restoration Area 1 and five (5) in Restoration Area 2. Plot locations will be mapped and included in annual monitoring reports.

For each plot, all species will be ranked by stratum according to cover values. Pursuant to the Corps of Engineers Wetland Delineation Manual and regional supplement, more than 50% of the dominant species must be OBL, FACW or FAC as denoted within the current "National Wetland Plant List" (Lichvar 2016) to be considered a hydric or wetland vegetation community.

Each plot will be assessed for wetland hydrology and all indicators recorded and included in the yearly monitoring report.

Restoration areas will be assessed for wetland values and functions included in Table 1 of this report. Results of that assessment and comparison to adjacent wetlands will be included in yearly monitoring reports.

Monitoring for planting survivorship shall take place at the same time at wetland delineations and shall include a plant count by species and a general assessment of plant health.

Photo points shall be established and yearly, reproducible, monitoring photos shall be taken and included in annual monitoring reports.

Invasive plant species found in the treatment area will be noted and evaluated for removal.

After each monitoring visit the landowner shall be contacted and maintenance issues will be discussed and a plan for maintenance prior to the next monitoring visit will be created. It is the responsibility of the landowner or designee to maintain all sites and structures noted in this report. Maintenance may include the removal of invasive plant species.

## V. Monitoring Report

A monitoring report summarizing the efforts for the year, potential problems or changes needed, project compliance with implementation plan, and success of restoration goals shall be prepared and delivered each year by September 15. This report shall be completed by a qualified biologist or wetland delineator.

# 7.0 INVASIVE PLANT MANAGEMENT

Invasive plants are defined as plants that are not native to an environment, and once introduced, they establish, quickly reproduce and spread, and cause harm to the environment, economy, or human health (CAL-IPC 2019).

The California Invasive Plant Council (CAL-IPC) has produced a ranked list of invasive species in California, all listed plants should be considered when planning for invasive plant control but those rated as "High" have been found to be the most aggressive and potentially the most difficult to control. These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically (CAL-IPC 2019). A list of CAL-IPC "High" rated plants that are a concern for Humboldt County is included as Appendix B.

If any of the CAL-IPC "High" ranked invasive plants are noted within the restoration area they will be mapped and evaluated for removal.

### 7.1 Invasive Plant Removal

Invasive plant removal within the restoration area may only be accomplished by manual methods (hand tools only), no herbicide application or mechanical removal (heavy equipment) shall be done within the restoration area. If invasive plants with the potential to colonize the site are noted outside the restoration area, other removal methodologies (as feasible and applicable) shall be evaluated.

# 8.0 TERMS AND CONDITIONS

This report and accompanying maps and data should be transmitted to the reviewing agents for review and included in any application for permits necessary for completion of any proposed development projects on the subject property.

This report is based on conditions observed and recorded in June and August 2019. This report has not been reviewed nor has concurrence with the conclusion been obtained. Verification by agencies may be necessary in the future. Land use practices and regulations can change thereby affecting current conditions and results described herein.

This report was prepared for exclusive use; consultants are not liable for any actions arising out of the reliance of any third party on the information contained in this report.

Please call with any questions or comments.

