NATURAL RESOURCES REPORT

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Executive Summary

This report is intended to provide a planning-level review of natural resources within the Cooper Mountain Community Plan (CMCP) area. Specifically, this report covers wetlands and waterways, riparian areas, and upland wildlife habitats. The goal of this report is to provide project planners with the ecological context to support community plan development for the CMCP area. A Local Wetland Inventory (LWI) has also been conducted for the CMCP area. The detailed LWI documentation has been prepared as a separate report; however, the mapping results and general findings are included in this report.

The CMCP area (see Appendix A, Figure 1) primarily consists of rural lands that are bordered to the east, north, and south by suburban development. The area to the west of the overall CMCP area consists of rural landscape. The northern edge of the CMCP area is situated along the top of Cooper Mountain, where topography is typically gently rolling, with slopes gradually steepening to the north and south to each side of the ridge top. In this area, vegetation consists of lawns and suburban landscaping, and remnant tree groves.

Slopes steepen to the south of the CMCP area, with several drainages flowing generally from northeast to southwest. These drainages typically occur in steep, forested V-shaped ravines, including McKernan Creek, which is the principal drainage. The headwater of Summer Creek is located east of 175th Avenue and drains the easternmost portion of the CMCP area. Moderately sloping terraces occur between the ravines. These land surfaces typically consist of pasture and more intensive agricultural production including annual crops, vineyards, and orchards. Some wood lots and native forest also occur on the terraced surfaces. The majority of Cooper Mountain Nature Park (Nature Park) is located within the CMCP area; however, a portion occurs just outside the area to the northwest. The park contains a host of native plant communities, including Douglas-fir (*Pseudotsuga mensiezii*) forest, Oregon oak (*Arbutus menziesii*) and madrone woodlands, and prairie.

The Nature Park is a key natural resource feature within the CMCP area. As noted above, the park contains a diverse mix of native habitats and considerable restoration work has been—and continues to be—carried out in the park. The park contains the regionally rare upland prairie and oak and madrone woodland habitat, which supports what may be the largest remaining population of the state endangered pale larkspur (*Delphinium leucophaeum*). Park habitats also support populations of sensitive species including meadow checkermallow (*Sidalcea campestris*), breeding populations of Northern red-legged frog (*Rana aurora aurora*), and Western gray squirrel (*Sciurus griseus*). Restoring and enhancing oak and prairie habitat is one of the primary management goals for the park. Additional management goals include improving riparian corridors, enhancing park access through land acquisition and securing trail connections between major publicly owned properties, and keeping important wildlife corridors and buffers intact.

Slopes in the southern third of the CMCP area, particularly the southwest corner, tend to be gentler than elsewhere. In this portion of the CMCP area, generally west of SW 175th

Avenue, land use is predominantly agricultural and features a mix of annual crop production, pasture, orchards, and viticulture. However, an important partially forested riparian corridor along McKernan Creek extends through this area, with the creek eventually flowing under SW Grabhorn Road and outside the CMCP area. As development occurs within the CMCP and adjacent South Cooper Mountain Plan areas, this riparian corridor will be critical to fish and wildlife that may travel between the Nature Park and rural areas west of SW Grabhorn Road.

The CMCP area east of SW 175th Avenue is associated with the headwaters of the Summer Creek watershed. This area is consists of relatively steep terrain with a relatively high percent cover by native trees including Douglas-fir. In comparison to much of the area west of SW 175th Avenue, the area east of the roadway tends to have smaller lot sizes consisting of single-family residences and much less land devoted to agricultural uses.

Summary of Results

Waterways, Wetlands, and Riparian Areas

Roughly 7.83 miles of streams occur within the CMCP area. All mapped drainages are assumed to be subject to state and federal regulations.

Based on a review of Oregon Department of Fish and Wildlife (ODFW) fish distribution maps, CMCP area streams do not support populations of anadromous fish, such as salmon and steelhead trout. Likewise, there is limited habitat opportunity for native fish. Streams are fairly small (2 to 3 feet wide by 4 to 12 inches deep) and of relatively high gradient, and their upper reaches likely only flow seasonally. Portions of streams have also been rerouted, piped, and/or ditched. The lower reaches of McKernan Creek, within the CMCP area, are likely to provide the greatest opportunity for native fish as a result of channel size and consistency of flows.

Although the CMCP area streams may not provide much on-site habitat opportunity for native fish populations, they do likely provide other important functions. These include habitat for native amphibians, export of coarse organic matter to downstream fish-bearing waters, water source for native wildlife, and macroinvertebrate habitat.

Those streams with the most intact riparian corridors are likely to be in the best condition. For example, habitat conditions within McKernan Creek, which flows primarily through a deep, forested ravine, generally has greater bank and sediment stability, greater recruitment of woody debris and coarse organic materials, and greater overall habitat complexity than stream channels that have been notably altered and run through agricultural fields or adjacent to roadways (such as Stream MK-2, which is an altered drainage that has be relocated into a roadside ditch between the edge of a field and the east side of SW Grabhorn Road).

The CMCP area contains an estimated 23.18 acres of wetlands and probable wetlands. Wetland plant communities typically consist of the forested, scrub-shrub, or emergent classes according to the U.S. Fish and Wildlife Service (USFWS) wetland classification system (Cowardin 1979). Emergent wet prairie wetland is found within the Nature Park,

but some portions of this wetland have been planted to create a scrub-shrub community. Agricultural wetlands are also present in areas of annual crop production. Some agricultural fields may use tile drains to reduce saturated soil conditions; use of tile drains results in either a reduction of wetland acreage or the complete removal of wetland conditions relative to historical conditions.

The steeper, forested riparian areas within the CMCP area generally appear to have good vegetative cover, whereas riparian areas in flatter areas tend to have had greater disturbance to the natural vegetation. Development activities in riparian areas up to a certain distance from the water body are typically regulated and protected for water quality and/or habitat protection purposes by local codes.

Upland Habitats

Much of the high quality upland habitat in the CMCP area occurs within the Nature Park; however, there is considerable coverage of high quality habitat in private ownership as well. No upland habitat on private land in the CMCP area is currently protected by local regulations; however, the tree and vegetation protections of the City of Beaverton (City) will apply to the CMCP area, and the City can designate high quality areas as Significant Natural Resource Areas (SNRAs)(City land use designation intended to provide protection of valuable natural resources) as a part of the CMCP project.

Key Focal Habitat Conservation Areas

The CMCP area was reviewed for big picture opportunities to conserve and protect the most valuable natural resources, referred to herein as "key focal habitat conservation areas." One key focal habitat conservation area was identified within the CMCP area. This is the same area that was identified as a key focal habitat conservation area in the South Cooper Mountain Concept and Community Plans Natural Resource memo (DEA 2013). This key focal habitat conservation area includes the Nature Park and adjacent high-value habitats, along with the habitat corridor that leads from those areas and follows McKernan Creek and its tributaries to SW Grabhorn Road. It includes areas that Metro has in the past identified, in general terms, as areas for potential future park expansion. Portions of this focal habitat conservation area that are likely to remain in private ownership could potentially be included in Washington County (County) Habitat Benefit Area (HBA) or SNRA programs.

An important aspect of this focal area is maintaining and improving upon the wildlife corridor from the Nature Park, along McKernan Creek, and to lands west of SW Grabhorn Road that will remain rural for the foreseeable future. Currently, both large and small wildlife can relatively easily cross the roadway along a long stretch because of the rural nature of the land on both sides of the road. However, as development eventually increases in this area, wildlife crossing will be confined to the protected creek corridor. Currently, wildlife passage through the existing McKernan Creek culvert is likely negligible, if it occurs at all. Fish passage is also likely highly restricted at this culvert. Future improvements to the roadway should factor in the need for fish and large mammal passage at this location.

This focal area includes additional, but less critical, wildlife corridors as well. These corridors already have various impediments to movement of large mammals, such as roads, fences, and suburban disturbances. However, they could still benefit birds and smaller mammals (e.g., raccoons) that have an easier time moving through suburban landscapes. These corridors are intended to help connect wildlife movement from the Nature Park key focal habitat conservation area described above to nearby protected riparian corridors. These corridors can be maintained and enhanced as development occurs through actions such as planting and preserving trees, installing oversized culverts for small mammal passage, and integrating proposed pedestrian paths with these corridors.

