The Kaufman Habitat Conservation Plan for Taylor's Checkerspot Butterfly (*Euphydyas editha taylori*); Streaked Horned Lark (*Eremophila alpestris strigata*); and two subspecies of the Mazama Pocket Gopher (*Thomomys mazama pugetensis* and *Thomomys mazama yelmensis*); in Thurston County, Washington

Prepared for
Kaufman Holdings, Inc.
Kaufman Real Estate, LLC
Liberty Leasing & Construction, Inc.

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LIST OF ACROYNMS, ABBREVIATIONS, AND FREQUENTLY USED TERMS

AFB	Air Force Base
AIA	Artillery Impact Area
Applicants	The legal entities jointly applying for an Incidental Take Permit. The Applicants include Kaufman Holdings, Inc., Kaufman Real Estate, LLC, and Liberty Leasing & Construction, Inc.
CFR	Code of Federal Regulations
CNLM	Center for Natural Lands Management
Covered Activities	The Covered Activities include work related to site management (before development), development, and ongoing management (post construction). Covered Activities also include vegetation management at onsite habitat set-aside areas and Conservation Sites (Permit Area)
FR	Federal Register
Conservation Sites	Two properties, Leitner Prairie and Deschutes Corridor, owned by the Applicants that will be permanently dedicated to management and conservation of the Covered Species
Covered Species	Species that are covered for Incidental Take
EA	Environmental Assessment
ESA	Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.)
FAA	Federal Aviation Administration
GMA	Growth Management Act
HCP	Habitat Conservation Plan
ITP	Incidental Take Permit
JBLM	Joint Base Lewis-McCord
LLC	Limited Liability Company
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
Permit Area	The 13 project development sites and two Conservation Sites owned by the Applicants and covered by the HCP and the requested Incidental Take Permit
Project development sites	The thirteen Thurston County properties owned by the Applicants where development and construction activities covered by this HCP will occur
RCW	Revised Code of Washington
UGA	Urban Growth Area
USC	United States Code
USFWS	United States Fish and Wildlife Service
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife

Acknowledgements

This Habitat Conservation Plan (HCP) would not have been possible without the time and commitment of many people. Numerous meetings for negotiating conservation terms were held since 2012 with the Kaufman project team and USFWS staff in the Washington Fish and Wildlife Office in Lacey, Washington, including Lindsy Wright, Tim Romanski, Bridget Moran, Kevin Connally, and Ken Berg. USFWS staff provided text, comments, and revisions for this HCP; in particular Lindsy Wright kept the review process rolling at her office and provided valuable technical review. Species descriptions prepared by Washington State Department of Fish and Wildlife (WDFW) in support of Thurston County's HCP, in process, were provided by USFWS for use in this HCP. Willamette Partnership provided survey data, collected by Center for Natural Lands Management (CNLM) for Thurston County for testing a Prairie Habitat Assessment Model. Heather Burgess and Martha Wehling from Phillips Burgess PLLC provided support for negotiations and comments and revisions for the HCP. Very special thanks goes to John Kaufman and Theresa Wall, Kaufman Construction & Development, Inc., for their participation in and patience at the numerous meetings that were held for this HCP, their reviews of multiple drafts of this document, and their preparation of supporting documentation.

Introduction

Kaufman Holdings, Inc., Kaufman Real Estate, LLC, and Liberty Leasing & Construction, Inc. (jointly referred to as the Applicants) own thirteen properties (project development sites) comprising approximately 204 acres in various jurisdictions within Thurston County, Washington.

The Applicants recognize that some or all of these properties may be occupied by, or contain habitat for, one or more species listed under the Endangered Species Act of 1973, as amended (87 Stat. 884; 16 U.S.C. 1531 et seq.) (ESA). The Applicants recognize that it is not possible to completely avoid impacts to these species or their habitats while engaging in the otherwise lawful development of and construction on these properties. Krippner Consulting LLC prepared this Habitat Conservation Plan (HCP) on behalf of the Applicants in partial fulfillment of requirements to seek an Incidental Take Permit (ITP) under Section 10(a)(1)(B) of the ESA. An ITP provides exceptions to the prohibitions against "take" of species listed under the ESA under specified conditions and in compliance with all other applicable laws and regulations.

Each of the project development sites is zoned for commercial or industrial uses and the Applicants anticipate developing these parcels at some time over the next 20 years. Each of the project development sites may be occupied by or provide habitat for any or all of the following: the endangered Taylor's checkerspot butterfly (*Euphydryas editha taylori*), the threatened streaked horned lark (*Eremophila alpestris strigata*), and two threatened subspecies of Mazama pocket gophers (*Thomomys mazama pugetensis* and *Thomomys mazama yelmensis*), (collectively referred to as the Covered Species).

The Applicants have proposed a conservation program incorporating measures intended to minimize and mitigate for impacts to these species and their habitats that cannot be avoided. The conservation program actions will take place on the project development sites and on two dedicated conservation sites. The conservation sites comprise a total of approximately 87.5 acres and will be managed in perpetuity to provide conservation benefits for the Covered Species.

Regulatory and Legal Framework for Habitat Conservation Plans

The Endangered Species Act

The U.S. Congress enacted the ESA to protect plants and animals in danger of, or threatened with, extinction. The U.S. Fish and Wildlife Service (USFWS) is responsible for implementing the ESA for those species under its jurisdiction. The ESA and its implementing regulations in Title 50 of the Code of Federal Regulations (CFR) Section 17 prohibit the take of any fish or wildlife species that is federally listed as threatened or endangered without prior approval pursuant to either Section 7 or Section 10 of the ESA.

Section 3 of the ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or to attempt to engage in any such conduct" (16 United States Code [USC] § 1532 (19)). The term "harm" is defined to include any act "which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 C.F.R. § 17.3). The term "harass" is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by

annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (50 C.F.R. § 17.3).

Section 7(a)(2) of the ESA requires each Federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of critical habitat (16 USC § 1536 (a)(2)). If the actions of a Federal agency are not likely to jeopardize the continued existence of any endangered or threatened species, but could adversely affect the species or result in a take, the action must be addressed under Section 7 of the ESA (16 USC § 1536 (a)(2)).

Section 9 of the ESA prohibits the "take" of threatened and endangered species, including the attempt or action to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" such species (16 U.S.C. § 1532).

Section 10 of the ESA allows non-Federal applicants, under certain terms and conditions, to incidentally take ESA-listed species that would otherwise be prohibited under Section 9 of the ESA. When a non-Federal landowner or other non-Federal entity wishes to proceed with an activity that is legal in all other respects, but that may result in the incidental taking of a listed species, an incidental take permit, as defined under Section 10 of the ESA, is required. Incidental take is defined as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 CFR § 17.3). Under Section 10 of the ESA, an HCP that meets USFWS statutory and regulatory requirements is required to accompany an application for an incidental take permit to demonstrate that all reasonable and prudent efforts have been made to avoid, minimize, and mitigate for the effects of the potential incidental take.

The USFWS is required to respond to all applicants seeking permits, which would allow incidental take of listed species if approved. It is necessary for the USFWS to assure that the HCP and any implementing agreements submitted by the Applicants comply with the provisions of the ESA with regard to incidental take [50 CFR 17.22 (b) and 17.32(b)] prior to issuance of a take permit for federally listed threatened or endangered fish and wildlife species.

An HCP submitted in support of a Section 10 permit application must specify [16 U.S.C. § 1539(a)(2)(A)(i)-(iv)]:

- The impact that will likely result from the taking;
- Steps the Applicants will take to minimize and mitigate such impacts; the funding available to implement such steps; and the procedures to be used to deal with unforeseen circumstances;
- Alternative actions to such taking considered by the Applicants and the reasons why such alternatives are not proposed to be used; and
- Other measures that may be required as necessary or appropriate for the purposes of the plan.

To issue an incidental take permit, the USFWS must find that [ESA § 10(a)(2)(B)]:

- The taking will be incidental;
- The Applicants will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;
- The Applicants will ensure that adequate funding will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild; and
- The Applicants will ensure that other measures as may be required by USFWS as necessary or appropriate for the purposes of the HCP will be implemented.

The *HCP Handbook Addendum* (USFWS and National Marine Fisheries Service [NMFS] 2000), referred to as the "5-point policy," provides additional guidance and recommendations for the development of HCPs (65 FR 250-256). The five points are as follows:

1. Defined conservation goals and objectives;
2. An adaptive management strategy;
3. Compliance and effectiveness monitoring;
4. An established permit duration; and
5. Opportunities for public participation.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.) requires that Federal agencies analyze and publicly disclose the social, economic and environmental effects associated with major Federal actions (§ 4332). This analysis can take the form of an Environmental Assessment (EA) and/or Environmental Impact Statement (EIS). The issuance of an ITP is a Federal action subject to NEPA compliance. Before it can decide whether to approve an ITP under Section 10(a)(1)(B), the USFWS will prepare and distribute an Environmental Assessment (EA) or Environmental Impact Statement (EIS) that addresses the direct, indirect, and cumulative effects of the incidental take authorized by permit issuance, and the direct, indirect, and cumulative effects associated with the implementation of mitigation and minimization measures described in the HCP.

National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966, as amended (16 USC § 40 et seq.), requires Federal agencies to take into account the effects of their proposed actions on properties eligible for inclusion in the National Register of Historic Places. "Properties" are defined as "cultural resources," which includes prehistoric and historic sites, buildings, and structures that are listed or eligible for listing in the National Register of Historic Places. An undertaking is defined as a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency; including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license or approval; and those subject to state or local regulation administered pursuant to

a delegation or approval by a Federal agency. The issuance of an ITP is an undertaking subject to compliance with Section 106 of the National Historic Preservation Act.

Other Federal, State, County and Local Requirements
The Applicants understand that an ITP is valid so long as the Covered Activities are in compliance with all relevant Federal, State, and local laws, regulations, and ordinances. The Applicants acknowledge that they are responsible for ensuring that the proposed projects and the Covered Activities will comply with applicable Federal, state, and local laws, regulations, and ordinances.

Taylor's checkerspot butterfly and streaked horned lark are listed by the state of Washington as endangered (Washington Administrative Code [WAC] 232-12-014) and Mazama pocket gopher is listed by the state of Washington as threatened (WAC 232-12-011[1]).

Three of the project development sites (Deschutes Industrial Park, Tumwater Commerce, and Tilley Road) incorporate onsite habitat set-asides for Mazama pocket gophers. These onsite habitat set-asides were established by the Applicants in accordance with City of Tumwater and Thurston County requirements in place before the subspecies of Mazama pocket gopher were listed as threatened under the ESA. Prior to federal listing, WDFW guidance for the then state-listed species recommended establishment of onsite habitat set-asides as a minimization measure for projects that could impact the species. The Applicants will continue to manage these existing on-site habitat set-asides in accordance with City of Tumwater and Thurston County permitting requirements that pre-date the federal listing of the species and creation of this HCP. Details regarding the location and management of the WDFW onsite habitat set-asides are provided in Appendix E.

Development of the project development sites will require various permits and project approval from County and local jurisdictions including Thurston County and the Cities of Tenino or Tumwater. Permits likely to be required will include those for clearing, grading, storm water management, utilities, and construction. Compliance with relevant Critical Area Ordinances will also be required.

Purpose and Need

This HCP has been prepared to meet the requirements of the ESA. An HCP is needed because project components have the potential to result in take of listed species that inhabit or may transit the Permit area. Pursuant to Section 10(a)(1)(B) of the ESA, USFWS may authorize incidental take by a non-Federal entity though the issuance of an ITP. In support of an application for an ITP, the Applicants must prepare an HCP. This document establishes the methods and measures of success required to meet the conservation needs of listed species that could be impacted by the proposed projects. Importantly, it also provides a stable and predictable operating and regulatory environment and preserves the Applicants' ability to pursue their development objectives with assurances from the USFWS that incidental take of Covered Species is authorized. The purpose of the HCP is to:

- Quantify the potential impacts that the development and conservation program may have on the Covered Species;

- Address the potential take of the listed species by setting forth measures that are intended to ensure that any such take caused by the development and conservation program will be incidental;

- Ensure that the impacts of the take will, to the maximum extent practicable, be minimized and mitigated, including provisional procedures to deal with changed and unforeseen circumstances;

- Ensure that mitigation for impacts to listed species that cannot be avoided will result in a net benefit to the Covered Species;

- Ensure that adequate funding for implementation of the HCP will be provided; and

- Ensure that the take of the listed species will not appreciably reduce the likelihood of the survival and recovery of these species in the wild.

This HCP addresses activities including clearing, improvement, and development of land for industrial and commercial development in Thurston County, Washington in compliance with other applicable Federal, state, and local requirements.

Plan Area and Permit Area

The geographic boundaries of the HCP consist of a Plan Area that includes all relevant aspects of the proposal including the ranges of the listed species that may be affected, the location of conservation sites, and the Permit Area.

Plan Area

The Plan Area (see Figure 1 "The Plan area") encompasses the ranges of the Taylor's checkerspot butterfly (see Figure 2, "Taylor's checkerspot butterfly range"), the migratory south Puget Sound population of the streaked horned lark (see Figure 4 "Historical and current range of the streaked horned lark"), and two listed Mazama pocket gopher subspecies that may be affected by the Covered Activities (see Figures 6 and 7 "Mazama pocket gopher range in Washington State", and "Mazama pocket gopher subspecies distribution", respectively).

Permit Area

The Permit Area (see Appendix A. vicinity/index map) is a subset of the Plan Area consisting of the thirteen project development sites (totaling 203.83 acres) and the two conservation sites (totaling 87.5 acres) where Covered Activities and resulting incidental take will occur. The Applicants own and exercise direct control over all of the approximately 291 acres within the Permit Area. These properties are named in Table 1 below, mapped in Appendix A: Existing Conditions Map Set, and described in Appendix B: Site Descriptions.

This HCP describes the Applicants' proposal to contribute to the conservation of these species through a combination of measures including short-term measures intended to benefit the species where they exist on the project development sites until such time as those tracts are developed, and permanent measures including the conservation of two sites for the benefit of the Covered Species. The conservation sites will serve to compensate for unavoidable impacts to the Covered Species that occur within the Permit Area and are intended to contribute to the recovery of the Covered Species. The conservation sites, known as Deschutes Corridor and Leitner Prairie, are

more fully described in the Mitigation Measures section of the Conservation Program and in Appendices A, B, C, and D.

The project development sites and conservation sites are located on glacial outwash soils in the south Puget Sound region. These glacial soils include sandy loams and gravelly sandy loams. Soils on most of the sites have previously been disturbed and compacted by various construction-related activities, and invasive, non-native grasses and Scot's broom (*Cytisus scoparius*) are present on most of the sites. Native conifer and deciduous forest communities are present on three of the development sites.

Table 1. Kaufman Properties

Appendix A Map #	Site Name	Taylor's checkerspot range?*	Streaked horned lark range?	Olympia pocket gopher range?	Yelm pocket gopher range?	Total Site Size (in acres)
Project Development Sites						
1A	Kaufman Industrial Park	Y	Y	Y	N	11.79
1B	79th Ave Business Park	Y	Y	Y	N	5.19
2	Liberty Leasing/Trails End Industrial Park	Y	Y	Y	N	4.42
3	Deschutes Industrial Park	Y	Y	Y	N	19.29
4	Tumwater Commerce Place	Y	Y	Y	N	36.47
5A	Tilley Road Industrial Park	Y	Y	Y	N	27.87
5B	88th Avenue Subdivision	Y	Y	Y	N	3.08
6	I-5 Commerce	Y	Y	Y	N	40.34
7	Lathrop Industrial Park	Y	Y	Y	N	7.68
8	Grand Mound Distribution Center	Y	Y	N	Y	18.89
9	Sargent Road	Y	Y	N	Y	10.74
10	Union Mills Road	Y	Y	Y	N	12.84
11	Wichman/McCellan Properties	Y	Y	N	Y	5.23
Conservation Sites						
12	Deschutes Corridor	Y	Y	Y	N	51.32
13	Leitner Prairie	Y	Y	N	Y	36.18

*All sites are within the historic range of Taylor's checkerspot. Figure 1 shows only the range of recent occurrences.