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# 9.0 REFERENCES


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# Appendix A

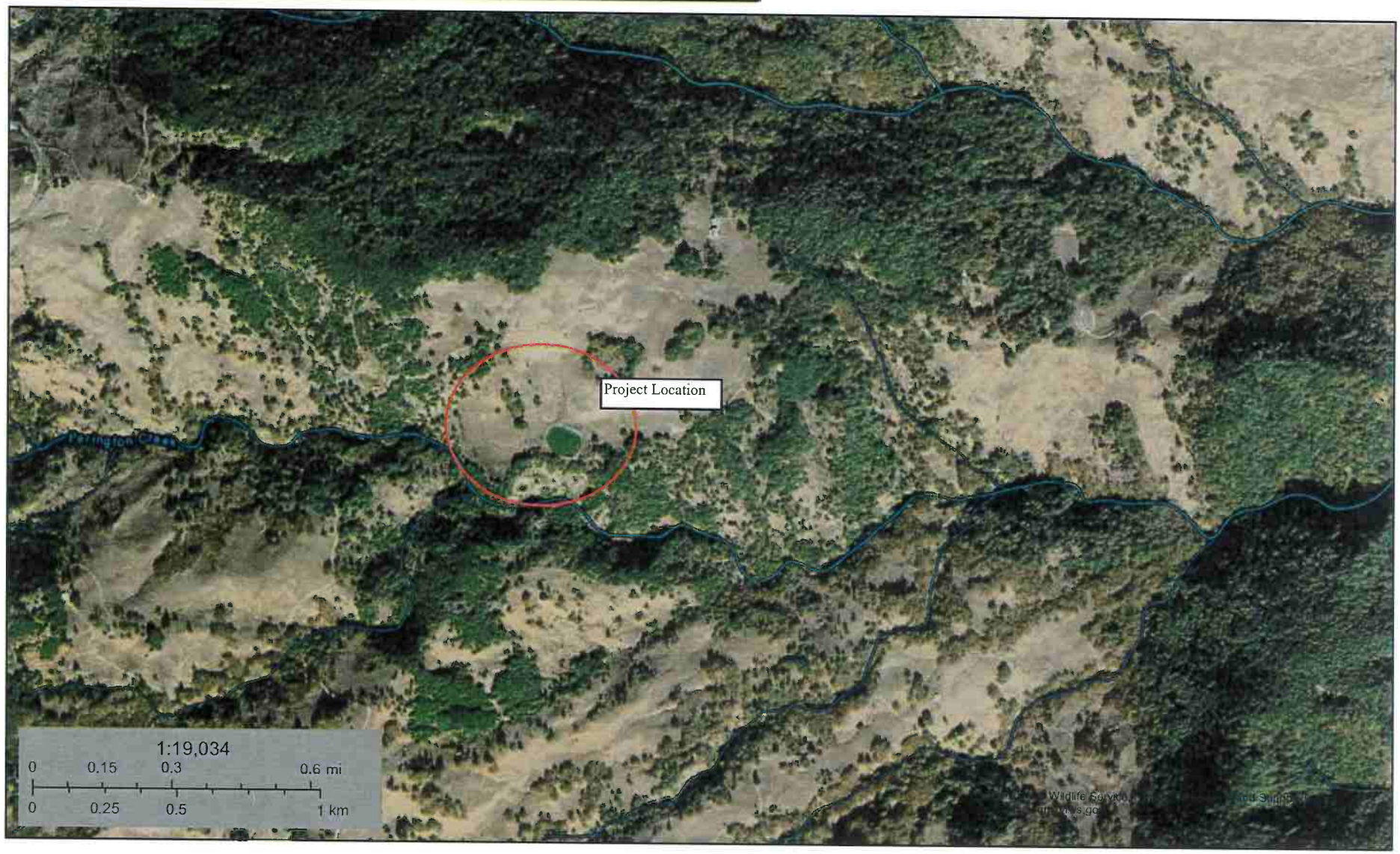
**USFWS Wetland Location Map**
**Humboldt County Parcel Map (Topo)**
**Humboldt County Parcel Map (Ortho w/SMA)**
**Wetlands and Waters Map (1993 photo)**
**Wetlands and Waters Map (2019 photo)**
**Restoration Planting Map**