Potential Opportunities

This review of CMCP area natural resources and local and regional conservation goals resulted in the following list of potential opportunities to protect and improve ecological conditions within the CMCP area (see also Appendix A, Figure 5):

- Expand Cooper Mountain Nature Park (the Nature Park)
- Protect and improve wildlife corridors:
    - Upgrade road crossings when conducting road improvements and as appropriate based on site-specific evaluation (i.e., fish-friendly and wildlife-passable culverts/bridges):
        - Place extra emphasis on the SW Grabhorn Road crossing of McKernan Creek to allow for passage of large mammals such as deer and coyote. As development continues in the CMCP and South Cooper Mountain areas, this will become a critical constriction to wildlife movement between the Nature Park and rural areas west of the crossing.
    - Limit the number of new road crossings and design crossings to minimize impacts
    - Protect and improve connections between high quality habitats (Locations shown on Figure 5 are approximate only and not defined by regulatory code. They are provided for planning discussion purposes.)
- Prioritize protection of oak woodland and remnant large oak trees
- Realign stream sections back to their natural state, away from roadways (for example, Stream MK-2, which runs in a ditch along the east side of SW Grabhorn Road)
- Restore agricultural wetlands to natural conditions either as a voluntary restoration opportunity or as a wetland mitigation opportunity
- Expand opportunities for the community to connect with nature (e.g., bike/pedestrian trails)
- Minimize unavoidable impacts to streams and riparian corridors, and, where they can't be avoided, locate them in low quality riparian corridors (i.e., Metro Title 13 Riparian Corridor Type III) before locating them in higher quality corridors, in order to protect both higher value riparian areas and the stream itself

- Promote voluntary conservation measures and integration of built and natural systems:
    - Utilize native habitats of the Nature Park as a template to guide planting schemes in developed areas
    - Integrate stormwater management with natural systems (i.e., place detention ponds adjacent to natural areas, acknowledge importance of tree canopy to storm water detention and delay, etc.)
    - Develop conservation easement or lease programs to protect upland habitats before and after development (i.e., programs similar to Natural Resources Conservation Service [NRCS] wetland and habitat conservation programs)—could entail allowing impacts to upland habitats to be offset by improving upland or riparian habitat elsewhere, either on-site or off-site. If improvements are off-site, they would result in a payment by the developer to the landowner protecting and/or enhancing habitat on their property, thereby creating a market for habitat conservation.

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Acronyms and Abbreviations

CMCP	Cooper Mountain Community Plan
Corps	U.S. Army Corps of Engineers
CWS	Clean Water Services
DEA	David Evans and Associates, Inc.
DSL	Oregon Department of State Lands
ESRI	Environmental Systems Research Institute
GIS	Geographic Information System
GPS	Global Positioning System
HBA	Habitat Benefit Area
HGM	Hydrogeomorphic
LIDAR	Light Detection and Ranging
LWI	Local Wetland Inventory
NHD	National Hydrographic Database
NRCS	Natural Resources Conservation Service
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish and Wildlife
OFWAM	Oregon Freshwater Assessment Method
RLIS	Regional Land Information System
SNRA	Significant Natural Resource Area
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Project Overview

The Cooper Mountain Community Plan (CMCP), which covers an approximately 1,240-acre area, will establish a long-term vision for the area's growth and development to support livable, walkable neighborhoods that honor the unique landscape and ensure a legacy of natural resource protection and connection. The area is anticipated to provide at least 3,760 homes, including a mix of single-family and multifamily homes. Annexation and development are not expected to occur until after the planning process is complete.

The plan will be created with the community. Public engagement will intentionally include historically underserved and underrepresented communities to ensure that the plan incorporates a broad array of ideas and feedback.

Report Purpose

This report is intended to provide a planning-level review of natural resources within the CMCP area. Specifically, this report covers wetlands and waterways, riparian areas, and upland wildlife habitats. The goal of this report is to provide project planners with the ecological context to support concept and community plan development for the CMCP area. A Local Wetland Inventory (LWI) has also been conducted for the CMCP. The detailed LWI documentation has been prepared as a separate report; however, the LWI mapping results and general findings are included in this report.

Documentation of natural resources is intended to support compliance with Oregon State Goal 5 and associated Metro Titles 3 and 13. Washington County (County) and City of Beaverton (City) planning codes have also been taken into consideration. The Regulatory Context section of this report discusses the regulatory considerations for the various habitat types that are part of this planning-level review.

Landscape Setting and Land Use

The CMCP area, shown in Appendix A, Figure 1, primarily consists of rural lands that are bordered to the east, north, and south by suburban development. The area to the west of the CMCP area consists of rural landscape. The northern edge of the CMCP area is situated along the top of Cooper Mountain, where topography is typically gently rolling, with slopes gradually steepening to the north and south to each side of the ridge top. In this area, vegetation consists of lawns and suburban landscaping, and remnant tree groves.

Slopes steepen quickly to the south of the CMCP area, with several drainages flowing generally from northeast to southwest. These drainages typically occur in steep, forested V-shaped ravines, including McKernan Creek, which is the principal drainage.

The headwater of Summer Creek is located east of SW 175th Avenue and drains the easternmost portion of the CMCP area. Moderately sloping terraces occur between the ravines. These land surfaces typically consist of pasture and more intensive agricultural production including annual crops, vineyards, and orchards. Some wood lots and native forest also occur on the terraced surfaces. The majority of the Nature Park is located within the CMCP area; however, a portion occurs just outside the area to the northwest. The Nature Park contains a host of native plant communities, including Douglas-fir (*Pseudotsuga mensiezii*) forest, Oregon oak (*Quercus garryana*) and madrone (*Arbutus menziesii*) woodlands, and prairie.

The Nature Park is a key natural resource feature within the CMCP area. As noted above, the Nature Park contains a diverse mix of native habitats, and considerable restoration work has been—and continues to be—carried out. The Nature Park contains the regionally rare upland prairie and oak and madrone woodland habitat, which supports what may be the largest remaining population of the state endangered pale larkspur (*Delphinium leucophaeum*). Park habitats also support populations of sensitive species including meadow checkermallow (*Sidalcea campestris*), breeding populations of Northern red-legged frog (Rana aurora aurora), and Western gray squirrel (*Sciurus griseus*). Restoring and enhancing oak and prairie habitat is one of the primary management goals for the Nature Park. Additional management goals include improving riparian corridors, enhancing park access through land acquisition and securing trail connections between major publicly owned properties, and keeping important wildlife corridors and buffers intact.

Slopes in the southern third of the CMCP area, particularly the southwest corner, tend to be gentler than elsewhere. In this portion of the CMCP area, generally west of SW 175th Avenue, land use is predominantly agricultural, and includes a mix of annual crop production, pasture, orchards, and viticulture. However, an important partially forested riparian corridor along McKernan Creek extends through this area, and the creek eventually flows under SW Grabhorn Road and outside the CMCP area. As development occurs within the CMCP area and adjacent South Cooper Mountain Plan area, this corridor will be critical to fish and wildlife that may travel between the Nature Park and rural areas west of SW Grabhorn Road.

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Methods

Resource review included a review of CMCP area background materials, and drive-by and on-site field reconnaissance visits. Field work was conducted during the week of April 20, 2020.

Preliminary Resource Review

Reference materials were reviewed prior to the field investigation to provide information regarding the possible presence of wetlands, water features, hydric soils, wetland hydrology, site topography, and habitat conditions. The materials reviewed included:

- Environmental Systems Research Institute (ESRI) National Geographic World Map for ArcGIS (2020a)
- ESRI ArcGIS OnlineWorld Imagery aerial photo imagery for ArcGIS (2020b)
- Metro Regional Land Information System (RLIS) Geographic Information System (GIS) wetlands layer, hydric soils layer, and GIS streams layer (2020)
- Metro Technical Report for Fish and Wildlife Habitat (2005a)
- Metro Cooper Mountain Natural Resource Management Plan (2005b)
- NRCS Soil Survey Geographic Database for Washington County, Oregon (2020)
- Oregon Department of Fish and Wildlife (ODFW) Fish distribution GIS layers (2020)
- Shapiro & Associates, Inc. City of Beaverton Local Wetland Inventory and GIS data (2000)
- U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory Wetland Mapper (2020)
- U.S. Geological Survey (USGS) National Hydrographic Database (NHD) GIS high resolution streams layer (2020)
- City of Beaverton, January 2013, LIDAR (LIDAR stands for Light Detection and Ranging, a laser-based contour mapping technology) derived contours (2013)
- David Evans and Associates, Inc. (DEA) South Cooper Mountain Concept and Community Plans Natural Resources Memorandum (2013)
- DEA South Cooper Mountain Annexation Area Local Wetland Inventory (2016)

Resource-specific Methods

The methods used for mapping and evaluating waterways, wetlands, riparian and upland habitats, and wildlife habitat corridors are provided below.