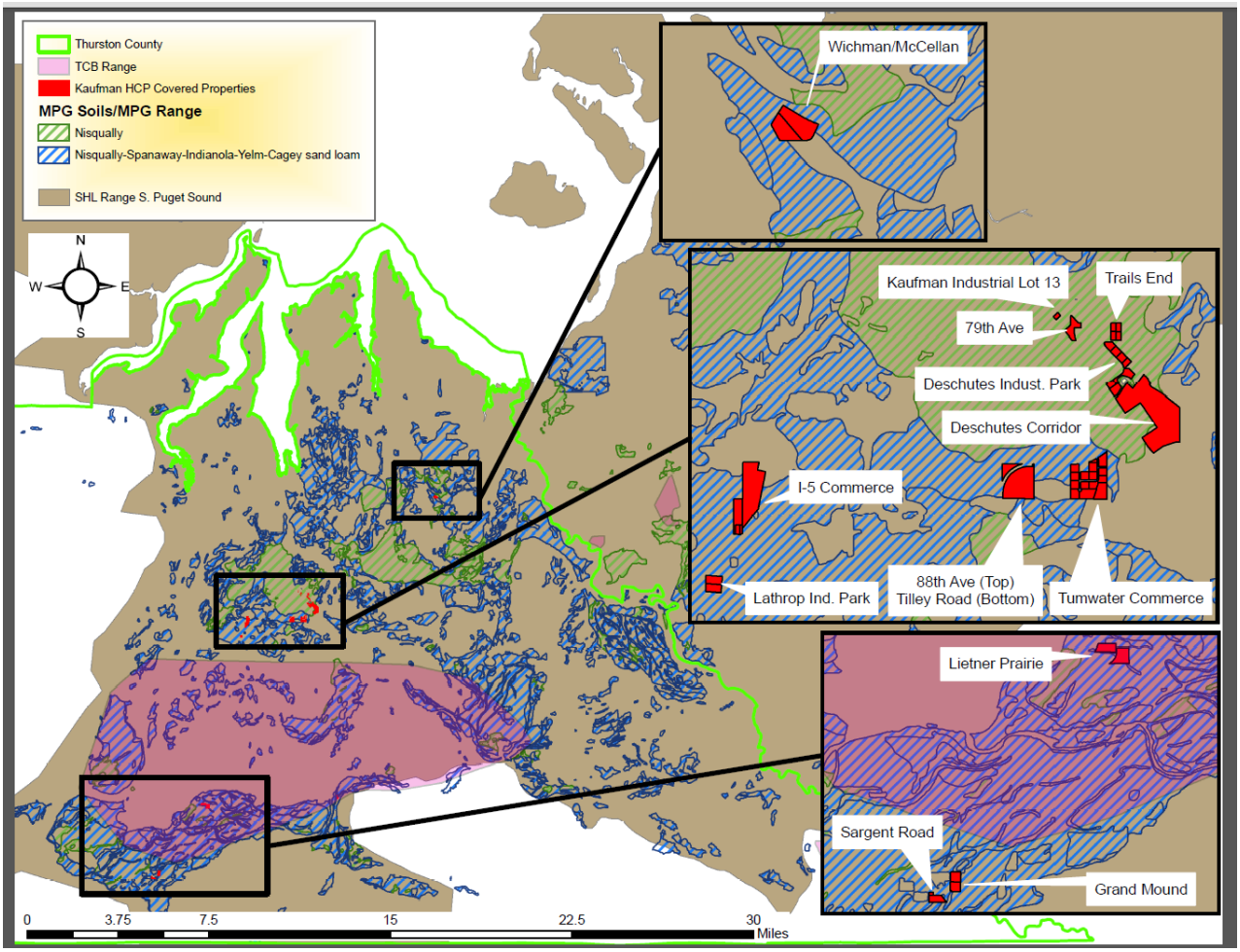


Figure 1. Plan Area
Map prepared by USFWS with data from WDFW

Common wildlife species on the project development and conservation sites include deer mouse (*Peromyscus maniculatus*), vole (*Microtus spp.*), mole (*Scapanus spp.*), mountain beaver (*Aplodontia rufa*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), coyote (*Canis latrans*), black-tailed deer (*Odocoileus hemionus columbianus*), red-tailed hawk (*Buteo jamaicensis*), American robin (*Turdus migratorius*), song sparrow (*Melospiza melodia*), black-capped chickadee (*Poecile atricapilla*), dark-eyed junco (*Junco hyemalis*), house finch (*Carpodacus mexicanus*), and Pacific treefrog (*Pseudacris regilla*). Some of the properties also provide habitat for Olympia (*pugetensis*) or Yelm (*yelmensis*) pocket gophers as shown in Table 1 and described in Appendix B. Taylor's checkerspot butterfly and streaked horned lark are not known to be present on the project development or conservation sites; however, the Applicants seek coverage for these species in the event that these sites become occupied at some future date during the term of the requested permit. Taylor's checkerspot butterfly, streaked horned lark, and the Olympia and Yelm subspecies of Mazama pocket gopher are more fully described in the Status of the Species section.

Some of the project development sites contain existing buildings or infrastructure such as roads and utilities that were constructed prior to the listing of the Covered Species under the ESA. All project development sites are located within cities or designated Urban Growth Areas (UGAs) and are zoned for industrial or commercial uses. The Deschutes Corridor conservation site is zoned for a mix of industrial, residential, and open space. The Leitner Prairie conservation site is zoned for rural residential resource (one residential unit per 5 acres).

Proposed Action

The Applicants propose to develop the project development sites in accordance with applicable state and local laws, regulations, and ordinances. The properties will not necessarily be developed upon permit issuance, but may be developed in accordance with this HCP at any time during the duration of the requested permit.

The Applicants have determined that site preparation, construction, and development activities cannot completely avoid impacts to listed species or their habitats on these parcels.

Covered Activities

Covered activities include actions related to site management (before development), development, construction, and ongoing management (post-construction). Covered activities also include vegetation management on the project development sites (including management of the pre-existing onsite habitat set-asides) and the conservation sites.

Vegetation will be managed to maintain or improve habitat conditions for listed species on each of the project management sites until site development work is actually initiated. Management will include control of non-native invasive plants, in particular Scot's broom. No trees will be removed before site construction in accordance with local ordinances intended to protect existing trees.

The steps required for development will vary by project development site. Initial survey work has been completed for some locations. Not all of the following steps may be necessary depending upon the level and type of commercial or industrial development proposed at each site. The steps required for developing and maintaining a site for commercial or industrial use follow this general sequence of events:

1) Initial site studies are conducted for planning and permitting purposes. Initial land surveys can include soil testing and ground water monitoring, requiring excavation of test pits up to 20 feet deep. Vegetation clearing may occur for survey access. A backhoe is normally used for excavating test pits. Ground water monitoring wells may also be installed for site engineering purposes. Pits are filled again following data collection.

2) Temporary construction fencing and storm water management controls, such as sediment fencing and infiltration basins, if required, are installed. Creation of temporary erosion control features such as infiltration basins may require excavation and grading.

3) Vegetation is cleared on portions of the site to be developed, usually on the entire site. Equipment that may be used for vegetation clearing includes brush cutters, rotary cutters, chain saws, chippers, and stump grinders.

4) Temporary staging areas are cleared and designated for construction management trailers, equipment storage, topsoil piling, and other construction-related requirements.

5) Topsoil is removed and stockpiled for site restoration. Trenches are excavated for installing underground utilities. Soils on the site are graded and leveled by cut and fill in accordance with approved project plans. Equipment used for these tasks includes graders, excavators, and dump trucks.

6) Gravel fill material is spread and compacted for roads. Roads are paved. Utilities are installed and the trenches covered with gravel fill and topsoil. Equipment used for these tasks includes graders, scrapers, rollers, dump trucks, concrete mixer trucks, and concrete pump trucks, and pavers.

7) Utility corridors are seeded or planted. Other undeveloped areas that have been cleared and graded are seeded for erosion control, if required.

8) Building sites are excavated; subsoil and gravel fill required for building foundations are compacted; concrete footings and base floor are poured; wood framing is constructed; electrical and water utilities are installed; walls, flooring, ceiling, and roofing are constructed; and building interior is completed.

9) Topsoil is replaced in landscape and storm water facilities, as specified on project plans. These areas are seeded and planted as required in the landscape plan in accordance with local regulations.

10) Ongoing management of sites will be required post-construction. Storm water facilities may require upgrades when standard storm water manuals are updated. Local laws, as amended, may require additional repair and maintenance. This work may require grading, excavation, soil amendments, seeding, or planting in storm water facilities. Site soils may also be disturbed when work is done on underground utilities or other infrastructure such as roads or sidewalks are improved. Landscaped areas will be maintained by mowing, pruning, and plant replacement as needed.

Vegetation management will be ongoing at the onsite habitat set-asides and at the conservation sites (Leitner Prairie and Deschutes Corridor) as needed to manage invasive plant species, remove shrubs and trees, and maintain suitable habitat for the listed species at these locations. Clearing of invasive species and woody vegetation is likely to be accomplished primarily with mechanical means such as brush cutters, rotary cutters, and riding mowers, or with the use of prescribed fire. USFWS will not cover the use of herbicides or pesticides as a covered activity in the HCP until such time as analysis to evaluate the effects of these products on listed species and critical habitat are complete. The Applicant acknowledges that any use of such means therefore remain subject to the take prohibitions in place under the ESA until such time as any needed analyses are finalized.

Requested Permit Duration

The Applicants request a renewable ITP with a duration of 20 years. The Applicants believe that the project development sites will be developed and that the HCP will achieve the described conservation goals within 20 years. If all of the project development sites have not been

developed before the permit expires, the Applicants may wish to renew the permit to continue ongoing actions or to provide for those sites that have not been developed.

In order to renew the ITP, the Applicants will notify USFWS in writing and submit a renewal request at least 30 days prior to permit expiration (50 CFR 13.22). The Applicants understand that USFWS will review the conservation program; the benefits accrued to the Covered Species and the status of those species upon receipt of the renewal request. The Applicants also understand that USFWS will consider the best science available at that time and complete any additional analyses needed to comply with applicable laws or regulations when processing a renewal request. Minor or technical changes or updates may be incorporated into a renewed permit. Substantive changes may require additional analysis, amendments, or the issuance of a new permit. Permit renewals, amendments, and other changes are described more fully later in this document.

Status of the Covered Species

Covered Species

The Applicants have determined that the following listed species or their habitats may be present on the project development sites or the conservation sites either now or at some time during the term of the requested permit: Taylor's checkerspot butterfly (*Euphydryas editha taylori*), the streaked horned lark (*Eremophila alpestris strigata*), and the Olympia (*Thomomys mazama pugetensis*) and Yelm subspecies (*Thomomys mazama yelmensis*) of Mazama pocket gophers. The Applicants therefore propose to cover each of these species for incidental take.

Taylor's Checkerspot nectaring on Balsamroot).
Photo by Aaron Barna

Taylor's Checkerspot Butterfly

Also called Whulge Checkerspot

Euphydryas editha taylori,
W.H. Edwards, 1888

Family: Brush-footed Butterflies (Nymphalidae)

Status Classification:

Federal (USFWS):	Endangered	2013
State (WDFW):	Endangered, SGCN (see below)	
NatureServe Global status:	G5T1 (Critically Imperiled)	
NatureServe State status:	S1 (Critically Imperiled)	

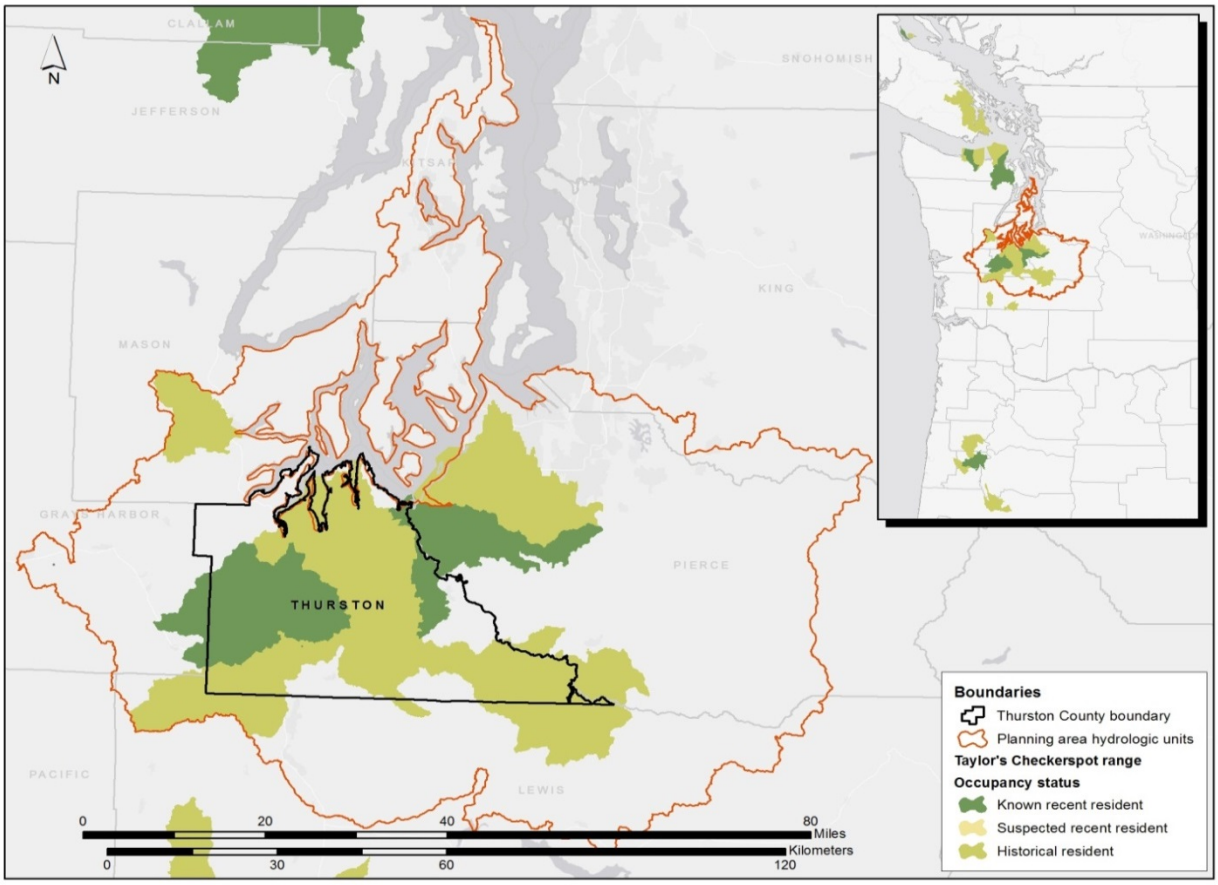
Conservation Status

Taylor's checkerspot butterfly was listed as endangered under the ESA on October 3, 2013 (78 FR 61451-61503). Since 1989, extensive surveys have been conducted to determine the status of documented populations and search for undiscovered sites across the butterfly's range (Fleckenstein and Potter 1999, Shepard 2000, Stinson 2005, Ross 2006, Holtrop 2010, COSEWIC 2011, Potter 2011, B. Bidwell, lepidopterist, unpubl. data, WDFW unpubl. data: K. McAllister, A. Potter, M. Walker, WDFW). Through these efforts, many populations located in the past were determined to be extinct; a few new populations were discovered of which some declined to extirpation and some persist. Some life history and habitat research has recently been accomplished across the butterfly's range (Hays et al. 2000, Severns and Warren 2008, Page et al. 2009, Severns and Grosboll 2011, Grosboll 2011).

Taylor's checkerspot is recognized as a butterfly of conservation concern throughout its range. In Washington, it is one of 19 butterfly Species of Greatest Conservation Need listed in *Washington's Comprehensive Wildlife Conservation Strategy* (WDFW 2005). WDFW completed an extensive status review for this butterfly, which includes detailed accounts on Taylor's checkerspot taxonomy, natural history, habitat, and threats (Stinson 2005). The U.S.