U.S. Fish and Wildlife Service

National Wetlands Inventory

# Journey Aquarian - Wetland Restoration

APN 216-135-008



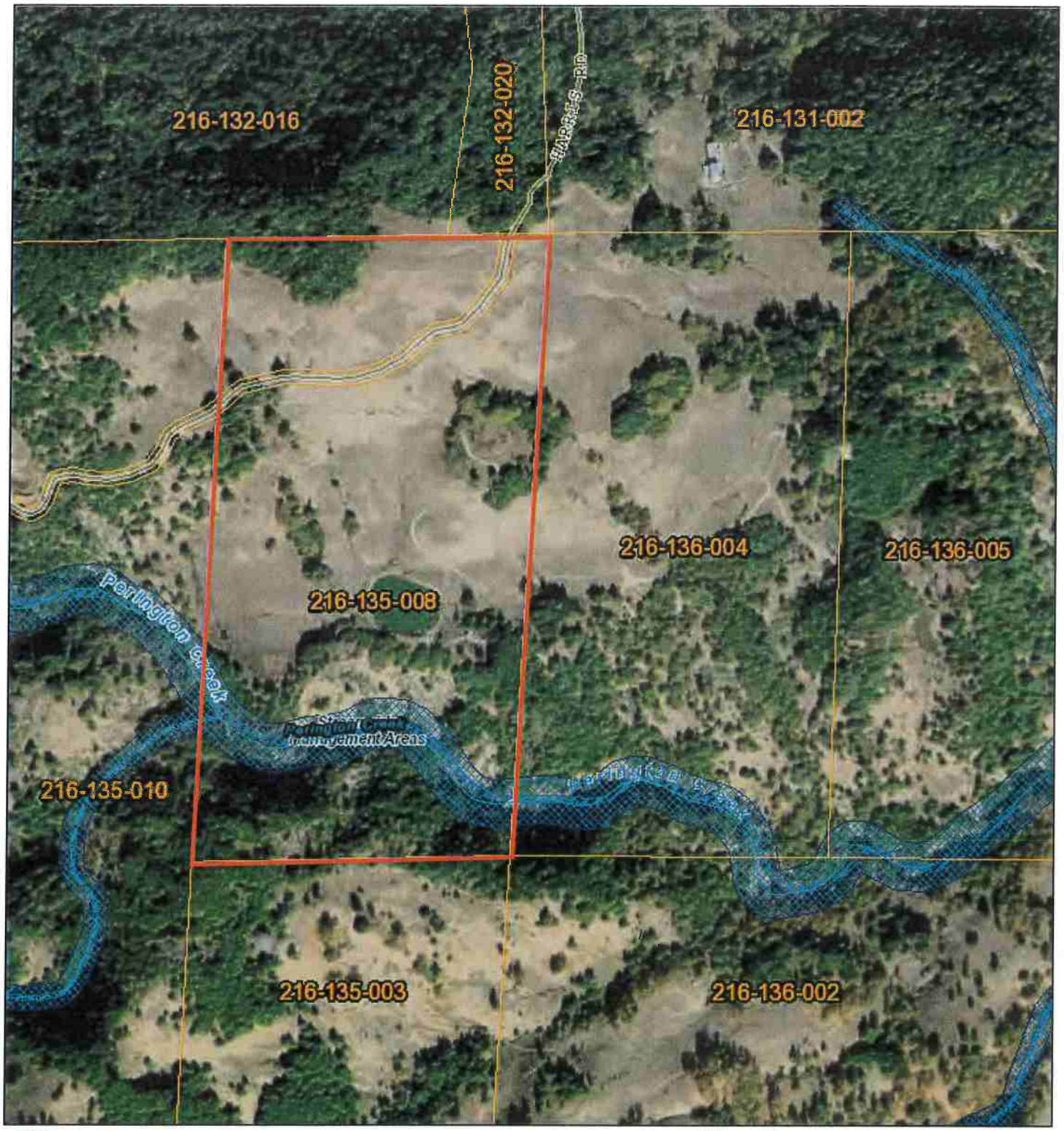

August 29, 2019

**Wetlands**

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper




Journey Aquarian - Ortho with SMA buffers

Humboldt County Planning and Building Department

APN 216-135-008

0 350 700 1,400 Feet

0 0.05 0.1 0.2 Miles

RF= 1:9,028 1 in = 752 ft

Printed: August 29, 2019 Web AppBuilder 2.0 for ArcGIS

**Highways and Roads**
- Principal Arterials
- Minor Arterials
- Major Collectors
- Minor Collectors
- Local Roads
- Private or Unclassified
- Major River or Stream