Wetlands and Streams

A local wetland inventory, or LWI, was conducted for the CMCP area in accordance with Oregon Department of State Lands (DSL) rules, specifically Oregon Administrative Rule (OAR) 141-086. All wetlands 0.5 acre or larger were mapped as wetlands, while wetlands smaller than that were mapped as "probable wetlands." Although DSL only requires that probable wetlands be mapped as point features (meaning that a single point would represent the wetland), for the CMCP, these wetlands were mapped as polygons in locations where site access or clear indicators on aerial photographs

allowed for a reasonably accurate level of mapping. This polygon mapping was conducted to aid the planning efforts, because these wetland features will likely need to be avoided or encroachment on them will likely need to be minimized. Mapping these features as polygons also enables the creation of buffers (such as Clean Water Services [CWS] "vegetated corridors"), which will also need to be avoided.

Where site access was available within the CMCP area, sample plots documenting typical conditions for the respective wetlands were completed, and boundaries were mapped using Global Positioning System (GPS). Data collection and wetland boundary delineation followed the Level 2 Routine Delineation Method described in the U.S. Army Corps of Engineers (Corps) Wetlands Delineation Manual (Environmental Laboratory 1987) and further supported by the Western Mountains, Valleys, and Coast Region regional supplement (Supplement) (Corps 2010). This method requires the simultaneous presence of hydrophytic vegetation, hydric soils, and positive wetland hydrology to determine wetland delineations.

Mapping of LWI features was supported through use of high-resolution color aerial photography (ESRI 2020), the USGS NHD high resolution streams layer (USGS 2020), and LIDAR contour data provided by the City of Beaverton (2013). Ground truthing occurred on tax lots where access was available and from publicly accessible viewing areas (i.e., roadway right of way). In-office review using aerial and LIDAR contours was conducted using GIS technology, which allowed for viewing information at various scales.

Mapping of streams started with use of the USGS NHD high-resolution streams GIS layer, which matched very closely with LIDAR contours (City of Beaverton 2013). Stream lines were modified based on field observations where access was available. In other areas, stream lines were adjusted to better match topographic contours and aerial photo interpretation.

Wetland functions were evaluated for wetlands greater than 0.5 acre using the Oregon Freshwater Wetland Assessment Method (OFWAM). OFWAM results were used to determine whether any of the wetlands in the CMCP area qualify as "locally significant wetlands" in accordance with criteria set forth in OAR 141-086-0350. Following DSL guidance, probable wetlands were not included in the evaluation of locally significant wetlands.

Riparian Habitats

In the context of this review, the term "riparian area" refers to the land surrounding wetlands, streams, and other water bodies. Typically, a buffer area of a certain distance from the water body is regulated and protected for water quality and/or habitat protection purposes. These buffer areas are typically determined through various land use codes, and the width of the buffer is determined by a mathematical formula that takes into account measures such as wetland size, stream type, drainage basin area, and slopes. Beaverton, CWS (the water resources management utility in the area), and Metro all have regulations defining these areas. Generally speaking, the typical buffer width defined by these regulations is 50 feet, and this buffer width can extend to a maximum of 200 feet in areas of steep slopes (i.e., slopes of 25 percent or greater).

Riparian resources throughout the CMCP area were mapped following CWS standards for determining buffer widths for vegetated corridors, as described in Design and Construction Standards for Sanitary Sewer and Surface Water Management (CWS 2007). However, CWS guidance requires that the determination of whether streams are perennial or intermittent occur during the summer dry season and that two site visits, one month apart, are required to confirm that a stream flows intermittently. Because site visits were conducted in April (i.e., still within the typical wet season rather than the dry season), a determination of perennial or intermittent for streams in the CMCP area could not be accurately performed. As a result, all CMCP area streams were assumed to be perennial for the purposes of determining the vegetated corridor. CWS currently does not have jurisdiction in the CMCP area; however, CWS will have jurisdiction in the future if the Urban Growth Boundary is extended to include this area. Currently adopted Washington County Significant Natural Resource Areas (SNRAs) apply to these areas. CWS vegetated corridors are presumed to cover an equal or greater area than the County SNRAs.

An assessment of the quality of riparian corridors in the CMCP area was based on Metro Title 13 habitat mapping, which was revised based on a combination of site reconnaissance and aerial photo review. Metro's 2005 inventory of regionally significant riparian corridors and wildlife habitat provided the technical basis and starting point for this assessment. Starting with Metro's inventory allowed for the CMCP natural resources review to incorporate and build on the extensive research, technical analysis, and public review that shaped Metro's regional inventory. DEA, the CMCP project natural resource consultant, updated the riparian habitat boundaries as a result of changes to the underlying stream and wetland boundary mapping results from the LWI.

Metro classifies riparian habitats into Classes I, II, or III. Class I habitats are the highest quality habitats, and progressively lower quality habitat is provided by Classes II and III. According to the Metro method, these classifications are based on the ability of the riparian habitat to provide the following important ecological functions:

- Microclimate and shade
- Bank function and control of sediments, nutrients, and pollutants
- Streamflow moderation and flood storage
- Organic inputs and food web
- Large wood and channel dynamics
- Wildlife habitat/corridors

Upland Habitats

DEA mapped upland wildlife habitat using Metro Title 13 habitat mapping. As with Metro's inventory, DEA's mapping effort focused on forest vegetation, which provides critical functions for native wildlife in the Willamette Valley, including breeding, foraging, dispersal, and wintering habitat. Grassland and pasture habitats were included only if they were found to contain remnant native grassland or prairie (no such habitats were found outside the Nature Park). Orchards, hedgerows, and small patches of forested habitat were not included unless they were found to contain native oak habitat or to be especially valuable for wildlife migration (primarily due to location). Similar to the mapping for riparian habitats, upland habitat mapping was revised based

on site reconnaissance and aerial photo review. Forested areas that had been harvested since the 2005 mapping were generally removed from mapping, as were areas where recent residential development had occurred.

The upland habitat mapping was based on the following assumptions:

- Large habitat patches are more valuable than small patches.
- Interior habitat is more important to at-risk wildlife species than edge habitat.
- Connectivity and proximity to other habitat patches are important.
- Connectivity and proximity to water are important.
- Unique or at-risk habitats deserve special consideration.

Based on these assumptions, Metro classifies upland habitats into Classes A, B, or C. Class A habitats are the highest quality habitats (those that best meet the above assumptions), and progressively lower quality habitat is provided by Classes B and C. Following Metro mapping methods, all areas within 300 feet of streams or wetlands also were mapped, whether they currently contain native habitat (Class A or B), or they are occupied by agricultural lands or non-native grasslands (Class C).

Wildlife Habitat Corridors

Potential wildlife habitat corridors were mapped based on site reconnaissance and aerial photo review. The goal of the corridors is to connect high-value habitats within the CMCP area with those outside of the CMCP area. Corridors were divided into two types as follows:

- Type 1 Corridor: Connects two high-value habitat types together. High value habitats include: Upland Habitat Class A, Riparian Habitat Classes I and II, proposed key focal habitat conservation areas, and currently protected areas.
- Type 2 Corridor: Connects one high-value habitat type (as defined above) to a lower value habitat type (i.e., Upland Habitat Classes B and C, Riparian Habitat Class III)

Generally speaking, the mapped corridors provide general locations for potential wildlife corridors and are intended to support concept planning discussions. The corridors were not developed based on regulatory code, because there is currently no regulatory program that specifically defines and regulates wildlife corridors within the CMCP area.

Regulatory Context

Streams, Water Bodies, and Wetlands

All mapped drainages, including in-line ponds,[1] are assumed to be regulated by the Corps and U.S. Environmental Protection Agency under Section 404 of the Clean Water Act, and by the DSL under state Removal-Fill law. Mapped wetlands would also be regulated by these agencies; however, the Corps does not take jurisdiction over isolated wetlands, such as some of the small depressional wetlands not connected to streams. Small irrigation or stock water ponds clearly dug from uplands and not connected to jurisdictional waters may be exempt from the jurisdiction of both the DSL and the Corps. Local agencies, including CWS, the City, and the County, also have land use codes that protect streams, water bodies, and wetland resources. In general, regulations give first priority to avoiding these resources. Unavoidable impacts to these resources typically require mitigation.

Riparian Habitats

For this natural resources review, riparian area boundaries have been defined in accordance with the methods for determining CWS vegetated corridor widths. CWS currently has or will soon have jurisdiction within the CMCP area, and therefore mapped vegetated corridors in the CMCP area are assumed to be jurisdictional resources that have development restrictions. CWS requires all degraded vegetated corridors on a parcel to be improved as a condition of issuing development permits regardless of whether the vegetated corridor is impacted. In addition, CWS typically requires mitigation for unavoidable impacts.