Forest Service and Bureau of Land Management list it as a sensitive species (USFS/BLM 2012). In British Columbia, Canada, it is classified as an endangered species under the Species at Risk Act (COSEWIC 2011).

Figure 2. Taylor's Checkerspot Butterfly Range



Taylor's checkerspot range in the south Puget Sound region of Washington and in total (inset). Range is shown using occurrences associated with hydrology units that intersect the planning area, thus depicting a broad generalization rather than a specific extent (Source: WDFW).

Population Trends and Distribution

Rangewide. Taylor's checkerspot is a Pacific Northwest endemic butterfly once found on over 80 sites in the Willamette Valley, Oregon, western Washington, and Vancouver Island, British Columbia, Canada (Figure 1) (Stinson 2005, Ross 2006, Holtrop 2010, COSEWIC 2011, A. Potter, WDFW, unpubl. data, P. Severns, lepidopterist, pers. comm.).

Taylor's checkerspot was originally described in 1988 by W. H. Edwards from material collected in the Victoria, British Columbia area by a noted amateur lepidopterist, the Reverend George Taylor. In British Columbia, Taylor's checkerspot used to occupy at least 24 prairie-oak and

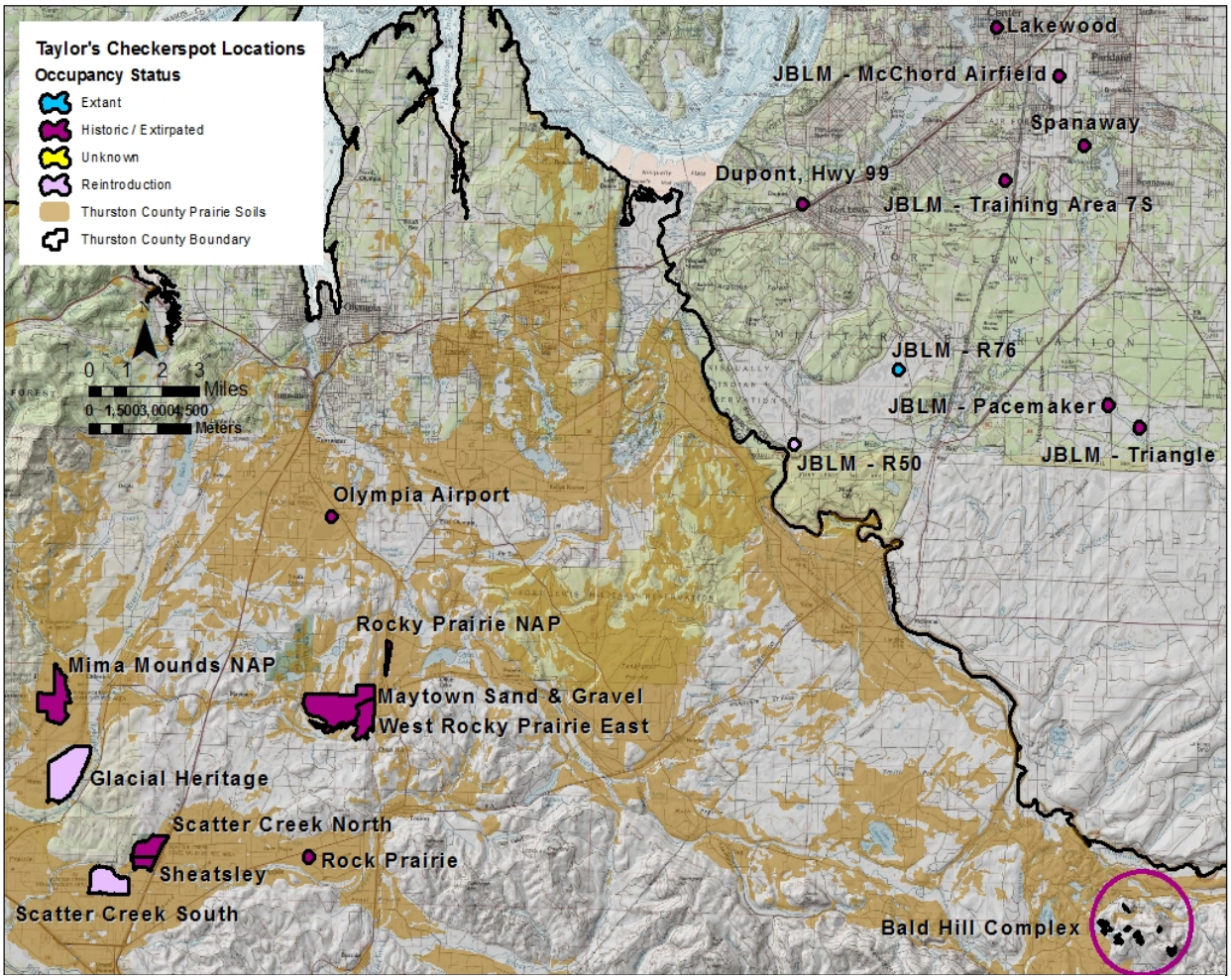
coastal meadow sites in southern Vancouver Island, but today persists on only one site (COSEWIC 2011).

In Oregon, the butterfly occurs in the Willamette Valley, where over 14 sites were documented in the past, but only two of these are currently extant (Hinchliff 1995, Stinson 2005, Ross 2006, H. Rice, lepidopterist, pers. comm., P. Severns, lepidopterist, pers. comm.). This indicates that in the past Taylor's checkerspot was likely more widespread throughout its range.

Washington. In Washington, Taylor's checkerspot was formerly documented from 24 sites; one each in San Juan and Island Counties, two in coastal Clallam County, and 20 on south Puget Sound prairies, oak woodlands, and other open habitats (Lewis, Mason, Pierce, and Thurston Counties) (Hinchliff 1996, B. Bidwell, lepidopterist, pers. comm.). By 2004, it was documented extirpated (or likely extirpated) from all former locales in Island, Lewis, Mason, Pierce, San Juan, and Thurston Counties (Stinson 2005). However, intensive survey efforts initiated in the 1990's located additional populations of the butterfly on five south Puget Sound prairies (Char and Boersma 1995, Chramiec 2004; unpubl. data: B. Bidwell, J. Fleckenstein, DNR, and A. Potter, WDFW), forest balds in southeast Thurston County (unpubl. data: M. McCallum, DNR, K. McAllister, WDFW, A. Potter, WDFW, and M. Walker, WDFW), and a few forest balds and coastal sites in Clallam County (Holtrop 2010, A. Frost, entomologist, pers. comm., unpubl. data: A. McMillan, WDFW, A. Potter, WDFW, and T. Stuart, WDFW).

Thurston County Area. Of the 24 documented Taylor's checkerspot sites in Washington, the species is known from just two locations in Thurston County (Figure 2). Two additional populations are located on Joint Base Lewis- McChord (JBLM) lands in adjacent western Pierce County. Three of these four populations are the result of recent reintroduction efforts (Stinson 2005, Linders 2006, Linders 2012).

Taylor's checkerspot distribution and site occupancy status is based on observation data collected during general prairie butterfly surveys (Char and Boersma 1995, Hinchliff 1996, Fleckenstein and Potter 1999, Wolford et al. 2007, Fimbel 2008, unpubl. data: B. Bidwell, lepidopterist, K. McAllister, WDFW, A. Potter, WDFW), incidental observations (A. Potter, WDFW, unpubl. data, pers. comm.: B. Bidwell, lepidopterist, E. Delvin, UW, C. Fimbel, CNLM, D. Grosboll, TNC, K. McAllister, WDFW, W. Yake, lepidopterist), and focal research on this butterfly (Hays et al. 2000, Grosboll 2011, Potter 2011, Linders 2012). As part of the WDFW Taylor's checkerspot status review, the agency led a comprehensive effort in the south Puget Sound region to revisit historic locales and identify and survey potential habitat for the butterfly (A. Potter, WDFW, pers. comm.).



Distribution of Taylor's checkerspot in south Puget Sound, Washington: extant, past, unknown status, and reintroduction sites. Polygons depict site boundaries; points depict generalized locations (Source: WDFW).

Figure 3. Taylor's Checkerspot Butterfly Distribution

Taylor's checkerspot populations are closely monitored at the four extant south Sound sites (Olson and Linders 2010, Linders 2012). Three of these populations were recently established (or in one case perhaps augmented) by translocations of captive-reared butterflies (Linders 2006, Linders 2012). The three reintroduced populations occur on Scatter Creek Wildlife Area – South, Glacial Heritage County Park, and JBLM Artillery Impact Area – Range 51. During monitoring of the reintroduced populations, small numbers of butterflies have been observed at the first two sites, while large numbers of adults, 100s and perhaps 1,000s of individuals have been observed recently at the JBLM reintroduction site (Linders 2012). The sole extant south Sound population that is not the result of recent translocation is located on JBLM Artillery Impact Area – Range 76, and is also the single source population for the south Sound Taylor's checkerspot captive-rearing effort. Close monitoring of this population has consistently detected 1000s of butterflies during recent years (Olson and Linders 2010, Linders 2012).

Life History and Ecology

Description. Taylor's checkerspot is a brightly colored, medium-sized butterfly with a striking checkered pattern of orange to brick red, black, and cream. It resembles no other butterfly found on south Puget Sound prairies. Females are larger than males, though both have the same checker-patterned wings.

Life cycle and behavior. Taylor's checkerspot is univoltine; it completes one life cycle annually. They are sedentary insects, inhabiting their sites year-round as an egg, larva, pupa, and adult. In the south Sound, adults (butterflies) typically begin to emerge from their chrysalids (pupae) in late-April, though this and all other life stage dates for this butterfly can vary due to weather conditions (Linders 2006, A. Potter, WDFW, pers. comm.). Although individual butterflies may live only a few days, the entire adult flight period in the south Sound often lasts through late-May (Linders 2006, Olson and Linders 2010, Linders 2012, unpubl. data: D. Grosboll, TESC, K. McAllister, WDFW, A. Potter, WDFW). Butterflies in this region have been observed as early as late-March (A. Potter, WDFW, unpubl. data) and as late as early-June (Hinchliff 1996, Linders 2012, K. McAllister, WDFW, unpubl. data).

Males use two strategies for finding mates: perching and patrolling (Bennett et al. 2011). In perching, males select specific sites to perch and then dart out at passing butterflies to determine if it is a female of its species. In patrolling, males search for females by almost constant flying, often along a regular route or territory. Females lay eggs in clusters, low on their host plants, which in the south Sound are the non-native narrowleaf plantain (*Plantago lanceolata*) and native Harsh paintbrush (*Castilleja hispida*) (Char and Boersma 1995, Hays et al. 2000, Severns and Grosboll 2011, Grosboll 2011, unpubl. data: D. Grosboll, TESC, M. Linders, WDFW, A. Potter, WDFW).

Male and female butterflies feed by using their long proboscis to explore flowers and sip floral nectar. Annual variation in plant phenology and condition affects availability of nectar resources thereby causing variation in plant species use among years. An early pollination study on south Puget Sound prairies (Jackson 1982) found Taylor's checkerspots nectaring solely on common camas (*Camassia quamash*). Hays et al. (2000) observed (but did not quantitatively study) Taylor's checkerspot nectar habits on a south Sound prairie and found them primarily using common camas and nine-leaved lomatium (*Lomatium triternatum*). Other nectar sources regularly used by Taylor's checkerspot in the south Sound region include: deltoid balsamroot

(*Balsamorhiza deltoidea*), spring gold (*Lomatium utriculatum*), wholeleaf saxifrage (*Saxifraga integrifolia*), and seablush (*Plectritis congesta*) (Linders 2012, A. Potter, WDFW, unpubl. data).

Adult movement studies of the closely related *E. editha bayensis* and *Melitaea cinxia* have found these butterflies to be consistently sedentary, though a few individuals move some distance, most remain within a few hundred meters (USFWS 1998, Nieminen et al. 2004). No research specific to Taylor's checkerspot has been conducted to determine their movement patterns or distance.

Several scientists have observed Taylor's checkerspot egg masses and larvae extensively in the south Sound, but their phenology in the wild has not been studied completely (Severns and Grosboll 2011; unpubl. data: D. Grosboll, TESC, M. Linders, WDFW, A. Potter, WDFW). Careful and detailed phenological data for Taylor's checkerspot larvae has been collected by the Oregon Zoo as part of a captive-rearing program (Barclay et al. 2010). James & Nunnallee (2011: pp. 286-287) provide detailed descriptions and photographs of the species life stages. Butterfly eggs hatch in 8-9 days (James and Nunnallee 2011); eggs within a cluster typically hatching in synchrony (Barclay et al. 2010). The resulting caterpillars (larvae) create webbing and feed communally through the spring on the host plant species on which eggs were deposited, continuing to grow and shed their skins to expand, during instar stages. Larvae enter a dormant phase (diapause) in late-June or early-July (M. Linders, WDFW, unpubl. data, A. Potter, WDFW, unpubl. data) when host plants are senescing and no longer provide palatable vegetation. Larvae often diapause in a sheltered location under rocks, logs, or litter (Guppy and Shepard 2001). Diapausing larvae develop a thick exoskeleton that helps prevent dehydration (Scott 1986). The diapause phase lasts for many months, until early the following spring (January or February in the south Sound). Upon breaking diapause, Taylor's checkerspot larvae reinitiate feeding on a broader array of plant species. Plant species that held egg masses remain a major component of their diet, but additional post-diapause food sources, sea blush, blue-eyed mary (*Collinsia parviflora*), and dwarf owl-clover (*Triphysaria pusilla*), also are used. Larvae pupate in March or April (M. Linders, WDFW, unpubl, data).

Habitat Characteristics

Taylor's checkerspot inhabits grasslands in low-elevation prairies and meadows; coastal meadows and stabilized dunes; and montane meadows and balds. Balds are shallow-soiled, grass, herbaceous vegetation, or lichen and moss dominated sites, typically less than 5 ha (12.5 ac), that occur within forested lands (Chappell 2006). A few studies of Taylor's checkerspot habitat have been conducted outside of the south Puget Sound region, including in Oregon (Severns and Warren 2008), British Columbia (Page et al. 2009), and the north Olympic Peninsula (Severns and Grosboll 2011, Grosboll 2011). Egg-laying (oviposition) habitat is often studied with this and other butterflies because it is a limiting factor, determines the site of pre-diapause larvae, and influences the location of diapause, post-diapause, and pupation. Severns and Warren (2008) found that Taylor's checkerspot butterflies select habitat for egg laying that occurred within high cover of short-stature native bunchgrasses and adult nectar resources, indicating that females select egg-laying sites based on habitat condition. Page et al. (2009) found the most common activity of post-diapause larvae was basking and perching, demonstrating the importance of thermal habitats in this life stage. The British Columbia study population had multiple host plant species available and females' selection of egg-laying sites in this environment was influenced by host plant phenology and condition (Page et al. 2009). A characteristic of egg-laying habitat consistently identified in the British Columbia and three

Olympic Peninsula populations was the abundance of host plants (number or percent cover) (Page et al. 2009, Severns and Grosboll 2011, Grosboll 2011).

Within the south Sound region, the butterfly has been found on prairies and balds. Habitat selection by egg-laying females has been studied in one population, the sole extant south Sound site (JBLM Artillery Impact Area – Range 76) by Linders et al. (2009), Severns and Grosboll (2011), and Grosboll (2011). All researchers found that females selected habitat with high host plant density for oviposition. Grosboll (2011) determined that the butterfly selected for host plant patches with >10,000 cm^3 volume. Severns and Grosboll (2011) found that the butterfly laid eggs more frequently along two-track road edges than the open prairie, and explained this may be due to the strong association between the host plant at this site (narrowleaf plantain) and these road edges.