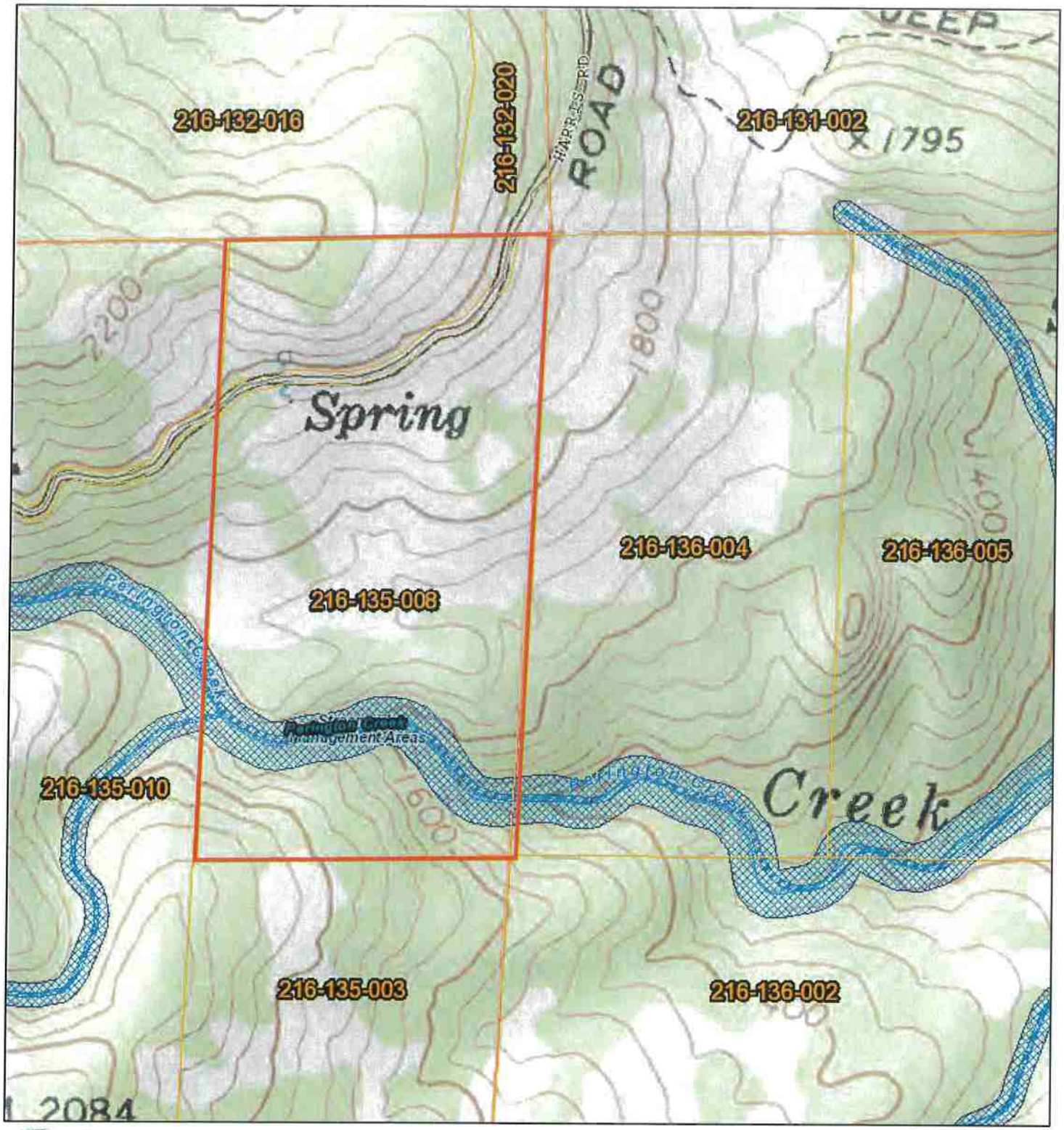
**Blue Line Streams**
- Perennial 1-3
- Perennial >4
- Intermittent
- Subsurface

Parcels

Streamside Management Areas

Map Disclaimer:
While every effort has been made to assure the accuracy of this information, it should be understood that it does not have the force & effect of law, rule, or regulation. Should any difference or error occur, the law will take precedence.