CWS currently does not have jurisdiction within the CMCP area and likely will not have jurisdiction there for some time. Therefore, CWS vegetated corridors mapped in CMCP area are for general planning purposes, because they currently do not carry CWS development restrictions. However, currently adopted County SNRA mapping does apply. County mapping does not specifically show mapping of riparian communities in the CMCP area; however, it does show a "Water areas, wetlands, and fish and wildlife habitat" SNRA mapped along the various stream corridors. This County SNRA mapping appears to be limited to the ravine bottoms and does not extend up the slopes as the CWS vegetated corridor mapping does.

Both the County and the City were partners in the Tualatin Basin Natural Resource Coordinating Committee. Using Metro habitat mapping, this committee developed a voluntary program to protect, conserve, and restore Class I and II Riparian Habitats and Class A Upland Habitats, referred to as Habitat Benefit Areas (HBAs). The City has also chosen to include Class III Riparian Habitat as an HBA. The intent is that HBAs can be protected, conserved, and restored, even though they are not managed or protected

[1] An in-line pond is created by blocking flows within the stream channel.

through other programs, such as City and County Goal 5 SNRAs and CWS vegetated corridors.

Upland Habitats

The City protects upland habitats through the designation of high quality areas, typically native forest, as an SNRA. The City's tree and vegetation protections also support protection of forested upland habitats. These protections would apply to the CMCP area. The City's SNRAs will be developed as a part of the CMCP project.

The County also protects upland habitats through designation of SNRAs. However, no SNRAs covering upland resources are mapped for the CMCP area in the County's adopted SNRA mapping.

As noted in the discussion of riparian habitats, above, Class A upland HBAs are protected through voluntary means. These voluntary means include habitat-friendly development practices, but they do not necessarily include complete avoidance of impacts to these resources.

Wildlife Corridors and Key Focal Habitat Conservation Areas

Wildlife corridors and key focal habitat conservation areas were identified to support the integration of local and regional conservation planning efforts with the CMCP project. Although these areas may include habitats containing existing protections, as noted above, the designation of "wildlife corridor" or "key focal habitat conservation area" does not itself provide any regulatory protection. Protections, through regulatory or voluntary programs, could be identified as part of the CMCP development process, which will include stakeholder involvement.

Existing Conditions

Drainage Basins and Streams

Roughly 7.83 miles of streams occur within the CMCP area. The breakdown of the two stream types (perennial versus intermittent) is currently unknown, and because the field work occurred during the spring (not the dry season) and because of limited site access, determination of stream types in the CMCP area was not conducted. However, many of the streams in the CMCP area, particularly the upper reaches of these streams, are likely to be intermittent, whereas as the lower reaches likely to flow perennially. Table 1 provides a summary of CMCP area drainage basins and associated streams. These are also displayed in Appendix A, Figure 2.

Based on a review of ODFW fish distribution maps, CMCP area streams do not support populations of anadromous fish, such as salmon (*Oncorhynchus* sp.) and steelhead trout (*Oncorhynchus mykiss*). Likewise, there is limited habitat opportunity for native fish. Streams are fairly small (2 to 3 feet wide by 4 to 12 inches deep) and of relatively high gradient, and their upper reaches likely only flow seasonally. Portions of streams have

also been rerouted, piped, and/or ditched. The lower reaches of McKernan Creek, within the CMCP area, are likely to provide the greatest opportunity for native fish, because of their relatively larger channel size and consistent flows.

Although CMCP area streams may not provide much on-site habitat opportunity for native fish populations, for the reasons described above, they likely do provide other important functions. These include habitat for native amphibians, export of coarse organic matter to downstream fish-bearing waters, water source for native wildlife, and macroinvertebrate habitat.

Those streams with the most intact riparian corridors are likely to be in the best condition. For example, the habitat within McKernan Creek, which primarily flows through a deep, forested ravine, should have greater bank and sediment stability, greater recruitment of woody debris and coarse organic materials, and greater overall habitat complexity than stream channels that have been notably altered and that run through agricultural fields or adjacent to roadways (such as Stream MK-2, which is an altered drainage that has be relocated into a roadside ditch between the edge of a field and the east side of SW Grabhorn Road).

Table 1. Drainage Basins and Streams

Clean Water Services Stream Shed[1]	Clean Water Services Basin ID[2]	Water Body[3]	Water Body ID[3]
Jackson/Lindow	LW	McKernan Creek	MK
	LW	Unnamed tributary to McKernan Creek-1	MK-1
	LW	Unnamed tributary to McKernan Creek-2	MK-2
	LW	Unnamed tributary to McKernan Creek-3	MK-3
	LW	Unnamed tributary to McKernan Creek-4	MK-4
	LW	Unnamed tributary to MK-4ab	MK-4a
	LW	Unnamed tributary to MK-4ab	MK-4b
	LW	Unnamed tributary to MK-4ab	MK-4ab
	LW	Unnamed tributary to McKernan Creek-5	MK-5
	LW	Unnamed tributary to McKernan Creek-6	MK-6
Summer Creek	SM7W4	Summer Creek	SM
	SM7W4	Unnamed tributary to Summer Creek	SM-1
Unnamed Tributary to Tualatin River	SMC	*Unnamed tributary to SMC	SMC
	TR06.5	*Unnamed tributary to Tualatin River	TR-1
	TR06.5	*Unnamed tributary to TR-1	TR-1a
Johnson Creek South	JSBS	No streams mapped in CMCP area	--
	JSE	No streams mapped in CMCP area	--
	JSCS	No streams mapped in CMCP area	--

[1] Data from "CWS_SmallSubBasins" GIS shapefile, "STREAMSHED" data field.
[2] Data from "CWS_SmallSubBasins" GIS shapefile, "IDALL" data field.
[3] Water body IDs assigned by Cooper Mountain Community Plan project.

Wetlands

Table 2 provides a summary of wetlands identified during LWI mapping for the CMCP project. These are displayed in Appendix A, Figure 2. The CMCP area contains an estimated 23.36 acres of wetlands and probable wetlands. Table 2 provides a list of individual wetlands, their sizes, and their hydrogeomorphic (HGM) and Cowardin wetland classifications. For the wetland acreage totals provided in Table 2, a wetland size was available only for probable wetlands that have a polygon associated with them, not for those mapped as a point (entries in the table that are shown as having "0.00" acres.)

Table 2. LWI Wetland Summary Results for the CMCP Area

Wetland ID[1]	Cowardin[2]	HGM	Acres
PW-MK-1-a	PEM1B	Slope	0.07
PW-MK-4-a	PEM1B	Depressional	0.37
PW-MK-4a-a	PEM1B	Depressional	0.00
PW-MK-4-b	PSS1B	Depressional	0.00
PW-MK-a	PEM1B	Depressional	0.06
PW-MK-b	PEM1B	Depressional	0.04
PW-MK-c	PSS1B	Slope	0.22
PW-MK-e	PSS1B	Slope	0.48
PW-MK-f	PSS1B	Slope	0.57
PW-MK-g	PSS1B	Slope	0.41
PW-MK-h	PSS1B	Depressional	0.00
PW-SM-a	PEM1B	Slope	0.00
PW-SM-b	PEM1B	Slope	0.13
PW-SM-c	PEM1B	Slope	0.11
PW-SM-d	PSS1B	Riverine	0.12
PW-SMC-a	PSS1B	Slope	0.00
PW-TR-1-a	PSS1B	Riverine	0.17
PW-TR-1a-a	PEM1B	Slope	0.00
PW-TR-1a-b	PEM1B	Slope	0.08
PW-TR-1a-c	PEM1B	Slope	0.09
PW-TR-1a-d	PEM1B	Depressional	0.00
W-MK-1	PEM2Bf	Slope	4.01
W-MK-1	PEM1B	Slope	1.10
W-MK-1	PFO1B	Slope	7.26

Wetland ID[1]	Cowardin[2]	HGM	Acres
W-MK-1-1	PEM1B	Slope	1.31
W-MK-4-1	PEM1B	Slope	1.14
W-MK-6-1	PSS1B	Slope	1.38
W-MK-6-1	PEM2Bf	Slope	3.21
W-MK-6-1	PFO1B	Slope	1.05
Probable Wetland Acreage			**2.92**
Wetland Acreage			**20.26**
Grand Total			**23.18**

[1] "W" = wetland, "PW" = probable wetland

[2] PEM2Bf= Palustrine Emergent, Nonpersistent, Seasonally Saturated, Farmed
PEM1B = Palustrine Emergent, Persistent, Seasonally Saturated
PSS1B= Palustrine Scrub-shrub, Broad-leaved Deciduous, Seasonally Saturated
PFO1B= Palustrine Forested, Broad-leaved Deciduous, Seasonally Saturated

Only four wetlands larger than 0.5 acre occur in the CMCP area. These tend to be relatively long and linear-shaped wetlands that follow along the McKernan Creek riparian corridors. These wetlands contain a patchwork of palustrine emergent wetlands that are dominated by non-native grasses (e.g., meadow foxtail [*Alopecurus pratensis*]) or are in agricultural production, as well as forested and scrub-shrub wetlands typically dominated by native plant species. One relatively large palustrine emergent wetland area occurs within the Nature Park and contains a relatively diverse native plant community as a result of active management.