Although there has been no quantitative study of Taylor's checkerspot nectar plant use or preference, several plants have been identified as key nectar sources in south Sound populations (common camas, deltoid balsamroot, sea blush, wholeleaf saxifrage, nine-leaved lomatium, and spring gold) (Jackson 1982, Hays et al. 2000, Linders 2012, M. Linders, WDFW, unpubl. data, A. Potter, WDFW, unpubl. data). Because annual variation in plant phenology and condition determines the availability of nectar resources and causes variation in availability (and therefore use) among years, variety of nectar sources is an important habitat component.

Threats/Reasons for Decline

Prairie-oak butterfly species in the Willamette Valley-Puget Trough-Georgia Basin (WPG) ecosystem have declined dramatically due to widespread habitat degradation and loss of prairie-oak ecosystems in the region (Schultz et al. 2011). Also see the *Factors Affecting Continued Existence* section in the Washington State Status Report for Taylor's checkerspot for more complete and detailed information on threats (Stinson 2005, pp. 99-105).

Habitat loss and fragmentation. Habitat loss is the consistent, primary factor driving species extinctions and declines world-wide (Groom et al. 2006), and the most common threat to butterfly populations (New et al. 1995). Prairies and oak woodlands in south Puget Sound have been converted to development, agriculture, gravel mines, and lost to forest succession resulting from the elimination of fire and other beneficial sources of disturbance. In 1997, Crawford and Hall estimated that over 60,000 ha (>148,263 ac) of prairie existed historically in the south Sound region, and that only 3% of that remained dominated by native vegetation. Prairie loss has likely continued since 1997, but no updated estimates are available for this specific region. Chappell et al. (2001) refined the estimate of grassland habitat for the entire WPG ecosystem, and estimated the total amount of prairie, oak woodland, and grassland bluffs and balds prior to Euro-American settlement was over 72,000 ha (180,000 ac).

Butterflies and other prairie species are also affected by fragmentation of their habitat. Crawford and Hall (1997) found that historically in south Puget Sound there were 233 prairie sites, averaging 250 ha (618 ac) in size, including 18 large prairies (>405 ha), and contrasted that to 1997 conditions: 29 prairie sites, averaging 175 ha (432 ac) in size, with only two large prairies extant. Fragmentation of prairies directly threatens prairie butterflies by creating smaller and isolated populations, which increases the potential for population loss and inbreeding. Butterfly habitat fragmentation also occurs within prairies from habitat degradation that results in small, disjunct patches of suitable habitat.

Invasive species. Invasive plants have dramatically altered the ecological function of Pacific Northwest prairies (Dunwiddie and Bakker 2011). Woody shrubs, including Scot's broom, and non-native grasses, especially tall oatgrass (*Arrhenatherum elatius*), bentgrasses (*Agrostis*), and sweet vernal grass (*Anthoxanthum odoratum*) have invaded most extant south Puget Sound prairies. Uncontrolled, these plants dominate native prairie vegetation, including Taylor's checkerspot larval and nectar plants, and change vegetation structure and soil conditions. Tall grasses (slender false brome (*Brachypodium sylvaticum*) and tall fescue (*Festuca arundinacea*)) deterred Taylor's checkerspot egg-laying and reduced cover of larval and nectar plants in the Willamette Valley, Oregon (Severns and Warren 2008).

Effects from long-term lack of beneficial disturbance. The prairies and oak woodlands of the south Puget Sound region are the result of glacial history, climate conditions (especially the warm, dry climatic period between 9,000 and 4,000 B.P.: Holocene Climate Optimum or Hypsithermal), topography, and human interaction (Ewing 1997, Crawford and Hall 1997). Native Americans regularly set fire to prairies in the Pacific Northwest to support food production and manage hunting sites (Norton 1979, Boyd 1986, Agee 1993) and this process supported open prairie and savannah. Soil disturbance also regularly occurred from Native American harvest of bulbs and rhizome plant material (Turner 1999) and the activity of burrowing mammals, especially the Mazama pocket gopher (Huntly and Inouye 1988).

Cultural practices changed when Euro-Americans began to settle the Pacific Northwest and the prairies; soil and vegetation disturbance from fire setting and prairie plant harvesting ceased. Encroachment by trees and shrubs, first native species and then non-native, combined with the introductions of invasive grasses and herbaceous species, resulted in the loss of prairie to forest, and dramatic alterations to the extant grasslands. However, restoring disturbance regimes to prairies is difficult, and in the case of fire, does not replicate effects of historic burning. Balancing the requisite prairie disturbance with fire or mowing logistics, endangered species management, and weed invasion must be done with a very deliberate and careful approach (Schultz and Crone 1998, Schultz et al. 2011).

Prairie management. Fire, herbicide use, mowing, and other prairie management techniques are important tools for re-creating or simulating disturbance mechanisms that historically maintained prairies, reducing invasive species, and restoring endangered species habitat connectivity (Dunwiddie and Bakker 2011, Schultz et al. 2011). These prairie management practices implemented to restore or enhance prairie vegetation and wildlife habitat, also can directly or indirectly harm butterflies (Schultz et al. 2011). Effects of these practices on butterflies, including Taylor's checkerspot, are not completely understood. Prairie management in areas occupied by butterfly species of concern is necessary and must be undertaken with special methods and considerations to reduce or eliminate harm to these species.

Military training: The sole source population for Taylor's checkerspot captive rearing and translocation, along with the only other south Sound Taylor's checkerspot site that currently supports a robust population are located within the Artillery Impact Area (AIA) of JBLM. There are a variety of vegetation conditions within the AIA, most of which have been significantly affected by frequent fires that result from repeated ordnance explosion. The closed nature of the AIA, coupled with a low-intensity, high fire frequency, has in some areas supported significant patches of Taylor's checkerspot habitat. However, frequency and type of use in the AIA (and JBLM) has changed. In recent years, development within the AIA has increased the footprint and

intensity of roads and structures within areas occupied by Taylor's checkerspot (M. Linders, WDFW, pers comm., T. Thomas, USFWS, pers. comm.). Fire timing, frequency, and intensity also may have changed (R. Gilbert, JBLM, pers. comm.). Buildings and other structures, along with their intense use affect Taylor's checkerspot butterflies directly and reduce the amount of habitat. Vehicle traffic likely crushes eggs, larvae, pupae, and adults (Stinson 2005). Increased fire frequency and earlier fire dates also are likely threats to Taylor's checkerspot butterflies and their habitat.

Narrowleaf plantain pathogen: A recently identified potentially significant threat to Taylor's checkerspot is the widespread presence of a pathogen specific to the primary larval host narrowleaf plantain (Stone et al. 2011). This fungal pathogen (*Pyrenopeziza plantaginis*), like the plant it specifically attacks, is native to Europe, and was first documented in the Pacific Northwest (and North America) in 2011; the length of time it has been present in these regions is unknown (Stone et al. 2011). The fungus has infected plantain at Taylor's checkerspot sites in Oregon (Stone et al. 2011) and Washington (P. Severns, lepidopterist, pers. comm.). Peak necrosis of plantain leaves resulting from infection occurs in late-winter and can overlap with the Taylor's checkerspot post-diapause larval period (Stone et al. 2011), a time when the plant is needed in abundance to feed larvae.

Knowledge gaps. Taylor's checkerspot appears to be highly selective in its habitat requirements; however, habitat needs have not been fully studied. Knowledge of habitat needs for adults, larvae, and diapause are essential elements to conserving and managing for Taylor's checkerspot (Schultz et al. 2011). Severns and Grosboll (2011) and Grosboll (2011) studied egg-laying habitat selection, and both identified understanding larval survival in different environments and on different host plants as an important research topic. Methods to reliably develop and manage for Taylor's checkerspot habitat are needed. Grosboll (2011) identified the need to develop methods for enhancing host plant resources. Harsh paintbrush and narrowleaf plantain have been identified as Taylor's checkerspot host plants. On most recently known sites, only one of these species occurs; additional study is needed to determine the effects of multiple host species availability to short and long-term survival of checkerspot populations.

Streaked Horned Lark

Eremophila alpestris strigata Henshaw, 1884

Status Classification

Federal (USFWS):	Threatened 2014
State (WDFW):	Endangered 2006
NatureServe Global rank:	G5T2 (Imperiled)
NatureServe State rank:	S1B (Critically Imperiled)

Conservation Status

The streaked horned lark was listed as threatened under the ESA on October 3, 2013 (78 FR 61451-61503).

Streaked Horned Lark
(*photo by Rod Gilbert*)

Population Trends and Distribution

The streaked horned lark is a rare endemic subspecies found only in western Washington and Oregon (Figure 3). It is perhaps the most distinct subspecies of the horned lark, a small common ground-dwelling passerine that prefers open grassland habitat (Beason 1995, Rogers 2000, Stinson 2005). Rogers (1999) and MacLaren and Cummins (2000) conducted surveys to determine the status of streaked horned larks in Washington, and visited locations on south Puget Sound prairie remnants, the San Juan Islands, northern Puget Sound sites (e.g., Skagit, Stillaguamish, Lummi Flats, Dungeness Spit), sites on the outer coast in Grays Harbor and Pacific counties, and along the lower Columbia River. No larks were detected at northern Puget Sound locations or in the San Juan Islands, and no new inland nesting sites were found besides those already known at JBLM, Olympia Airport, and Shelton Airport. Nesting was recently discovered at the Tacoma Narrows Airport in the summer of 2014 (Tirhi pers. comm. 2014).

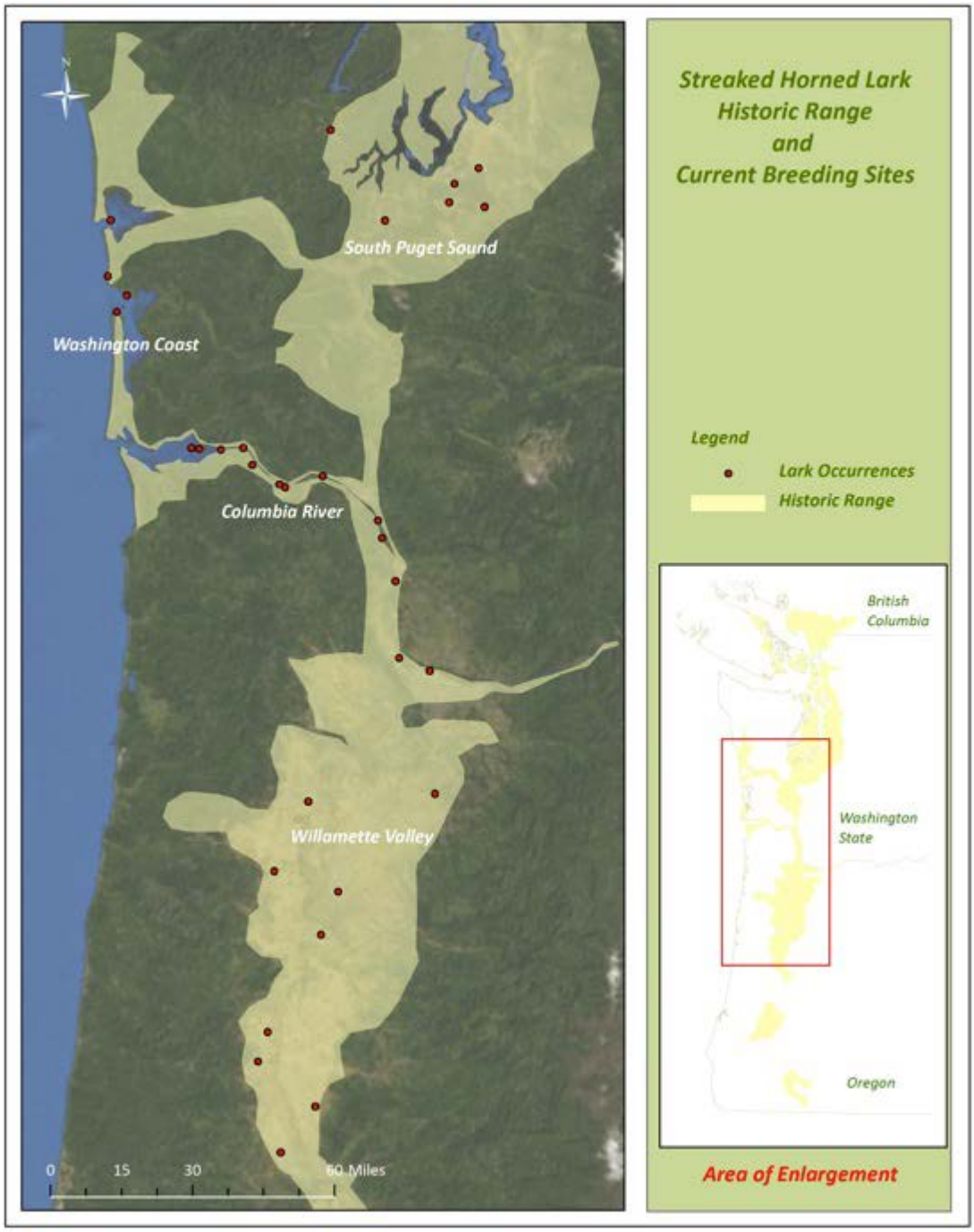


Figure 4. Historical and Current Range of Streaked Horned Lark
(Anderson in litt. 2015)

In the past, streaked horned larks bred from southern British Columbia, through the Puget Trough in Washington and in the Willamette and Rogue River Valleys in Oregon (Rogers 2000, Stinson 2005). The breeding range of the lark contracted over time with extirpation from former breeding sites in northern Puget trough, southern British Columbia, the Washington Coast north

of Grays Harbor, and the Rogue River Valley of Oregon (Rogers 2000, Beauchesne and Cooper 2003, Stinson 2005). The streaked horned lark is currently known to breed at about fourteen locations in Washington: six inland sites (Figure 4), three coastal sites, and four Columbia River sites (additional Columbia River sites exist in Oregon).

Population estimates indicate that there are probably fewer than 1,700 streaked horned larks remaining in existence, and only in Washington and Oregon (current range and known nesting sites shown in Figure 5). Population estimates based on winter surveys produced estimates of about 500-600 individuals in 2004-2005 (Pearson et al. 2005a). Pearson and Altman (2005) estimated about 330 birds breeding in Washington and 440 in Oregon; they cautioned that these estimates combined data from separate efforts over a time period of 8 years. Altman (2011) recently estimated a total population of 1,170-1,610. Camfield et al. (2010) reported that demographic data suggested an ongoing steep decline in the Washington population. McChord Field, which formerly had the highest number of nesting pairs, has seen a marked decline.