Source: NRCS, Humboldt County GIS, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




# Journey Aquarian - Topo with SMA buffers

Humboldt County Planning and Building Department

APN 216-135-008

0 350 700 1,400 Feet

0 0.05 0.1 0.2 Miles

RF= 1:9,028 1 in = 752 ft

N W E S

Printed: August 29, 2019 Web AppBuilder 2.0 for ArcGIS

**Highways and Roads**
- Principal Arterials
- Minor Arterials
- Major Collectors
- Minor Collectors
- Local Roads
- Private or Unclassified
- Major River or Stream

**Blue Line Streams**
- Perennial 1-3
- Perennial >4
- Intermittent
- Subsurface

Parcels

Streamside Management Areas

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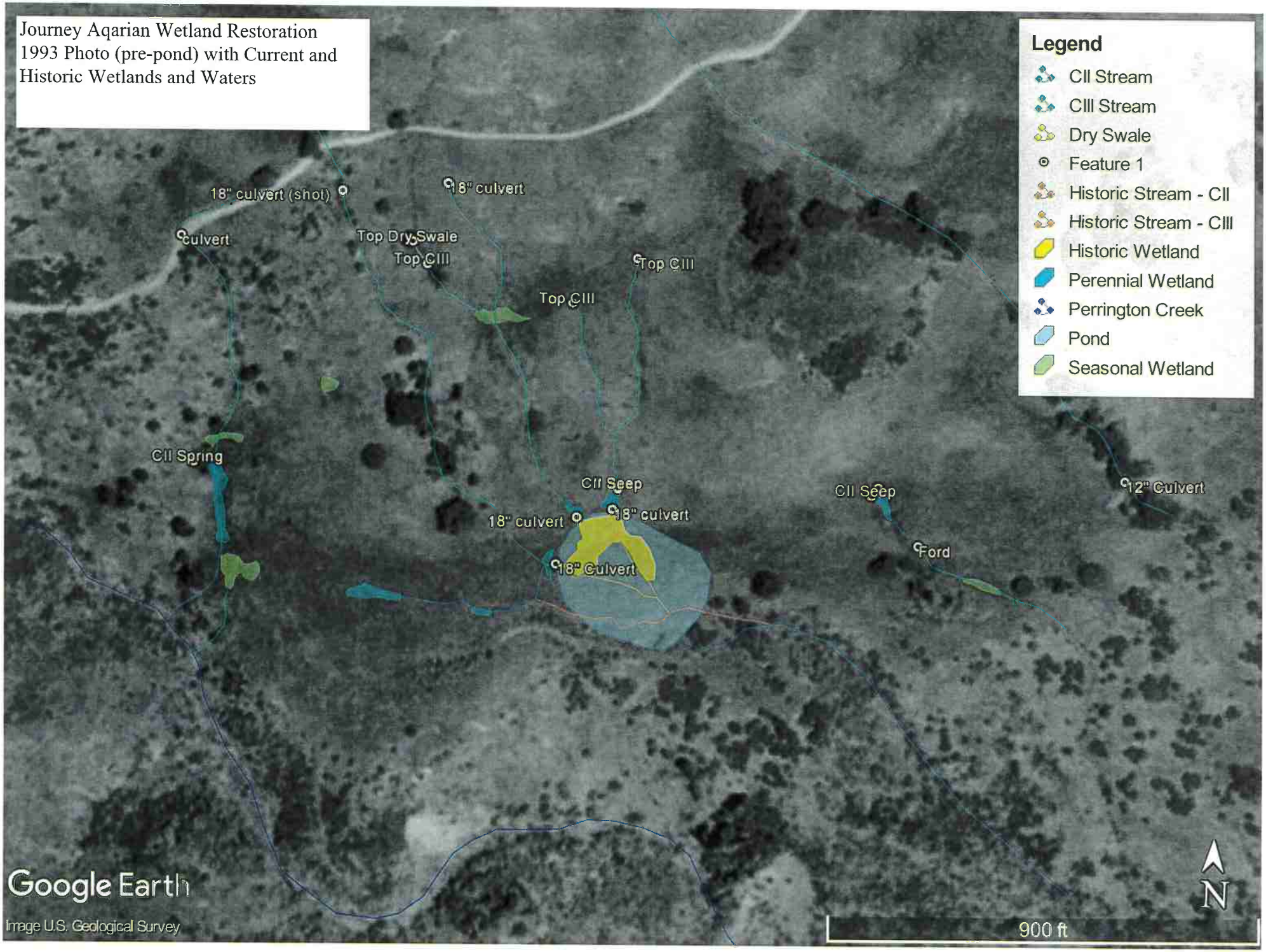
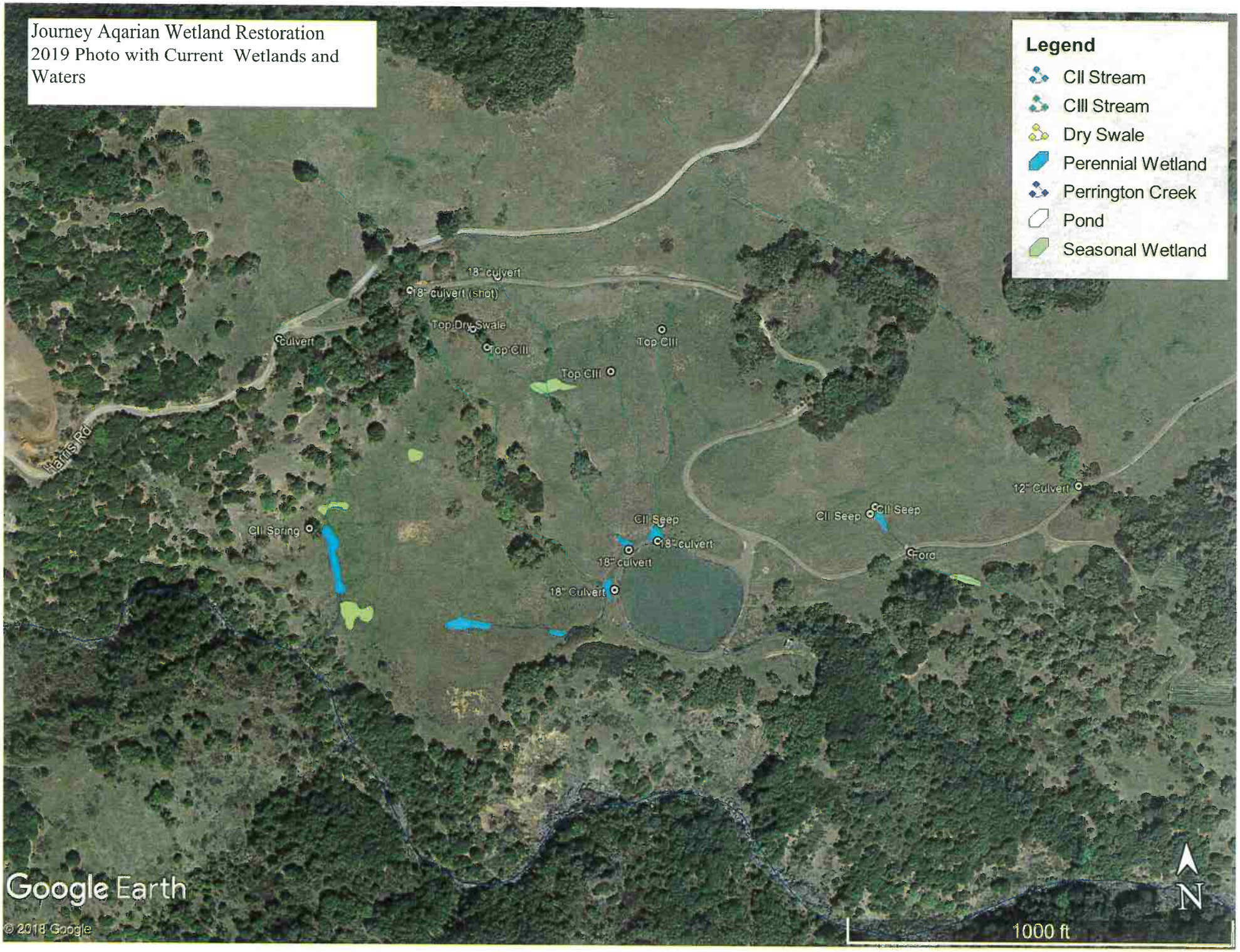
Source: NRCS, Humboldt County GIS, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Journey Aqarian Wetland Restoration
1993 Photo (pre-pond) with Current and Historic Wetlands and Waters
Legend
CII Stream
CIII Stream
Dry Swale
Feature 1
Historic Stream - CII
Historic Stream - CIII
Historic Wetland
Perennial Wetland
Perrington Creek
Pond
Seasonal Wetland
18" culvert (shot)
18" culvert
Culvert
Top Dry Swale
Top CIII
Top CIII
Top CIII
CII Spring
CII Seep
CII Seep
12" Culvert
18" culvert
18" culvert
Ford
18" Culvert
Google Earth
Image U.S. Geological Survey
N
900 ft