Most wetlands were considered to be slope wetlands, because the dominant source of hydrology is likely hillside seepage or shallow subsurface flow. However, several small probable wetlands appear to be fed primarily by precipitation and a small amount of runoff, and had no outlet—these are classified as depressional. Two probable wetlands are fed primarily by flows from small streams rather than mainly groundwater and are classified as riverine.

Table 3 summarizes the functional assessment results for wetlands that are 0.5 acre or more in size. Wetland W-MK-1 meets locally significant wetland criteria (which means at least one of the four functions evaluated rated highly). Wetlands W-MK-1-1, W-MK-4-1, and W-MK-6-1 do not meet locally significant wetland criteria, primarily because they do not provide fish habitat support and are fed by groundwater rather than river flows because of their positions that are much higher in the watershed than that of Wetland W-MK-1. However, it should be noted that the forested portions of both Wetland W-MK-6-1 and Wetland W-MK-1 meet the criteria for wetlands of Special Interest for Protection, because they are mapped Goal 5 resources.

Table 3. Wetland Functional Assessment Results

Wetland ID	Wildlife Habitat	Fish Habitat	Water Quality	Hydrologic Control	Meets Locally Significant Criteria
W-MK-1	Diverse	Intact	Degraded	Intact	Yes
W-MK-1-1	Degraded	Degraded	Degraded	Degraded	No
W-MK-4-1	Degraded	Degraded	Degraded	Degraded	No
W-MK-6-1	Degraded	Not applicable	Not present	Not present	No

Wetland plant communities typically consist of the forested, scrub-shrub, and emergent classes according to the USFWS classification system (Cowardin 1979). Emergent wet prairie wetland is found within the Nature Park, with portions having been planted to establish a scrub-shrub community. Agricultural wetlands are also present and occur in areas of annual crop production. Some agricultural fields may use tile drains to reduce saturated soil conditions, which results in either a reduction of wetland acreage or the complete removal of wetland conditions relative to historical conditions. The following sections provide additional details about the wetland plant communities.

Forested and Scrub-Shrub Wetland Habitat

The forested wetland habitat is typically dominated by Oregon ash (*Fraxinus latifolia*), red-osier dogwood (*Cornus stolonifera*), Pacific willow (*Salix lucida*), slough sedge (*Carex obnupta*), and reed canarygrass (*Phalaris arundinacea*). The same species, with the exception of Oregon ash, were found within the scrub-shrub wetland habitat.

Emergent Wetland Habitat

Emergent wetland habitats tend to be dominated by non-native pasture grasses. Dominant species typically included meadow foxtail (*Alopecurus pratensis*), tall fescue (*Schedonorus phoenix*), Kentucky bluegrass (*Poa pratensis*), and reed canarygrass.

Riparian Habitats

Aerial photo review reveals that the characteristics of the riparian areas in the CMCP area correspond to their topographic settings. The steeper, forested riparian areas within the CMCP area generally appear to have good vegetative cover, whereas riparian areas in flatter portions of the CMCP area tend to have had greater disturbance to natural vegetation. This pattern is visible in Appendix A, Figures 3 and 4. The steep ravine side slopes appear to have protected the forest within the riparian zones along these stream reaches. The Nature Park also provides important protection of riparian corridors in the CMCP area. Table 4 provides a breakdown of riparian habitat classes in the CMCP area.

Table 4. Title 13 Riparian Habitats in the CMCP Area

Title 13 Riparian Habitats		
Class I (acres)	**Class II (acres)**	**Class III (acres)**
142.30	36.78	149.77

Plant communities found within designated riparian areas in the CMCP area include both true riparian plant communities (i.e., those typical of moist soil conditions) as well as those typically considered to be upland communities (i.e., relatively dry conditions). A description of the typical riparian plant community that is adapted to moist soil is provided below. Those plant communities that are adapted to relatively dry conditions and that may occur in the riparian or upland locations in the CMCP area are described in the Upland Habitat section of this report, below.

Riparian Forest (Class I)

This habitat is dominated by a fairly open canopy of red alder (*Alnus rubra*), big leaf maple (*Acer macrophyllum*), black cottonwood (*Populus trichocarpa*), Douglas-fir, and western red cedar (*Thuja plicata*). The understory includes sword fern (*Polystichum munitum*), snowberry (*Symphoricarpos albus*), Indian plum (*Oemleria cerasiformis*), and tall Oregon grape (*Mahonia nervosa*), among others.

Upland Habitats

Much of the high quality upland habitat in the CMCP area occurs within the Nature Park; however, there is considerable coverage of high quality habitat in private ownership as well. Table 5 provides a breakdown of upland habitat acreage by habitat class within the CMCP area.

In addition, although not classified as Class A habitat, the numerous small groves of large conifer trees scattered among the residential units in the CMCP area do provide valuable habitat, particularly for bird species.

Table 5. Title 13 Upland Habitats in the CMCP Area

Title 13 Upland Habitats		
Class A (acres)	**Class B (acres)**	**Class C (acres)**
240.15	147.38	149.77

Typical wildlife that may occur within upland areas includes numerous mammal species such as raccoon (*Procyon lotor*), black-tailed deer (*Odocoileus hemionus columbianus*), bobcat (*Lynx rufus fasciatus*), coyote (*Canis latrans*), Mazama pocket gopher (*Thomomys mazama*), and little brown bat (*Myotis lucifugus*), among others. Birds heard during the site visits, including during the South Cooper Mountain Concept Plan site visits in 2013, include numerous songbirds, such as red-breasted nuthatch (*Sitta canadensis*), black-capped chickadee (*Poecile atricapillus*), Bewick's wren (*Thryomanes bewickii*), orange-crowned warbler (*Leiothlypis celata*), yellow-breasted chat (*Icteria virens*), and many others, and may include great horned owl (*Bubo virginianus*), sharp-shinned (*Acipiter striatus*)or Cooper's hawk (*Accipiter cooperii*), and hairy and downy woodpeckers (*Dryobates villosus* and *pubescens*), among others.

The following sections describe habitats outside of the Nature Park. Habitats within the Nature Park are described in detail in the Washington County Master Plan & Management Recommendations (2005). Where these habitats fall within the calculated CWS vegetated corridor, they are classified as riparian communities.

Mixed Forest (Upland Habitat Class A or Riparian Habitat Class I)

In the CMCP area, forested areas are generally mid-seral to late seral (mid-seral refers to medium-sized trees generally 15 to 19 inches in diameter, and late seral refers to larger-sized trees generally larger than 20 inches in diameter). Overstory vegetation consists primarily of Douglas-fir and red alder, with smaller amounts of Oregon ash and Oregon white oak (*Quercus garryana*). Shrub cover ranges from sparse to dense and is dominated by snowberry, Indian plum, cluster rose (*Rosa pisocarpa*), beaked hazelnut (*Corylus cornuta*), Pacific madrone (*Arbutus menziesii*), poison oak (*Toxicodendron diversilobum*), and oceanspray (*Holodiscus discolorh*). Ground cover consists primarily of sword fern, native trailing blackberry (*Rubus ursinus),* salal *(Gaultheria shallon),* tall Oregon grape, and youth on age *(Tolmeia menziesii*). In densely forested areas, there tends to be minimal invasion of exotic species because of the closed forest canopy, although Himalayan blackberry (*Rubus armeniacus*) is present in places. However, where this habitat mixes with rural and semisuburban residences and roads, understory diversity has been reduced.

Oak Forest (Upland Habitat Class A or Riparian Habitat Class I)

Very little oak forest was present in areas with access, other than the Nature Park. Species in oak forest are similar to those described for mixed forest, but with greater cover by Oregon white oak, Pacific madrone, and poison oak. A few remnant individual oak trees or small oak groves are still present beyond the park boundaries.

However, the relatively large grove of oak trees mapped by the Oakquest database north and east of SW Horse Tale Drive is no longer present (see Appendix A, Figure 3).

Young Forest and Mixed Shrub Areas (Upland Habitat Class B or C and Riparian Habitat Class II)

This habitat occurs in relatively unmaintained areas that were clear cut and have not been replanted with trees. Non-native grasses such as tall fescue and Kentucky bluegrass are being succeeded by Himalayan blackberry, trailing blackberry, and young trees. These habitat types were typically assigned to Upland Habitat Class C. Due to the relatively low functions. However, where these habitat types occurred along the main McKernan Creek corridor and McKernan Creek tributary confluence area, these habitat types were assigned to the Upland Habitat Class B category to acknowledge the important wildlife corridor functions they provide.