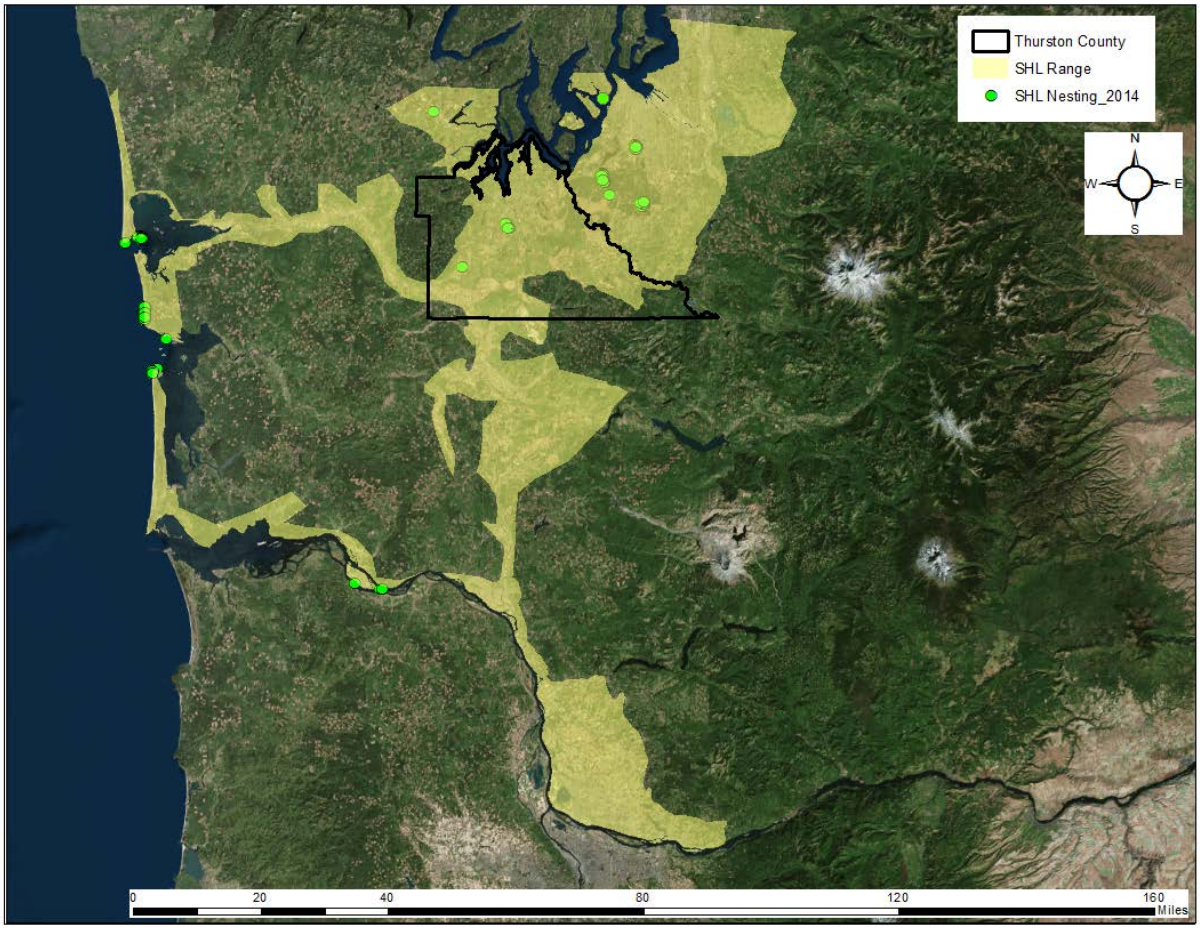


Figure 5. Streaked Horned Lark Distribution in Washington State

Table 2. Estimated Number of Streaked Horned Lark Pairs in South Puget Sound Nesting Areas
(not including individuals breeding in Range 50 and the Tacoma Narrows Airport).

Area	Number of Pairs			
	2010	**2011**	**2012/2013**	**2014**
Olympia Airport	**22 pairs**[1]	**21 pairs**[2]	**23 pairs (2012)**[2]	**22 pairs (2014)** [5]
Shelton Airport (Sanderson)	7-8 pairs[1]	5 pairs[2]	8 pairs (2012)[2]	7-8 pairs[6]
Gray Army Airfield	14 pairs[2]	12 pairs[2]	11-12 pairs (2013)[3]	10-13 pairs[4]
McChord Field Airfield	13 pairs[2]	9 pairs[2]	8-9 pairs (2013)[3]	8-9 pairs[4]
AIA (Range 74/76) and Range 50	6 pairs[2] (Range 74/76)	4 pairs[2] (Range 74/76)	2 pairs (2012)[2] (Range 74/76)	8 pairs[4] (Range 76) & 9 pairs (Range 50)
13th Division Prairie (TA 14)	2 pairs[2]	8 pairs[3]	8 pairs + 1 single male (2012)[3] 9 pairs + 1 single male (2013)[3]	10 pairs[4]
Tacoma Narrows	n/a	n/a	n/a	2 pair[7]

[1] High count of streaked horned larks (Linders 2011, p. 3), divided by 2 to estimate number of pairs.
[2] High count of streaked horned larks (WDFW 2013, p. 70) divided by 2 to estimate number of pairs.
[3] Estimated number of territories (Wolf, in litt. 2014).
[4] Estimated number of breeding pairs counted at JBLM (CNLM 2015, p. 21).
[5] Estimated number of breeding pairs based on high counts of individuals counted at Olympia Airport (Pearson pers. comm., 2015) (high count of 45 divided by 2, equals 22 breeding pairs).
[6] Estimated number of breeding pairs, based on email from Scott Pearson (May 11, 2015)
[7] Estimated number of breeding pairs, based on email from Michelle Tirhi; two females, two males, and one fledgling (non-flight) (May 5, 2014).

Camfield et al. (2011) monitored streaked horned lark nests on seven sites in Washington and banded 58 adults (26 females, 32 males) and 88 juveniles. They developed a demographic model to estimate population trends and to identify the parameter and life stage that would be the

most important targets for management. They reported that streaked horned larks in Washington were declining rapidly and that local breeding sites were not sustainable without immigration. In addition, although there are no data on range-wide population trends for streaked horned larks, territory mapping data from four sites in the Puget lowlands indicated that the number of territories had decreased 45% over three years from 77 territories in 2004, to 42 in 2007 (S. F. Pearson, WDFW, unpubl. data). They concluded that the highest priority for management was to increase adult survival, followed by improvement of juvenile survival and fecundity.

Life History and Ecology

Horned larks forage on the ground, usually in short and sparse vegetation. Diet has not been studied in *E. a. strigata*, but horned larks are largely granivorous, both in winter (80-100% seeds) and in the breeding season (up to 73% seeds), while nestlings are fed insects exclusively (Beason 1995). Adults will dig up worms and insect larvae, and pry moth larvae from weed clumps to obtain food for chicks. Insects eaten include grasshoppers, beetles, and Lepidoptera larvae, and they also are adept at chasing and catching small insects (Beason 1995).

Territorial and courtship behavior. Streaked horned lark males begin to sing and establish territories after they arrive in Washington in the latter half of February and early March (Rogers 2000, Pearson 2003). Males sing from the ground and in flight. Ground singing functions in territorial defense and is often done from a post, rock, or dirt mound (Beason 1995). Aerial singing is part of an elaborate courtship display. Song flights last 0.5-8 minutes and are performed most frequently before nest building, for a brief period after broods fledge, and when a nest is destroyed (Beason 1995).

Horned larks defend an "all purpose" territory (Beason 1995). Territory sizes likely vary with habitat quality and lark density. Streaked horned lark territories in Oregon averaged 0.77 ha (1.9 ac; range 0.6-1 ha; n = 3) using the "repeat flush" territory mapping technique described by Wiens (1969) and (Altman 1999). In other subspecies, territories ranged from 0.3 – 5.1 ha (0.7-12.6 ac) (Beason 1995). Territories are defended until the last brood leaves the nest. There are no data on seasonal home ranges of broods after territories are abandoned, or on home ranges of winter flocks (Beason 1995). Bowles (1898) reported that some locations had high densities of nests, while large expanses of apparent habitat were vacant, suggesting that streaked horned larks display aggregated nesting.

Nesting and brood rearing. Horned larks build a compact cup of dead grass, or other plant material that is usually placed in a depression scratched out to 5-7.5 cm (2-3 in) deep or a cavity from an upturned stone (Bowles 1900, Pickwell 1931, Campbell et al. 1997). Streaked horned larks have a long nesting season. Nest building in the south Puget Sound area was first observed mid-April to early May (Pearson and Hopey 2005). Clutch initiation dates vary with location; the first eggs are observed around the 1st of May (Pearson 2003, Pearson and Hopey 2004), though the early date for British Columbia is 5 April (Campbell et al. 1997). Bowles (1898) stated that one could confidently look for eggs at Washington locations between 1 May and the "last of July," and perhaps earlier and later. Except at high elevations or high latitudes, horned larks typically raise 2 or more broods per season (Beason 1995). South Puget Sound birds seem to exhibit 2 peaks in clutch initiation, with the first peak from late April/early May and lasting until late May/early June; a peak of second clutches or re-nests after failures follows in late June to late July (Pearson and Hopey 2005). Nesting activity ended 8 August, 9 August, and 30 July

in 2002, 2003, 2004, respectively (Pearson and Hopey 2004, 2005). The clutch size is most often 3; with a mean of 3.05 eggs (± 0.06 SE) for 135 clutches in Washington (Camfield et al. 2010). Clutch size may be affected by conditions, such as drought or a wet spring. Incubation lasts about 11 days, but occasionally up to 14 days during colder weather (Beason 1995).

The chicks attain 60% of the adult body weight in the first 8 days (Beason 1995). Kennedy (1913a in Jewett et al. 1953) noted horned lark chicks in eastern Washington leave the nest at 6-8 days; in British Columbia, chicks leave the nest at 7-9 days (Campbell et al. 1997). The chicks can flutter and hop at departure, fly a few meters in a few days, and can walk and fly well by day 27 (Beason 1995). The parents provide food for a week or more after fledging. Chicks start to become independent by 3 weeks of age and are mostly independent at 4 weeks (Beason 1995).

Reproductive success. Pearson and Hopey (2005) reported that 63 of 167 (37%) active nests found on south Puget Sound study areas in 2002 - 2004 fledged at least 1 young. Overall nest success at 4 Puget lowland study sites calculated using the Mayfield method was 28%, 21%, and 28% in 2002, 2003, and 2004 (Pearson and Hopey 2005). Predation was the most frequent (69%) cause of nest failure at sites in south Puget Sound and caused 46% of failures at 2 coastal and 1 river island sites in 2004 (Pearson and Hopey 2005). Abandonment was the source of failure for 22% (23 of 106) of south Puget Sound and 46% (6 of 13) of coastal and river island nests. Some abandonment was human-related (e.g., tents erected next to nests on Gray Army Airfield). Failures directly caused by humans include eight caused by mowing at south Puget Sound sites, and one that was crushed by a horse and rider on Midway Beach (Pearson and Hopey 2005). Recreational activities, including dog walking, beachcombing, vehicles, and horseback riding may increase predation and nest abandonment at coastal sites (Pearson and Hopey 2005).

In comparing the fecundity of the streaked horned lark to an alpine subspecies, the pallid horned lark (*E. a. articola*), Camfield et al. (2010) found the replacement nest and multiple brood intervals for the streaked horned lark to be almost 4 times longer than the pallid horned lark (22 vs. 6 days). This, combined with the streaked horned lark's smaller clutch size, lower hatchability of eggs, lower fledging success and high clutch depredation rates, resulted in higher annual fecundity for the pallid horned lark, despite the streaked horned lark's breeding season being over double the length of the pallid horned lark. Camfield et al. (2010) speculated that influences of anthropogenic habitat loss, habitat degradation, and increased nest predator populations on the vital rates of streaked horned lark, may explain the mismatch between the authors' predicted and observed life history strategy for streaked horned lark.

Habitat Characteristics

Breeding habitat. The streaked horned lark nests on sparsely vegetated open habitats dominated by short grasses and forbs (Altman 1999, Rogers 2000, Pearson and Hopey 2005) including airports, agricultural fields, sandy islands and coastal spits in Washington. Horned larks may select bare ground or short vegetation because adults normally walk rather than hop (Beason 1995). In agricultural areas in other parts of the country, horned larks often nest on bare ground, stubble fields, and pastures. Mowed fields adjacent to airport runways provide important nesting areas for streaked horned larks in Washington (Rogers 2000, Pearson and Hopey 2005). When selecting territories, males on south Puget Sound sites seemed to avoid areas dominated by shrubs, perennial bunchgrasses, sod-forming perennial grasses, and non-native perennial forbs

(Pearson 2003). They appear to select areas that are sparsely vegetated with short annual grasses and with a relatively high percent cover of rocks (≅ 9%) (Pearson and Hopey 2004, 2005).

Foraging sites. Streaked horned larks on JBLM prairies selected foraging sites with a large percentage of bare ground (>40% of 1 m radius plots; included occasional mosses) and low vegetation (<30 cm, 12 in) (Rogers 2000). Rogers (2000) noted that larks seemed to select foraging sites that were atypical of the existing prairie landscape, but suggested that in historical prairies, "such sites would not have been hard to find". Streaked horned larks in Oregon also used territories and nesting sites with a relatively high percentage of bare ground (Altman 1999). Given their selection for sparse, short vegetation and bare ground, streaked horned larks may have been restricted to the driest parts of the south Puget Sound prairies in the past. Larks may have selected areas where the vegetation was sparse because it burned frequently, where soils had a poorly developed A horizon or a high gravel/cobble content, or a combination of these factors (Pearson and Hopey 2004). In a 2004 experiment, burned plots on 13th Division Prairie received much higher use by post-breeding streaked horned larks than unburned plots (Pearson and Hopey 2005).

Migration and winter habitat. Horned larks generally use the same open habitats during migration and winter, but perhaps with more frequent use of ocean beaches, dunes, and airports than during the breeding season (Beason 1995). All habitats where streaked horned larks were detected in winter were large treeless/shrubless expanses with a high percentage of bare ground (Robinson and Moore 2004). Most birds were recorded on fallow ryegrass fields in the Willamette Valley and on dredged material along the lower Columbia River; smaller numbers were found on sandy Washington coastal sites (Robinson and Moore 2004, Pearson et al. 2005a).

Threats/Reasons for Decline

Habitat loss, degradation, and fragmentation. In the south Puget Sound area, over 90% of the original grassland has been converted to other uses or succeeded to forest (Crawford and Hall 1997, Chappell et al. 2001). Olympia and Shelton Airports are planning for development of significant portions of their grasslands, which may affect nesting lark populations. As is typical of many grassland birds, horned larks seem to need rather large open areas, and habitat fragmentation is an important factor in their decline (Peterjohn and Sauer 1999, R. Rogers, pers. comm.). The smallest open area known to be used for nesting by streaked horned larks in the south Puget Sound area is the 79 ha (195 acre) Tacoma Narrows Airport in Pierce County (Tirhi 2014). The water and beaches surrounding coastal and Columbia River sites creates much larger open areas free of tall vegetation and obstructions and as a result, larks will use smaller expanses of open habitat under those conditions.

Fire suppression allows succession by native and exotic flora. Douglas-fir (*Pseudotsuga menziesii*) has invaded substantial portions of past prairies (Foster and Shaff 2003). Invasion by shrubs, tall vegetation, and turf-forming grasses eliminates the short, open structure that larks seek for nesting and foraging. Nearly all remaining prairie sites are degraded to some extent by exotic forbs and grasses, creating conditions that are not compatible with lark use. Pearson et al. (2005b) reported that late summer prescribed burn plots on 13th Division Prairie were selected by post-breeding adult and hatch-year larks, and by breeding birds the following spring; late summer prescribed burns created habitat conditions that were attractive to larks. Scot's broom and other weedy plants are also invading some coastal (especially Damon Point) and Lower

Columbia sites. Introduced beach grasses (*Ammophila* spp.) reduce or eliminate un-vegetated or sparsely vegetated sand used for nesting by streaked horned larks at coastal sites.

Army Training on Joint Base Lewis-McChord. JBLM has generally been proactive in the conservation of prairie species, but larks are sometimes directly affected by Army training activities when they coincide with lark nesting (Pearson and Hopey 2004). Nest abandonment caused 20% of nest failures and some abandonment was likely caused by human disturbance during training activities. Military training activities may also affect horned lark nesting areas where disturbance of native vegetation leads to increases in exotic vegetation. Training activities on the Artillery Impact Area may result in a fire frequency that exceeds what is desirable for maintaining native prairie vegetation (Tveten and Fonda 1999); the potential effects on larks use is not known.

Control of Scot's broom, Douglas fir and weedy forbs on JBLM military bases is beneficial to larks by maintaining open prairie. The abundance and diversity of native forbs, mosses and lichens decline with disturbance. In heavily disturbed areas, mosses and lichens disappear and the soil surface is bare or covered with leaf litter (Clampitt 1993). Military training may benefit larks by maintaining lower vegetation density and higher bare ground than would exist without training activities or restoration of prairie. However, management that restores and maintains the sparse bunchgrass structure and abundant moss that existed in the past may be optimal for lark nesting areas.

Disturbance, mortality and development at airports and military airfields. Olympia Airport, Shelton Airport, Gray Army Airfield and McChord AFB contain most of the inland nesting population of streaked horned larks in Washington. Airports can be hazardous environments for nesting due to mowing, potential for collisions with aircraft, and special events hosted at military bases. Mowing of airports and military airfields likely benefits larks by keeping the vegetation short, but can cause mortalities to eggs, chicks, or adults during nesting unless it is timed to minimize impacts. Careful timing of mowing and adjustment of blade height can minimize horned lark mortalities.