Journey Aqarian Wetland Restoration
2019 Photo with Current Wetlands and Waters
Legend
CII Stream
CIII Stream
Dry Swale
Perennial Wetland
Perrington Creek
Pond
Seasonal Wetland
18" culvert
18" culvert (shot)
Top Dry Swale
Culvert
Top CIII
Top CIII
Top CIII
Harris Rd
12" Culvert
CII Seep
CII Seep
CII Seep
CII Spring
18" culvert
18" culvert
Culvert
18" Culvert
N
1000 ft
Google Earth
© 2018 Google

# Journey Aquarian Wetland Restoration Restoration Site Map

Approximately 24, 910 ft² of proposed wetland restoration

Willow and Ash plantings will be installed at the outlets of the creeks and along the outside edges of restoration site to provide erosion control and increase habitat diversity.

Restoration Area 1:
Approximately 18,140 ft²

Following pond reduction the exposed areas shall be prepared by grading or ripping if necessary. Road materials will be removed and re-used as berm material or moved off site. The restoration area will be planted with native hydrophytes and once established will connect existing wetlands and provide a wetland buffer for the new ponded area.

Restoration Area 2:
Approximately 6,770ft²

This site shall be graded and shaped, prior to planting. Once established, this wetland will provide habitat connectivity between existing wetlands.

**Legend**

- CII Stream
- CIII Stream
- Historic Stream - CII
- Historic Stream - CIII
- Historic Wetland
- Perennial Wetland
- Perrington Creek
- Pond
- Restoration
- Seasonal Wetland

Google Earth



N

300 ft

# Appendix B

**Invasive Plant List**
**Restoration Planting List**

**Invasive Plant List**

| Scientific Name | Common Name | Rating |
|---|---|---|
| *Aegilops triuncialis* | barb goatgrass | High |
| *Alternanthera philoxeroides* | alligatorweed | High |
| *Ammophila arenaria* | European beachgrass | High |
| *Arundo donax* | giant reed | High |
| *Brassica tournefortii* | Sahara mustard, Morrocan mustard | High |
| *Bromus madritensis ssp. rubens* | red brome, foxtail chess | High |
| *Bromus tectorum* | cheatgrass, downy brome | High |
| *Carpobrotus edulis* | highway iceplant | High |
| *Centaurea maculosa, Centaurea stoebe ssp. micranthos* | spotted knapweed | High |
| *Centaurea solstitialis* | yellow starthistle | High |
| *Cortaderia jubata* | jubatagrass, pampasgrass | High |
| *Cortaderia selloana* | pampasgrass, white pampasgrass | High |
| *Cytisus scoparius* | Scotch broom, English broom | High |
| *Delairea odorata* | Cape-ivy, German ivy | High |
| *Egeria densa* | Brazilian egeria, egeria | High |
| *Ehrharta calycina* | purple veldtgrass, African veldtgrass | High |
| *Eichhornia crassipes* | water hyacinth, | High |
| *Foeniculum vulgare* | Fennel, sweet Fennel | High |