Agricultural Areas (Upland Habitat Class B or C or Riparian Habitat Class III)

These agricultural areas include fields planted with non-native grasses such as tall fescue and Kentucky bluegrass for pasture and grazing, as well as grape orchards with non-native grasses beneath. These habitat types were typically assigned to Upland Habitat Class C, due to the relatively low functions. However, where these habitat types occurred along the main McKernan Creek corridor and McKernan Creek tributary confluence area, these habitat types were assigned to the Upland Habitat Class B category to acknowledge the important wildlife corridor functions they provide.

Key Focal Habitat Conservation Areas and Wildlife Corridors

One key focal habitat conservation area was identified within the CMCP area (see Appendix A, Figure 5), which is the same area that was identified as a key focal habitat conservation area in the South Cooper Mountain Concept and Community Plans Natural Resource memo (DEA 2013). This focal habitat conservation area includes the Nature Park and adjacent high-value habitats, as well as the habitat corridor that leads from those areas and follows McKernan Creek and its tributaries to SW Grabhorn Road. It includes areas that Metro has previously identified, in general terms, as areas for potential future park expansion. Portions of this focal area that are likely to remain in private ownership could potentially be included in County HBA or SNRA programs.

An important aspect of this focal area is maintaining and improving the wildlife corridor from the Nature Park, along McKernan Creek, and to lands west of SW Grabhorn Road that will remain rural for the foreseeable future. This corridor is shown as a Type 1 Wildlife Corridor on Figure 5 in Appendix A. Currently, large and small wildlife can relatively easily cross the roadway along a long stretch because of the rural nature on both sides of the road. However, as development eventually increases in this area, wildlife crossing will be confined to the protected creek corridor. Currently, wildlife passage through the existing McKernan Creek culvert is likely negligible, if it occurs at all. Fish passage is also likely highly restricted at this culvert. Future improvements to the roadway should take into consideration passage of fish and large mammals at this location.

Type 2 Wildlife Corridors are also shown on Figure 5 of Appendix A. These corridors already have various impediments to movement of large mammals, such as roads, fences, and suburban disturbances. However, they could still benefit birds and smaller mammals (e.g., raccoons) that can more easily move through suburban landscapes. Type 2 Wildlife Corridors are intended to help connect wildlife movement from the Nature Park key focal area described above to nearby protected riparian corridors. These corridors can be maintained and enhanced as development occurs through actions such as planting and preserving trees, installing oversized culverts for small mammal passage, and integrating proposed pedestrian paths with these corridors.

Potential Opportunities

This review of CMCP area natural resources and local and regional conservation goals resulted in the following list of potential opportunities to protect and improve ecological conditions within the CMCP area (this list is also displayed, in part, in Appendix A, Figure 5):

- Expand Cooper Mountain Nature Park
- Protect and improve wildlife corridors
    - Upgrade road crossings when conducting road improvements and as appropriate based on site-specific evaluation (i.e., fish-friendly and wildlife-passable culverts/bridges, etc.):
        - Place extra emphasis on the SW Grabhorn Road crossing of McKernan Creek to allow for passage of large mammals such as deer and coyote (As development continues in the CMCP and South Cooper Mountain areas, this will become a critical constriction to wildlife movement between the Nature Park and rural areas west of the crossing.)
    - Limit the number of new road crossings and design crossings to minimize impacts
    - Protect and improve connections between high quality habitats (Locations shown on Figure 5 are approximate only and not defined by regulatory code. They are provided for planning discussion purposes.)
- Prioritize the protection of oak woodland and remnant large oak trees
- Realign stream sections back to their natural state, away from roadways (For example, Stream MK-2, which runs in a ditch along the east side of SW Grabhorn Road.)
- Restore agricultural wetlands to natural conditions either as a voluntary restoration opportunity or as a wetland mitigation opportunity
- Expand opportunities for the community to connect with nature (e.g., bike/pedestrian trails)
- Minimize unavoidable impacts to streams and riparian corridors, and, where they can't be avoided, locate them in low quality riparian corridors (i.e., Metro Title 13 Riparian Corridor Type III) rather than locating them in higher quality corridors, in order to protect both higher value riparian areas as well as the stream itself

- Promote voluntary conservation measures and integration of built and natural systems:
    - Utilize native habitats of the Nature Park as a template to guide planting schemes in developed areas
    - Integrate stormwater management with natural systems (i.e., place detention ponds adjacent to natural areas, acknowledge importance of tree canopy to stormwater detention and delay, etc.)
    - Develop conservation easement or lease programs to protect upland habitats before and after development (i.e., similar to NRCS wetland and habitat conservation programs—could entail allowing impacts to upland habitats to be offset by improving upland or riparian habitat elsewhere, either on-site or off-site. If improvements are off-site, then they would result in a payment by the developer to the landowner protecting and/or enhancing habitat on their property, thereby creating a market for habitat conservation.

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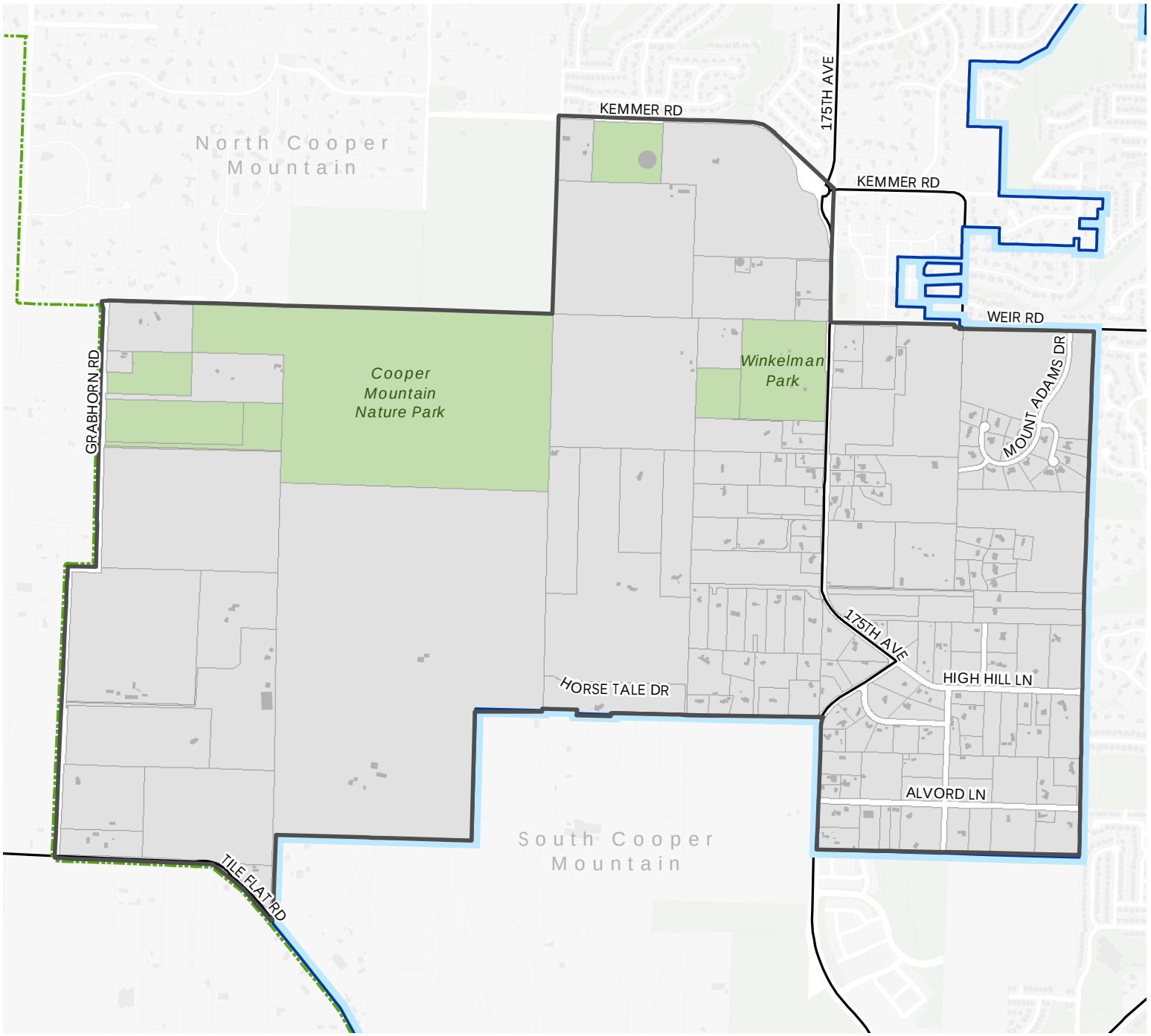
APPENDIX A - FIGURES