Gray Army Airfield adjusted its mowing schedule to minimize impacts to larks in 2003 and 2004. However, recently the paved area was expanded and the number of aircraft was increased and it also includes helicopters. This affected a portion of the habitat that was used by larks in recent years, and the hot downdraft produced by these aircraft may make some portion of the habitat unusable for lark nesting.

McChord AFB has not adjusted mowing schedules to minimize impacts to larks during the nesting season. Streaked horned larks do not seem to be overly disturbed by the routine comings and goings of the large military cargo aircraft based there (S. Pearson, pers. comm.). However, McChord occasionally hosts large military training and civilian events that impact larks; Air Expo events and Military Airshows. The overall number of pairs detected on McChord Airfield has declined since 2004 (Anderson 2010a). Additionally, although the data have not been analyzed, anecdotal observations by surveyors indicate that there are fewer singing larks in recent than in previous survey years (Anderson 2010a).

Civilian airports. In recent years the Olympia Airport has hosted the highest number of nesting pairs of sites in Washington, and Shelton Airport has consistently hosted small numbers of birds. Olympia Airport has modified mowing schedules to minimize impacts to larks during nesting.

Collisions with aircraft. Horned larks are particularly susceptible to being struck by aircraft, probably due to their affinity for the open, short-grass habitat surrounding runways. Horned larks are the most commonly reported species involved in collisions with Air Force aircraft, and represent almost 13% of all reported strikes (BASH 2009). Very few horned larks were involved in bird strikes on civilian aircraft reported to the Federal Aviation Administration. The difference between military and civilian aircraft is probably artificial because Air Force personnel are required to report all bird strikes, while only 20% of bird strikes recorded at civilian airports are reported to the FAA (Cleary et al. 2004). Few are reported when little or no damage to the aircraft occurs. Dead larks have been found along the runways at McChord AFB and Gray Army Airfield (Pearson and Hopey 2005). It is not known if aircraft collisions are a significant a source of mortality for the streaked horned lark population in Washington, but four of 12 known nesting populations are at airports, and they include the sites with the highest nesting populations. Collisions may be more likely at airports with closely mowed vegetation concentrated next to runways, but less likely where mowed vegetation attracts larks to areas set back from active runways (S. Pearson, WDFW, pers. comm.). Assessments are needed to determine whether aircraft collisions are an important source of mortality of streaked horned larks. Camfield et al. (2011) found that the nesting populations at airports were declining along with the coastal and Columbia River populations. Improving nesting habitat away from active runways may reduce collisions and improve adult survival if enough suitable habitat exists away from the runway.

Population size and genetic health. Analysis of mitochondrial DNA indicates that streaked horned larks have probably suffered a loss of genetic diversity (Drovetski et al. 2005). Diminished genetic diversity increases likelihood of populations suffering from inbreeding depression, reduced resistance to disease, and reduced adaptability to environmental change (Frankham et al. 2002). Inbreeding depression, in turn, can lead to reduced reproductive success. Streaked horned lark genetic health, represented by adequate genetic heterogeneity, is an important issue in populations in Washington, particularly in the Puget Trough. Anderson (2010b) reported that streaked horned larks at 13th Division Prairie on JBLM had significantly lower hatchability when compared to a guild of ground nesting birds and to savannah sparrows (*Passerculus sandwichensis*) at the site, suggesting the cause was not related to predation or other environmental factors at the site. The low hatching rate of streaked horned lark eggs (44%), coupled with genetic data indicating a recent population bottleneck and low genetic diversity (Drovetski et al. 2005), suggested that inbreeding depression was playing a role in the decline of larks at 13th Division Prairie. A project was initiated in 2011 to address the issue of inbreeding and low hatching rate by moving eggs from Willamette Valley in Oregon to nests on 13th Divisions; the plan involved moving eggs from 5 lark nests in 2011, and again in 2012.

Mazama Pocket Gopher *Thomomys mazama* Merriam, 1897

Protection Classification:
Federal status: Threatened (4 Washington subspecies)
State status: Threatened
NatureServe Global rank: G4
NatureServe State rank: S2

T. m. yelmensis	T1T2	S1
T. m. couchi	T1	S1
T. m. glacialis	T1T2	S1
T. m. pugetensis	T1Q	S1
T. m. tumuli	T1Q	S1
T. m. melanops	T3	S2
T. m. louiei	TH	SH
T. m. tacomensis	TXQ	-[1]

[1] *T. m. tacomensis* is believed extinct and was not ranked.

Mazama pocket gopher
(Photo by Bill Leonard)

Conservation status
In 1991 the Washington Fish and Wildlife Commission determined the Roy (*T. m. glacialis*), Tenino (*T. m. tumuli*), Tacoma (*T. m. tacomensis*), Shelton, (*T. m. couchi),* and Cathlamet (*T. m. louiei*) subspecies of the Mazama pocket gopher to be candidates for listing as threatened or endangered under state law (per title 77 of the Revised Code of Washington and the Washington Administrative Codes 232-12-014, 232-12-011, and 232-12-297). In 2001 the USFWS published notification that the Mazama pocket gopher in Washington was a candidate for listing under the ESA (66 FR 54808-54832). The state of Washington listed the Mazama pocket gopher as threatened under state law in 2006, making unlawful taking of the species a misdemeanor (RCW 77.15.130).

On April 9, 2014, USFWS listed the Olympia (*T. m. pugetensis*), Roy, Tenino, and Yelm (*T. m. yelmensis*) subspecies of Mazama pocket gopher as threatened under the ESA (79FR 19760-19796). Though multiple subspecies of Mazama pocket gophers are known from Washington State, this status of the species description will focus primarily on the two listed subspecies (the Olympia and Yelm subspecies) that may be affected by this HCP.

Distribution and Population Trends
Mazama pocket gophers are found in northern California, western Oregon, and western Washington. In Washington, Mazama pocket gophers are found on remnant glacial outwash prairies of the southern Puget Sound region and on subalpine meadows of the Olympic Mountains. Six subspecies are currently known to exist in Washington: one in Clallam; one in Mason; three in Thurston, and one in Pierce counties (Figures 6 and 7). They were formerly found near Tacoma and in Wahkiakum County.

Gophers are seldom found in densely developed areas, or sites with very rocky soil (WDFW 2013). There are perhaps 3-4 large (i.e., 1,000s) Mazama pocket gopher populations in Thurston/Pierce counties. The largest populations appear to be found on the Olympia and Shelton Airports, Scatter Creek Wildlife Area, and JBLM (WDFW 2014). Many surviving *T. mazama* subpopulations are small (<50) and appear to be isolated from other subpopulations, although there are few data on dispersal to help delineate genetically connected populations. Small subpopulations are unlikely to persist for long without at least occasional demographic and genetic recharge by dispersing individuals from other nearby populations (Stinson 2013). Re-colonization becomes less likely as habitat is fragmented and populations isolated. Large populations or clusters of subpopulations close enough and with land condition that permits exchange of dispersers, may be important for the persistence of each subspecies and the species. Most of the Mazama pocket gophers in the southern Puget Sound region currently occur in about ten general areas in Pierce, Thurston, and Mason counties (WDFW 2014). These

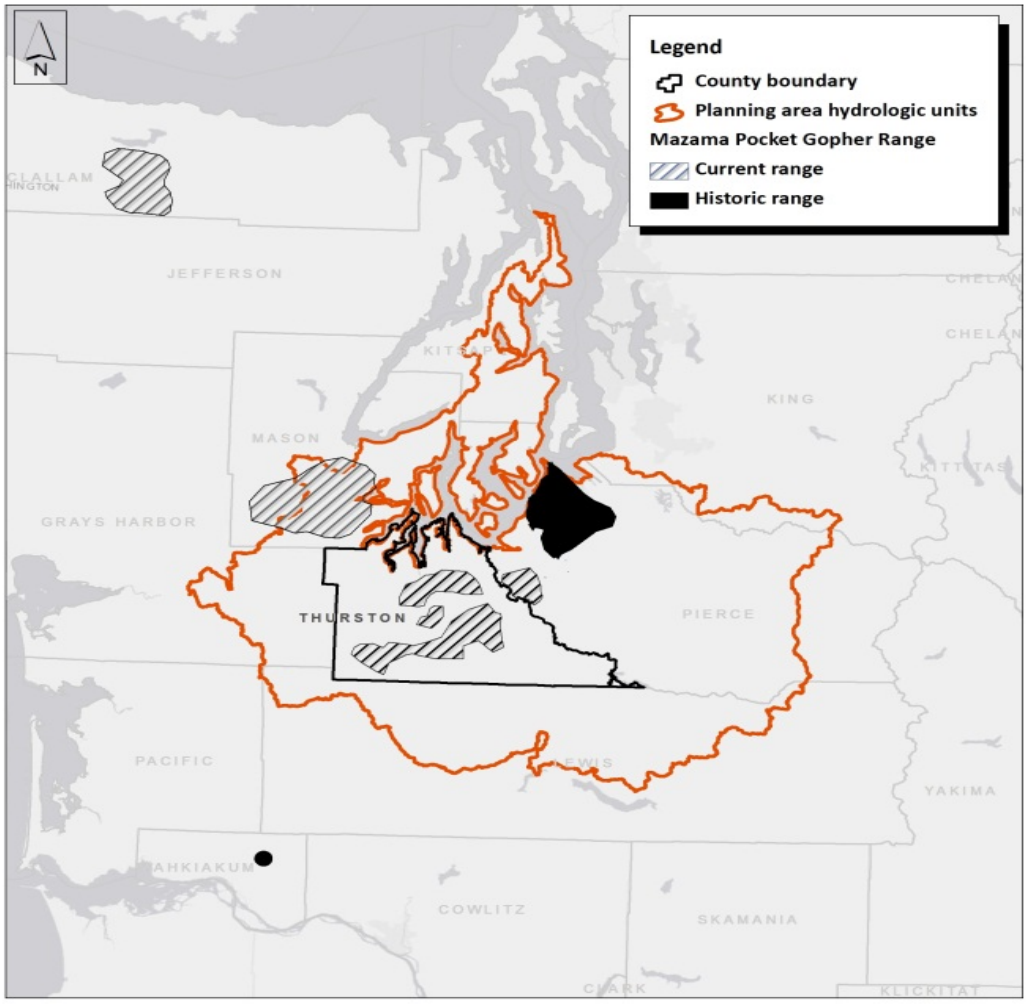
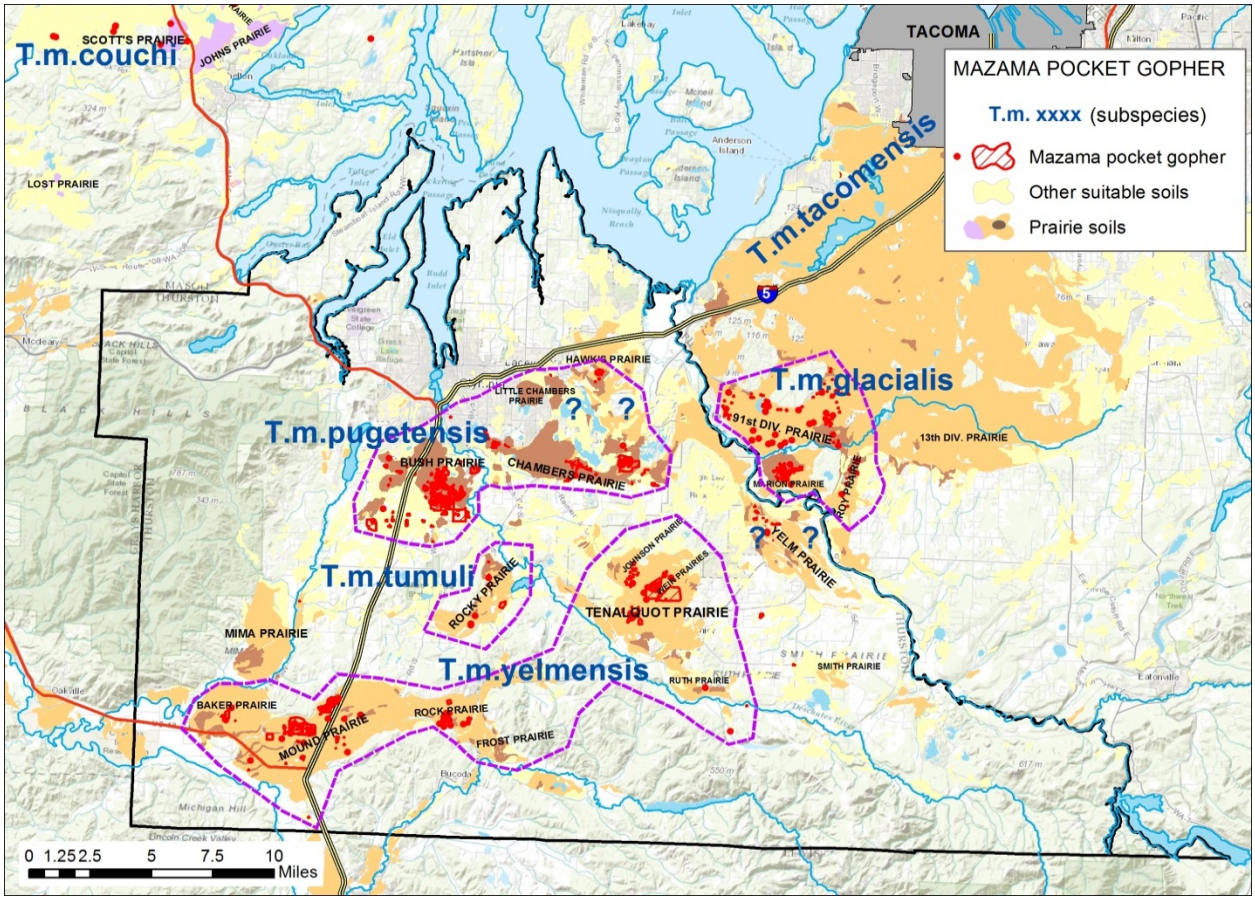


Figure 6. Current and historical range of the Mazama pocket gopher in Washington State



General distribution (within dashed lines) of Mazama pocket gopher subspecies in the south Puget Sound region, based on museum specimens, WDFW data, and Dalquest and Scheffer (1944).

Figure 7. Mazama Pocket Gopher Subspecies Distribution

concentrations of known gopher occurrences and prairie soil types are separated by distance or rivers and vary widely depending on soils present and land-use history. Abundance and distribution of the two subspecies (Figure 7) that may be impacted by this HCP is summarized below.

T. m. pugetensis. (Olympia subspecies) The largest known population of the Olympia subspecies of the Mazama pocket gopher is found in the loamy sand soils at the Olympia Airport and surroundings in Tumwater on Bush Prairie (Stinson 2013). Gopher mounds have been documented in surveys on over several hundred acres of maintained grassland at the airport (McAllister and Schmidt 2005). Gophers are also found in vacant lots, yards, and pastures in nearby locations on both sides of Interstate 5 (WDFW 2014). In 2005, McAllister and Schmidt (2005) derived a crude population estimate of 6,000 for the airport, but no trapping was done to determine how closely this approximated the number of actual gophers.

Chambers Prairie, extending from about Ward Lake to Lake St. Clair, is the largest area of Nisqually soil type (3,700 ac), and probably supported an extensive gopher population in the past (Stinson 2013). Most of the area has residential development of various densities. Chambers

Prairie has gophers scattered in vacant lots, roadsides, and rural and agricultural sites, but no large extensive populations like the airport are known (WDFW 2014). The northwestern half of the area is within the urban growth areas of Olympia and Lacey, and much is densely developed such that the likelihood of extensive local extirpation is elevated. The southeastern half of this area also has turf, Christmas tree, and berry farms, and other smaller farms and pastures (Stinson 2013).