| Scientific Name | Common Name | Rating |
|---|---|---|
| ***Genista monspessulana*** | French broom, soft broom | High |
| ***Hedera helix, H. canariensis*** | English ivy and Algerian ivy | High |
| ***Hydrilla verticillata*** | hydrilla, water thyme | High |
| ***Lepidium latifolium*** | perennial pepperweed, tall whitetop | High |
| ***Limnobium laevigatum*** | South American spongeplant, West Indian spongeplant | High |
| ***Ludwigia hexapetala*** | creeping waterprimrose, Uruguay waterprimrose | High |
| ***Ludwigia peploides*** | creeping waterprimrose, California waterprimrose | High |
| ***Lythrum salicaria*** | purple loosestrife | High |
| ***Myriophyllum aquaticum*** | parrotfeather, Brazilian watermilfoil | High |
| ***Myriophyllum spicatum*** | spike watermilfoil | High |
| ***Onopordum acanthium*** | scotch thistle, cotton thistle | High |
| ***Rubus armeniacus*** | Himalayan blackberry | High |
| ***Salvinia molesta*** | giant salvinia, karibaweed | High |
| ***Sesbania punicea*** | scarlet wisteria, red sesbania | High |
| ***Spartina alterniflora x foliosa, S. alterniflora*** | smooth cordgrass and hybrids | High |
| ***Spartina densiflora*** | dense-flowered cordgrass, Chilean cordgrass. | High |
| ***Spartium junceum*** | Spanish broom | High |
| ***Taeniatherum caput-medusae, Elymus caput-medusae*** | medusahead | High |
| ***Tamarix parviflora*** | smallflower tamarisk | High |

| Scientific Name | Common Name | Rating |
|---|---|---|
| ***Tamarix ramosissima, T. gallica, T. chinensis*** | saltcedar, tamarisk | High |
| ***Ulex europaeus*** | gorse, common gorse | High |

## Wetland Plant List

| Species Name | Common Name | Indicator Status | Planting Area | Strata | Present in Reference Sites |
|---|---|---|---|---|---|
| *Juncus effusus* | common bog rush | FACW | Area 1+2 | Herb | Yes |
| *Juncus patens* | spreading rush | FACW | Area 1+2 | Herb | Yes |
| *Scirpus microcarpus* | small-fruited bullrush | OBL | Area 1+2 | Herb | Yes |
| *Typha latifolia* | cattail | OBL | Area 1 | Herb | Yes |
| *Carex densa* | dense sedge | OBL | Area 1+2 | Herb | Known from wetlands in area |
| *Carex athrostachya* | slender beak sedge | FACW | Area 1+2 | Herb | Known from wetlands in area |
| *Carex serrotodens* | Saw-tooth sedge | FACW | Area 1+2 | Herb | Yes |
| *Salix lasiolepis* | arroyo willow | FACW | Area 1 - border erosion control | Shrub | Yes |
| *Fraxinus latifolia* | Oregon ash | FACW | Area 1+2 - border and interior | Tree | Yes |
| *Umbellularia californica* | California bay laurel | FAC | Area 1 - border erosion control | Tree | Yes |
| *Danthonia californica* | California oatgrass | FAC | Area 2, adjacent areas for erosion control | Grass | Yes |
| *Elymus glaucus* | blue wild rye | FACU | erosion control outside of wetland areas | Grass | No |
| *Bromus carinatus* | California brome | NI | erosion control outside of wetland areas | Grass | No |