Figure 1
Study Area



- Cooper Mountain Community Plan Boundary
- City Limits
- Metro UGB
- Taxlots
- Buildings
- Parks

6/11/2020

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Beaverton OREGON

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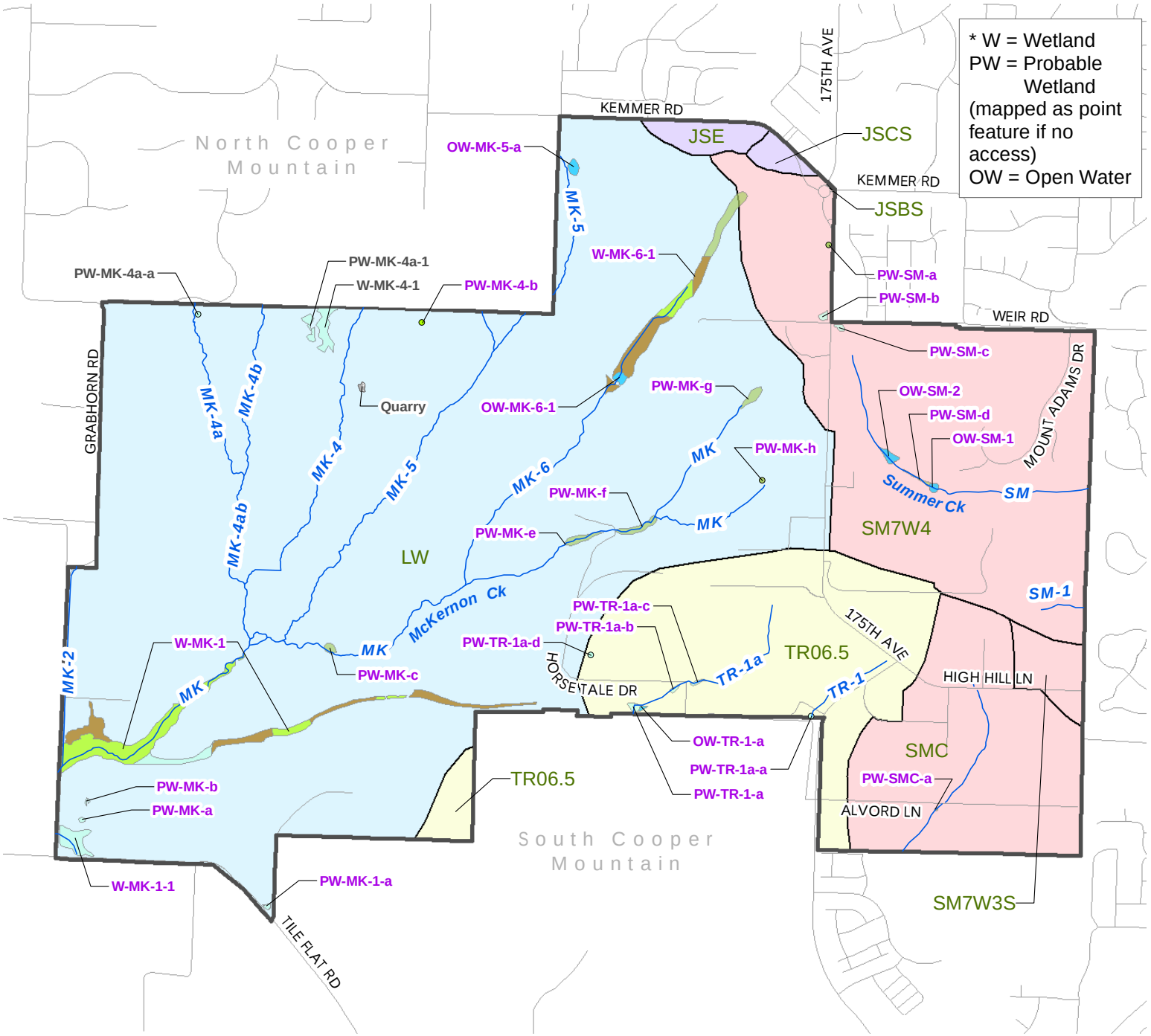

Figure 2
Drainage Basins and Streams

- Cooper Mountain Community Plan Boundary
- LWI Stream

CWS Streamsheds in Study Area

- Tualatin River Tributary
- Johnson Creek South (WA County)
- Lindow Creek/Jackson Creek
- Summer Creek

LWI Wetlands*

- Palustrine Emergent (PEM2Bf)
- Palustrine Emergent (PEM1B)
- Palustrine Forested (PFO1B)
- Palustrine Scrub-Shrub (PSS1B)
- Palustrine Unconsolidated Bottom (PUBx)
- Quarry

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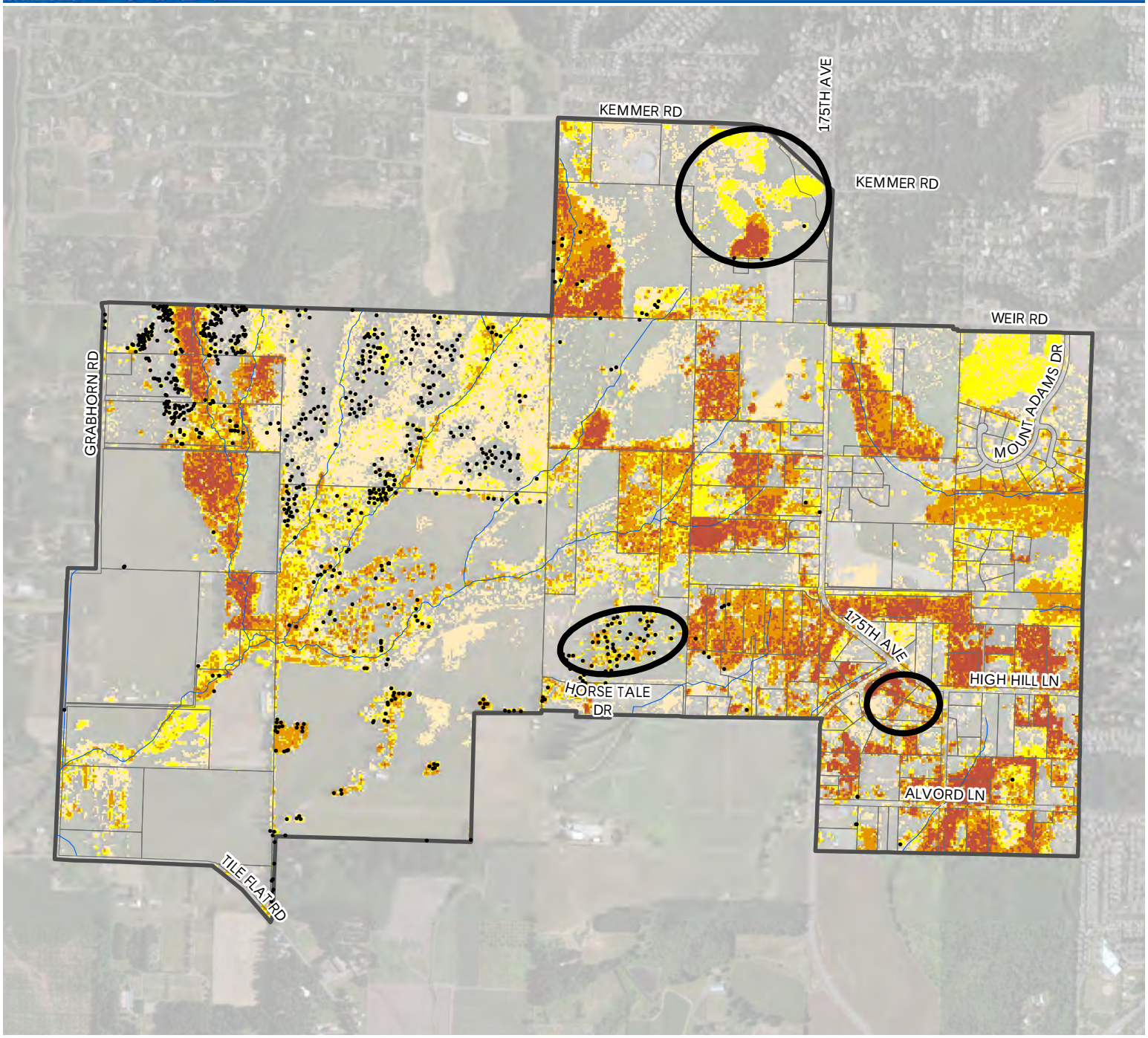