Little Chambers Prairie and Hawks Prairie contain substantial areas of loamy sand soils, but most of the suitable habitat is heavily developed, with dense residential neighborhoods, roads, and businesses. Small pockets of habitat with gophers exist on some less developed or undeveloped lands, but these appear to be small and isolated, and may not persist in the long-term (Stinson 2013).

T. m. yelmensis. (Yelm subspecies) Mound Prairie, near Grand Mound, is bisected by Interstate 5. West of I-5, north and south units of Scatter Creek Wildlife Area (WLA) support significant gopher populations. After 2004, when Scot's broom (*Cytisus scoparius*) control became widespread and intensive, gophers spread throughout the northern 2/3rds of the north unit, where they hadn't been observed previously (Stinson 2013). Scatter Creek WLA contains about 600 acres of prairie, and is mostly Spanaway-Nisqually complex soils. The north unit has about 80 acres of Nisqually soil and the south unit has about 8 acres. Most of the land west of I-5 near Scatter Creek WLA is subdivided into 5 acre parcels, with some higher density, including the Grand Mound Urban Growth Area.

Rock Prairie, an area of >1,200 acres of private lands, is located southwest of Tenino. Two large ranches in the area reportedly support populations of the species (Steinberg 1996), and one ranch has a 500-acre Grassland Reserve Program easement with management guidelines that protect prairie vegetation and maintain conditions suitable for gophers (Stinson 2013).

The Tenalquot Prairie area includes Weir Prairie (Upper, Lower, and South Weir), and Johnson Prairie, which are in the Rainier Training Area of JBLM, and Tenalquot Prairie Preserve. Most of the area is Spanaway soil types. This area also includes private lands south of the Rainier Training Area. The Weir Prairie Research Natural Area consists of Upper Weir Prairie (547 acres) and Lower Weir Prairie (440 acres), and is protected from the most destructive forms of military training, such as off-road vehicle maneuvers and digging. A WDFW research team found a density of ~2 adult gophers/acre on Lower Weir Prairie during 2010 and 2011. Johnson Prairie is about 194 acres of native and semi-native grassland and is among the highest quality Puget prairies (Stinson 2013). It supports a substantial population of Mazama pocket gophers (Steinberg 1995, WDFW data), as well as a high diversity of plants, butterflies, Oregon vesper sparrows, and western toads (Remsburg 2000, Altman 2003). Past activities have primarily been foot maneuvers, parachuting, and limited vehicle use (Remsburg 2000). No tracked or wheeled vehicle use is allowed off established roads, because the site is designated a Secondary Research Natural Area. Civilian recreational impacts are an increasing concern on Johnson and Weir prairies because unauthorized off-road vehicle use has increased in recent years. These areas also are used frequently for hunting and horseback riding (Stinson 2013).

Tenalquot Prairie Preserve is a 125-acre preserve south of South Weir owned by The Nature Conservancy; WDFW has a conservation easement on the property. It is being restored to high quality prairie by Center for Natural Lands Management (Stinson 2013).

Life History and Ecology

Pocket gophers spend most of their time within their system of burrows. Gophers are believed to be generally solitary and exclude other gophers from their burrows except when breeding and when females have litters. Pocket gophers generally remain within their established territories, although they will shift their home range in response to seasonally wet soils (Stinson 2013).

Thomomys pocket gophers adjust their annual cycle of activity to the seasonal changes of weather, soil, and plant growth where they occur (Cox and Hunt 1992). Pocket gopher territory (i.e., burrow systems) sizes vary with habitat quality and reproductive status. Using radio-telemetry, Witmer et al. (1996) estimated that the late winter-early spring home range of *T. mazama* on a fallow field averaged 108 m^2 for 4 males (range 73–143 m^2), and 97 m^2 for 4 females (range 47–151 m^2; 0.01–0.03 acre). WDFW personnel captured an average of nine gophers per acre in a 22-acre plot at Olympia Airport, but some gophers were not captured and remained in the plots (G. Olson, unpubl. data).

Mazama pocket gophers attain sexual maturity by the breeding season after their birth, when ~ 9 months old and rear a single litter of ~5 (2-7) pups per year (Witmer et al. 1996, Verts and Carraway 2000). Gopher populations can increase dramatically in the summer after the dispersal of young of the year, and may increase to 3–4 times the spring adult population. In addition to this annual influx of young-of-the-year, gopher populations also fluctuate year-to-year due to environmental conditions. Pocket gopher populations are characterized by local extinction and recolonization (Baker et al. 2003). Territoriality and extreme weather may influence pocket gopher populations more than any other factors.

Pocket gophers have been called ‘keystone species’ and ‘ecosystem engineers’ because they affect the presence and abundance of plants and other animals (Vaughan 1961, 1974; Reichman and Seabloom 2002). Their extensive excavations affect soil structure and chemistry; food caches and latrines enrich the soil, affecting plant community composition and productivity. Mazama pocket gophers are an important prey species for many predators, including hawks, owls, coyotes, and weasels; their burrows provide retreats for salamanders, western toads, frogs, lizards, small mammals, and invertebrates (Stinson 2005).

Habitat Characteristics

Mazama pocket gophers live on open meadows, prairies and grassland habitats of the glacial outwash plain where there are porous, well-drained soils (Dalquest 1948). Mazama pocket gophers do not require high quality prairie, but can live in a wide range of grasslands, particularly if they include a significant component of forbs, such as clover, lupines, dandelions, false dandelions, and camas. In addition to remnant prairies, occupied sites in Washington include grassy fields at airports, pastures, fields, Christmas tree farms, and occasionally clearcuts (Stinson 2013).

Although most of the populations are found in grasslands on land that was prairie, they will move into sites with well-drained soil where forest cover has been removed, including recent clearcuts. Gophers are known to populate sites after timber harvest and become common for a few years while grasses and forbs are available, but decline as the area regenerates to forest. This has been observed most frequently in Mason County. They are otherwise essentially absent from forest habitats in Washington (Stinson 2013). Gophers also less frequently reported where grassland has been taken over by dense Scot’s broom (Steinberg 1996, Olson 2011b).

Perennial forbs are preferred for food over grasses, and fleshy roots and bulbs, such as camas (*Camassia* spp.) are important when green vegetation is not available. The availability of forbs may provide nutrients important for gopher growth and reproduction. However, there is little research on the relative value of native versus non-native prairie vegetation as forage sources for the gopher. Gophers also eat fungi and disseminate the spores of species that have an important role in facilitating plant growth.

Mazama pocket gopher association with soil types and characteristics. The distribution and abundance of pocket gophers are greatly affected by soils. Soil characteristics that affect gophers include depth and texture, particularly rock and clay content that affects burrowing ability, permeability that can result in periodic flooding of burrows, and water-holding capacity and fertility that affect growth of plant foods. In general, pocket gophers prefer deep, light-textured, porous, well-drained soils, and do not occur in peat or heavy clay soils (Chase et al. 1982, Baker et al. 2003).

Distribution of Mazama pocket gophers appears correlated with prairie soil types, but they are not found on all remnant prairie sites. They rarely occur where soil is very rocky (Steinberg 1996, Olson 2011b). There are local populations in non-prairie loam, sandy, and gravelly soil types (e.g., Indianola loamy sand, Grove, Everett) that may have been unused by gophers in the past due to forest cover. These occurrences often are adjacent to more typical prairie soils (e.g., Nisqually soils). They may be able to occupy any site that supports herbaceous vegetation, does not have significant tree cover, and is well-drained sandy, loamy, or gravelly soil (Stinson 2013; WDFW 2013). *T. mazama* in Washington have not been found in clay, and there are few records in silt soils. In summary, deep well-drained, sandy loam or loamy sand with sufficient fertility and water-holding capacity to support desired forbs appears to provide optimal habitat (Baker et al. 2003).

Threats/Reasons for Decline

Much Mazama pocket gopher habitat in the south Puget Sound has been lost to development, agriculture, and succession to forest, and what remains continues to be degraded by invasion of Scot's broom and other non-native plants (Stinson 2013).

Urban Development. Residential development that becomes high density has been particularly destructive to prairie habitat, and probably led to extinction of *T. m. tacomensis*. Habitat loss has eliminated most of the prairie vegetation, though significant areas remain in grassland. Pocket gophers may not persist in high-density residential areas due to effects of frequent mowing, herbicides, impervious surfaces, and perhaps elevated mortality rates resulting from predation by cats and dogs and trapping or poisoning of rodents, including gophers (Stinson 2013).

Trends in the human population suggest that amount and quality of habitat will continue to decline without protection and careful management of conflicting uses. Thurston County is projected to have 170,000 additional people and need an additional 50,000 detached single-family housing units, and >25,000 multi-family units by 2040 (Sustainable Thurston 2011:A11). As habitat patches become smaller, fewer, and farther apart, the likelihood of each patch continuing to support gophers declines as intervening habitat patches are lost (Stinson 2013).

The persistence of Mazama pocket gophers on roadsides, vacant lots, lightly grazed pastures, and within commercial timberland suggests that they are relatively resilient, and may be able to persist in rural and low-density developed areas. However, recent extinction of the Tacoma pocket gopher indicates that life for gophers in high-density residential and commercial areas is hazardous and recruitment and re-colonization is inadequate to maintain local populations (Stinson 2013). The last possible records of the Tacoma pocket gopher were animals that were killed by pet cats and identified as gophers by homeowners (Ramsey and Slipp 1974). It is not known if the mortalities from these sources have a significant effect on gopher populations, particularly in less densely settled areas.

Pocket gophers can damage young trees and their mounds can be a nuisance to landowners. Their foraging habits can also be unwelcome in vegetable gardens and at Christmas tree, berry, and vegetable farms in the area. Though Mazama pocket gophers are currently protected from killing without a permit; the frequency with which they are trapped or poisoned is unknown. When larger populations are suppressed by these methods, they readily recover if habitat remains suitable, but for small and isolated populations, mortality from persecution added to other hazards may lead to extirpation (Stinson 2013).

Livestock grazing. Gophers may survive in pastures in rural residential areas, but studies in California indicate that gopher density tends to decrease in heavily grazed pastures (Eviner and Chapin 2003). *T. mazama* has persisted on well-managed ranches in Thurston County (Stinson 2013).

Gravel mining. South Puget Sound prairies are located on glacial outwash gravels. Some of these glacial gravel deposits are very deep and valuable for use in construction and road-building, and prairie sites may be destroyed by gravel mining. One of the sites where Tacoma pocket gophers were collected became a large gravel pit, and two gravel pits have been opened on occupied gopher habitat in Pierce County south of Roy, and on Rock and Rocky prairies in Thurston County (Stinson 2013).

Airport Management and Development. Pocket gophers are known to occur in grasslands surrounding airport runways and adjoining lands. Airport safety considerations require that the vegetation be mowed to maintain visibility, eliminate cover for large animals that might pose a hazard for aircraft, and provide a safety margin should aircraft overshoot or land short of runways. This management benefits gophers by reducing woody vegetation and maintaining grassland conditions.

Succession and invasive plants. The fire regime established and perpetuated by Native Americans maintained the south Puget Sound prairies for the past 4,000 years, or more. Fire suppression allows Douglas-fir to invade and overwhelm prairie ecosystems. Disturbances such as grazing and vehicle traffic may accelerate colonization by Douglas fir because Douglas fir seed germination is enhanced by disturbance that increases mineral soil contact (Stinson 2013). Douglas fir control has been conducted on prairies in recent years at Johnson Prairie and Weir Prairie RNA on JBLM, Mima Mounds and Rocky Prairie NAP, Thurston County's Glacial Heritage Preserve, and Scatter Creek WLA.

Scot's broom is the most visible invasive species that can cover prairies relatively rapidly. Olson (2011a) reported that Scot's broom negatively affected the probability of gopher site occupancy

and plot use; the model suggested that plot use appears to decline as Scot's broom cover approached 10%. Parker (2002) reported that the glacial outwash prairie ecosystem is readily invaded by Scot's broom and that simply reducing soil disturbance and fires would not stop broom invasion (Parker 2002). Rook et al. (2011) noted that Scot's broom has long lasting effects on the soil that reduces germination and success of some native species. Scot's broom can be killed through burning, hand pulling, or herbicide, but control requires an ongoing program because the plants produce abundant seeds that can remain viable in the soil for several decades. Regular mowing can prevent Scot's broom seed production. Fire often stimulates germination of broom seeds in the soil, so a second burn, or herbicide is often employed to effectively control the abundant seedlings (Rook et al. 2011). Portions of the Artillery Impact Area on JBLM are broom free, indicating that frequent burning prevents broom establishment, but this can also affect native species. All control methods can be detrimental to native species if not well planned.

There are numerous invasive exotic plants that degrade native prairies in the south Puget Sound region, in addition to Scot's broom. Techniques for restoration of prairies and oak woodlands of the Willamette Valley-Puget Trough-Georgia Basin ecoregion are reviewed in Dennehy et al. (2011), Dunwiddie and Bakker (2011), Hamman et al. (2011), and Rook et al. (2011).

Implications of habitat loss for populations. Pocket gophers are vulnerable to local extinctions because of the small size of local breeding populations (Steinberg 1999). Low effective size of local populations and relatively large genetic differences between populations may be typical of gopher populations (Daly and Patton 1990). Pocket gophers have probably persisted by continually re-colonizing habitat after local extinctions; however, the loss of habitat patches and increases in hazards such as busy roads may inhibit re-colonization (Stinson 2013).

Analysis of the Impacts Likely to Result from the Taking

Taylor's checkerspot butterfly

Taylor's checkerspot butterfly has not been recorded from any of the project development or conservation sites. However, several of the life stages of this species are inconspicuous or very difficult to detect, and Taylor's checkerspot spends a portion of its complex multi-stage lifecycle under rocks, logs, or litter. The entire Permit area is within the historical range of the species and the presence of suitable larval host and nectar plants suggests that these sites could provide habitat for the species. The lack of verified occupancy on these sites, therefore, does not rule out the potential presence of the species now or at any time prior to site development.

Incidental take could result directly or indirectly from actions that make up the Covered Activities. The small size and inconspicuous nature of several of the life stages of this species make it especially vulnerable to stressors that could result in take of individuals. Examples include death from crushing during excavation of test pits, degradation or loss of habitat during vegetation management activities, or loss of egg masses or diapausing instar stages during grading of sites or during installation of water quality infiltration basins. The difficulties associated with quantifying individuals of the species therefore suggest that take is best described in terms of degradation or loss of habitat.

It is difficult to estimate the amount of suitable habitat available to Taylor's checkerspot on the project development sites. Many of the sites have been impacted by activities such as initial site preparation or the construction of development infrastructure that occurred prior to the listing of Taylor's checkerspot as endangered in October of 2013. Most of the sites consist of moderately to severely degraded grasslands that include significant encroachment of Scot's broom and other invasive woody vegetation that can shade or out-compete the larval host and nectaring plants required by Taylor's checkerspot. Though some larval host and nectaring plant species are present, these important habitat components are not common or present in significant quantities or diverse assemblages on any of the project development sites.

In July 2014, Center for Natural Lands Management (CNLM) surveyed seven of the Kaufman sites for the presence of larval host and nectaring plants, for the purpose of testing a Prairie Habitat Assessment Model for Thurston County. This data is summarized below in Table 3. The estimates are based on the number of 625 square meter quadrats that contained at least 4 square meters of larval host plants. Since nectar sources can be as far away as 200 meters from the host plants, and all sites with larval host plants also had at least one nectar source, the presence of nearby nectar sources was assumed for all quadrats with host plants.

In all cases, the larval host plant observed was narrowleaf plaintain, and in most cases, the one nectar source observed was hairy cat's ear (*Hypochaeris radicata*). Both are non-native, weedy species. More nectar plant species may be present in spring; however, few nectar species have been present at the project development sites during spring field visits to project development sites. Habitat conditions on the project development sites are relatively poor due to this lack of nectar plant diversity.