Figure 3
Tree Canopy/ Height

- Cooper Mountain Community Plan Boundary
- White Oak Tree Location
- LWI Stream
- Taxlots

Tree Height (ft)

- >20 ft to 40 ft
- >40 ft to 60 ft
- >60 ft to 100 ft
- >100 ft (max. 174 ft)
- Trees no longer present

Data Sources
Tree Height: DOGAMI Lidar Data, DEA
White Oak: Oakquest 2018 v.3 (databasin.org)

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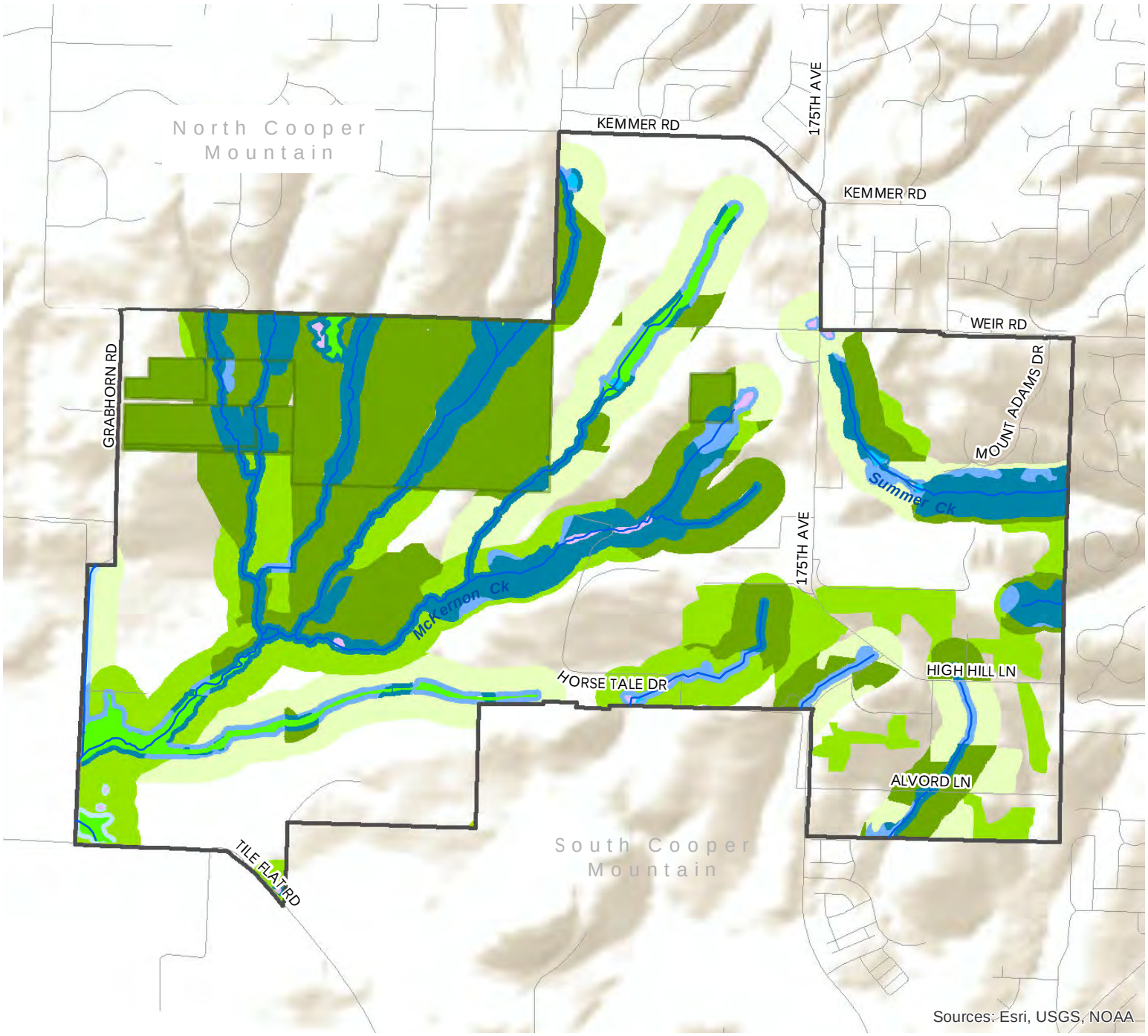

Figure 4
Riparian and Upland Habitats

Cooper Mountain Community Plan Boundary

Riparian Wildlife Habitat Quality

- Class 1
- Class 2
- Class 3

Upland Wildlife Habitat Quality

- Class A
- Class B
- Class C
- Metro Property
- LWI Stream
- Wetland
- Probable Wetland
- Open Water

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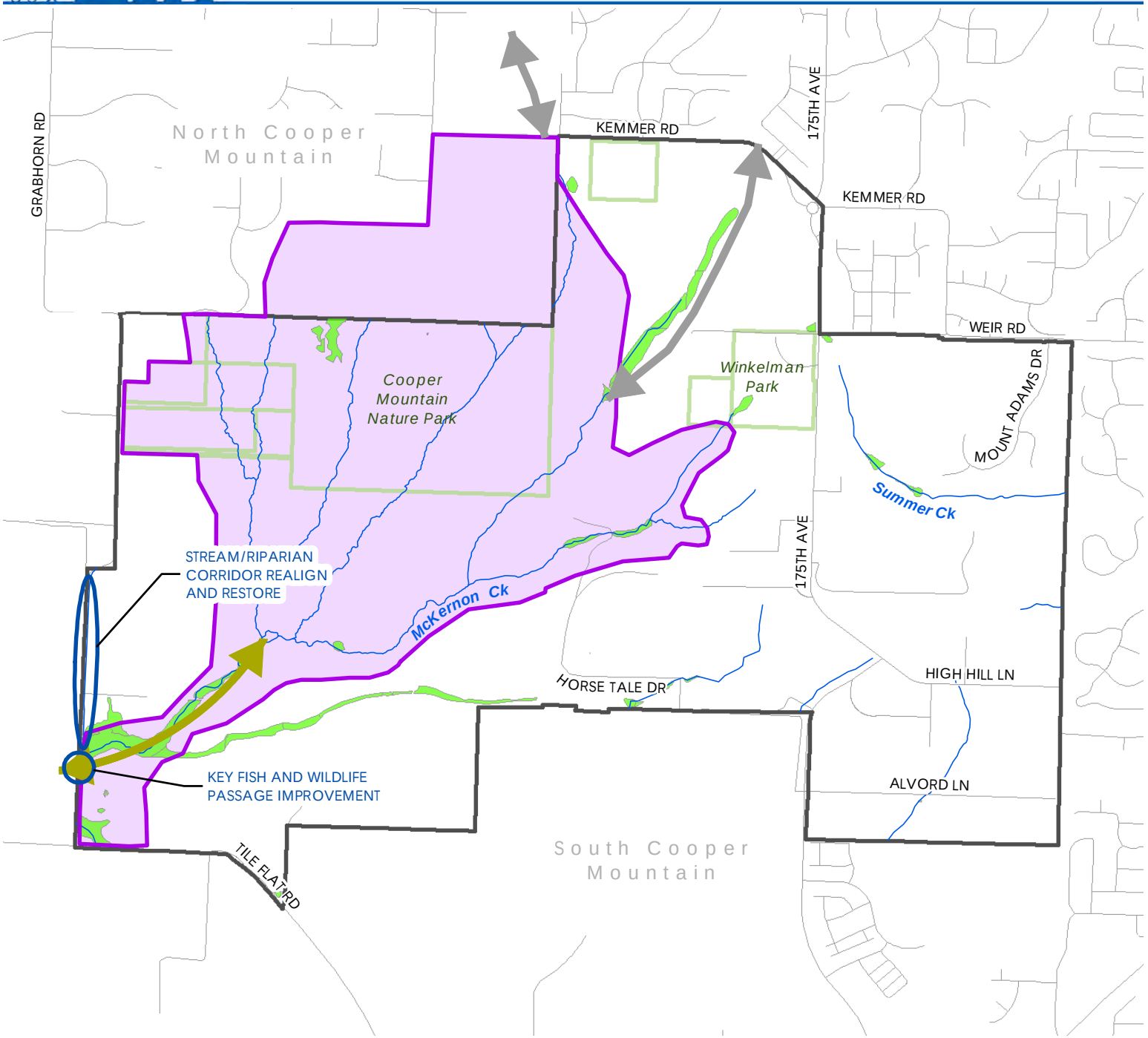

Figure 5
Potential Protection and Enhancement Opportunities

- Cooper Mountain Community Plan Boundary
- Natural Resource Opportunity
- Focal Habitat Conservation Area
- Type 1 Wildlife Corridor
- Type 2 Wildlife Corridor
- LWI Stream
- LWI Wetland
- Parks

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