Using the CNLM survey data with the conservative assumptions described above, no more than 6 acres, or 6 % of the total area of the seven project development sites surveyed currently consists of coverage of the plant species that make up suitable habitat for Taylor's checkerspot butterflies. None of the remaining sites are likely to have potential habitat, as described in Table 3. The estimate for potential habitat for the surveyed sites is likely to be much higher than actual habitat present given that only 4 square meters of potential habitat may be found within each 625 square meter quadrat. Therefore, if all of the project development sites are fully built out over the duration of the requested Permit term, it is estimated that no more than 6 acres of potential Taylor's checkerspot habitat (areas of larval host plants and nectar plants) will be lost as a result of the Covered Activities.

Table 3. Estimated Area of Potential Habitat for Taylor's Checkerspot to be Impacted

Appendix A Map #	Site Name	Taylor's Checkerspot Range?	Estimated total area of larval host and nectaring plants (in acres where surveyed)	Total Site Size (in acres)
Project Development Sites				
1A	Kaufman Industrial Park	Y	Not surveyed, mostly developed	11.79
1B	79th Ave Business Park	Y	0	5.19
2	Liberty Leasing/Trails End Industrial Park	Y	1.70	4.42
3	Deschutes Industrial Park	Y	2.47	19.29
4	Tumwater Commerce Place	Y	Not surveyed, dense grasses with few forbs	36.47
5A	Tilley Road Industrial Park	Y	Not surveyed, mostly forested	27.87
5B	88th Avenue Subdivision	Y	Not surveyed, mostly forested	3.08
6	I-5 Commerce	Y	0.31	40.34
7	Lathrop Industrial Park	Y	0	7.68
8	Grand Mound Distribution Center	Y	0	18.89
9	Sargent Road	Y	1.85	10.74
10	Union Mills Road	Y	Not surveyed, developed and dense shrubs	12.84
11	Wichman/McCellan Properties	Y	Not surveyed, dense grasses and fill soils	5.23
Total acreage			6.33	203.83

The only confirmed populations of Taylor's checkerspot butterfly in Thurston County consist of the small numbers observed at the two reintroduction sites, Scatter Creek Wildlife Area – South, and Glacial Heritage County Park. The loss of approximately 6 acres of potential low quality habitat scattered among the 13 project development sites over the course of the requested 20-year permit duration is unlikely to result in a demographic level effect to either of the only two populations known to exist in the area.

The Applicants propose to set aside and manage portions of the two permanent conservation sites for the benefit of Taylor's checkerspot butterfly. Management of the Leitner Prairie and Deschutes Corridor conservation sites includes performance standards specifying that no less than 10% of these sites provide suitable larval host and nectaring plants by the fourth year after

permit issuance. The proposed management plan further requires that these sites achieve and maintain at least 20% coverage by these species by year 10, and each year thereafter. This measure will provide 8.8 acres of permanently managed Taylor's checkerspot habitat within four years of permit issuance, which will double to more than 17 acres by year 10. The ongoing management of these sites will ensure that the plant composition required to support Taylor's checkerspot will be available in areas that greatly exceed the currently available amount of habitat in both quality and quantity. Potential habitat areas on the development sites are small and fragmented, and are situated in areas that are projected to become more urban over time, further degrading any remaining habitat on these sites.

The quality of habitat that will be provided at Leitner Prairie and Deschutes Corridor conservation areas will have much higher value in terms of the total abundance and diversity of larval host and nectar plants than that found on the project development sites. Already, the abundance of native flowering plants, such as camas, that provide nectar for Taylor's checkerspot, is much greater at Leitner Prairie than at any of the development sites, where few, if any native plants remain.

This commitment to the conservation of the Taylor's checkerspot is expected to reduce threats resulting from habitat loss and support efforts to recover the species in the wild. The long-term conservation provided by the Applicants in the conservation areas significantly exceeds the area of habitat that could be impacted by development. Further, the long-term conservation provides significantly higher biological value to the butterfly because of its larger contiguous size and restoration of habitat, resulting in superior quality and quantity of habitat in perpetuity.

Streaked horned lark

Streaked horned larks are not known to be present on any of the project development or conservation sites. None of these sites provide the large open areas, sparsely vegetated with short annual grasses, and high percent cover of rocks, typical of the breeding habitat used by inland south Puget Sound streaked horned larks (Pearson and Hopey 2004, 2005). Eight of the project development sites (Kaufman Industrial Park, 79th Avenue Business Park, Liberty Leasing/Trails End, Deschutes Industrial Park, Tumwater Commerce Place, Tilley Road, I-5 Commerce, and Lathrop) and one of the conservation sites (Deschutes Corridor), however, are located near the Olympia Regional Airport and have potential foraging habitat. The Olympia Regional Airport currently has the highest number of breeding pairs in the south Puget Sound and is the site of one of few confirmed inland streaked horned lark breeding sites in the south Puget Sound area.

Streaked horned larks are known to forage on sites with a large percentage of bare ground and low vegetation (Rogers 2000). Streaked horned larks that breed and rear their young at the Joint Base Lewis-McChord Gray Army Airfield (in Pierce County) regularly forage at the nearby recreational field areas just north and west of the airfield. These sites consist of baseball, softball, and football fields that are mowed and maintained in an open, low statured vegetation condition. These areas are similar to areas on some of the project development sites because they provide areas of flat open ground with low growing vegetation that provide seeds and insects for foraging. It is possible that areas with suitably short and low growing vegetation adjacent to a known breeding population and/or within the range of the streaked horned lark could serve as foraging habitat.

Table 4. Estimated Area of Potential Foraging Habitat for Streaked Horned Lark to be Impacted

Appendix A Map #	Site Name	Streaked horned lark Range?	Potential breeding habitat?	Near known breeding population ?	Potential foraging habitat (in acres)	Total Site Size (in acres)
Project Development Sites						
1A	Kaufman Industrial Park	Y	N	Y	0.20	11.79
1B	79th Ave Business Park	Y	N	Y	1.5	5.19
2	Liberty Leasing/Trails End Industrial Park	Y	N	Y	3.7	4.42
3	Deschutes Industrial Park	Y	N	Y	7.56	19.29
4	Tumwater Commerce Place	Y	N	Y	2	36.47
5A	Tilley Road Industrial Park	Y	N	Y	2	27.87
5B	88th Avenue Subdivision	Y	N	Y	0	3.08
6	I-5 Commerce	Y	N	Y	2.78	40.34
7	Lathrop Industrial Park	Y	N	Y	0.15	7.68
8	Grand Mound Distribution Center	Y	N	N	0	18.89
9	Sargent Road	Y	N	N	0.46	10.74
10	Union Mills Road	Y	N	N	0	12.84
11	Wichman/McCellan Properties	Y	N	N	1	5.23
Total acreage					21.41	203.83

Though streaked horned larks have not been observed on project development sites to date, it is possible that these sites are currently being used or may be used at some time during the term of the requested permit. At this time, approximately 21 acres on the project development sites provide the bare open or low (approximately <12") vegetation characteristic of streaked horned lark foraging habitat. The anticipated development of these sites at some time during the duration of the requested Permit will likely remove foraging habitat that may exist at these locations, except in maintained storm facilities and habitat set-asides.

Area estimates for potential foraging habitat were estimated from survey data collected by CNLM in July 2014 for seven Kaufman sites (79th Avenue, Trails End, Deschutes Industrial, I-5 Commerce, Lathrop Industrial, Grand Mound, and Sargent Road) and from field observations of low stature grasses and bare ground at each site. Areas were considered to be potential foraging habitat if vegetation height averaged less than 12 inches, or the percent of bare ground was 10% or more in a given area or quadrat for CNLM data.

Because streaked horned lark foraging has not been verified on these project development sites, it is difficult to estimate if the loss of these areas will impair feeding behavior to an extent that a measurable individual or demographic response can be discerned. If streaked horned larks are using these areas as foraging habitat, however, it is possible that the development of these sites will reduce available foraging habitat that could result in harassment of individuals. Harassment could reduce reproductive success, individual fitness, the overall numbers of individuals, or distribution of the listed species.

The Applicants' conservation program will manage the Deschutes Corridor and Leitner Prairie permanent conservation site to maintain open flat areas with sparse and low (approximately <12") vegetation providing seeds and insects suitable for streaked horned lark foraging behavior. At least 20% (about 17 acres) of the sites will be permanently managed as streaked horned lark foraging habitat no later than four years after Permit issuance. This area will increase to at least 40% (34 acres) by year 10 after Permit issuance and be maintained at no less than that area thereafter. Since the goal and intent of site management is to maintain all of Leitner Prairie and most of Deschutes Corridor in low stature grassland, the performance standard for low stature grasses and bare ground (20% by Year 4 and 40% by Year 10) is likely to be exceeded in all years. The conservation program also provides that the project development sites will be managed to ensure that streaked horned lark foraging habitat currently present on these sites will be maintained until building permits are issued for each of these sites and construction is initiated. This short-term commitment will ensure that existing foraging habitat on these sites remains viable and available for streaked horned larks in the area while the permanent conservation site benefits are implemented.

The two permanent conservation sites, approximately 51 acres and 36 areas in size will provide areas of potential foraging habitat that are much larger in size and have much better continuity than any of the project development sites. The conservation sites also may be connected with other potential habitat areas in the future, while the project development sites are located within an urbanizing landscape where habitat is already fragmented. Since streaked horned larks typically prefer larger, more open sites with greater sightlines, the two conservation sites will provide much more potential habitat that is higher quality for streaked horned lark than any or all of the project development sites combined.

Olympia subspecies of Mazama pocket gopher

Ten of the project development sites (Kaufman Industrial Park, 79th Ave Business Park, Liberty Leasing/Trails End Industrial Park, Deschutes Industrial Park, Tumwater Commerce Place, Tilley Road Industrial Park, 88th Avenue Subdivision, I-5 Commerce, Lathrop Industrial Park, and Union Mills Road Properties, totaling 168.97 acres) and one of the permanent conservation sites (Deschutes Corridor, 51.32 acres) are within the range of the Olympia subspecies of the Mazama pocket gopher (See Figure 1).

The relative value of Mazama pocket gopher habitat can be assessed based on a number of factors. Pocket gophers prefer deep, light-textured, porous, well-drained soils. Areas that include the soil types that the USFWS described in the habitat characterization in the final listing rule for the species (79FR 19760-19796) are considered to have higher habitat quality than sites with other soil types. Mazama pocket gophers prefer perennial forbs for food over grasses. Locations that provide preferred vegetation types such as clover, lupines, dandelions, false dandelions, and camas provide better habitat than sites under grassy cover. Pocket gophers are also less frequently reported where grassland has been taken over by dense Scot's broom (Steinberg 1996, Olson 2011b), and are essentially absent from forest habitats in Washington (Stinson 2013). Habitat value for gophers appears to decrease as the density of woody vegetation and Scot's broom increases.

The amount and quality of the potential habitat on the project development sites varies considerably. Some of these sites were disturbed prior to the listing of the species when they were prepared for anticipated development activities that have not yet occurred. Woody vegetation, forested cover, and invasive species such as Scot's broom that are less favored food items or that out-compete preferred foods subsequently moved into these disturbed sites and reduce the amount or usability of some of these locations. Some sites include potential habitat areas that were impacted during the installation of infrastructure such as roadways or utilities. Still other properties have been largely developed, but continue to have some areas that could constitute potential habitat for the species. Some of these sites contain few of the characteristics that might make them suitable for use by pocket gophers today, but their proximity to other pocket gopher sites suggest that recruitment from adjacent sites could result in their becoming occupied before the sites are fully developed.

Sites that contain characteristics associated with the presence of the species may represent potential habitat. These factors include the presence of suitable glacial outwash soil types (such as Alderwood, Cagey, Everett, Indianola, McKenna, Nisqually, Norma, Spana, Spanaway-Nisqually complex, Yelm, and others), the availability of vegetation types known to be used as foods, or proximity to other sites known to be occupied by pocket gophers.

Mazama pocket gophers can be difficult to detect because they spend most of their lives underground, with the exception of very brief surface forays for feeding or for dispersal of young from their natal burrow systems. Mazama pocket gophers are typically detected by searching potential habitat for the presence of gopher mounds. Detection of mounds can verify presence of the species on a site, but does not provide abundance or distribution data.

Surveys have documented the presence of Olympia pocket gophers on six of the project development sites that are within the range of this species, including 79th Ave Business Park, Liberty Leasing/Trails End Industrial Park, Deschutes Industrial Park, Tumwater Commerce Place, Tilley Road Industrial Park, and Lathrop Industrial Park.

Mazama pocket gophers have not been confirmed on Kaufman Industrial Park, 88th Avenue Subdivision, I-5 Commerce, or the Union Mills Properties. Some of these sites have been surveyed and have not confirmed presence, and other sites have not been thoroughly investigated. Each of these properties contains one or more characteristics typical of occupied Mazama pocket gopher habitat on at least some portion of the property, and could be considered potential habitat for the species.

A brief description of each of these project development sites describing the amount, relative quality, and occupancy status follows. Each of these sites is described more fully in Appendix B and the associated maps.

Kaufman Industrial Park: Most of this site was previously developed and now includes asphalt parking lots and buildings. The site is mapped as Nisqually loamy fine sand, 0 to 3% slopes. Soils have been compacted from years of use as vehicle parking and turnaround site for large trucks and heavy equipment. The remaining undeveloped vegetated areas include two small grassy areas totaling 1-acre. This area is dominated by non-native grasses, Scot's broom, bracken fern, and weedy herbs. A small area that is regularly mowed (0.2 acre) is vegetated primarily with low grasses, narrowleaf plantain, mosses, hairy cat's ear, vetch, and sorrel. Mazama pocket gophers have not been found on the site, though approximately 0.81 acres of potential habitat is present.

79th Ave Business Park: Most of this property was previously developed and now contains buildings and paved parking areas. The site is mapped as Nisqually loamy fine sand, 0 to 3% slopes. The site includes a storm water infiltration facility that becomes inundated during rain events and is therefore unlikely to support pocket gophers. The remaining approximately one acre consists of a mowed lawn and associated landscaping. Gopher mounds found on the site are restricted to the landscaped areas between the warehouse facility and the paved parking lot. These areas total approximately 0.78 acres in size.

Liberty Leasing/Trails End Industrial Park: This site was previously cleared and graded and now contains existing roads, utility infrastructure, and storm water facilities. The site is mapped as Nisqually loamy fine sand, 0 to 3% slopes. About 3.4 acres (including the storm water infiltration area) remain undeveloped, and are vegetated with weedy grasses and herbs. Pocket gopher mounds were observed in July 2014 in some of the vegetated portions of this site and on the side slopes of the storm water facility. The basin of the storm water facility is sometimes inundated and is therefore unlikely to support pocket gophers. Approximately 2.67 acres of the site might be considered potential pocket gopher habitat.

Deschutes Industrial Park: This parcel was cleared and graded in anticipation of future development prior to the listing of the species. Portions of the site include paved roads, utilities, and storm water facilities. The site is mapped as Nisqually loamy fine sand, 0 to 3% slopes; and

Nisqually loamy fine sand, 3 to 15% slopes. Approximately 17 acres are now covered primarily with non-native weedy grasses (such as sweet vernal grass, red fescue, brome, orchard grass, and velvet grass), herbs (including hairy cat's ears, long-leaf plantain, and vetch), and Scot's broom. This area includes a 3.22 acre onsite habitat set-aside described more fully in Appendix E. Pocket gopher mounds have been found on vegetated portions of the site including the periphery of the existing storm water retention ponds. A total of about 9.93 acres of the site constitute potential pocket gopher habitat.

Tumwater Commerce Place: This site was also cleared and graded for development, and infrastructure including paved roads, utilities and storm facilities are present. Soil maps show the site as Indianola loamy sand, 0 to 3% slopes; Everett very gravelly sandy loam, 30 to 50% slopes; and Alderwood gravelly sandy loam, 0 to 3% slopes. Undeveloped areas, including a 5.45 acre onsite habitat set-aside (described in Appendix E) encompass approximately 32.6 acres and are vegetated with weedy grasses and herbs. Storm water facilities are steep-sided and saturated in winter. Gopher mounds were observed in September 2014 on some of the vegetated portions of this site. Approximately 15.99 acres of the site is potentially suitable pocket gopher habitat.

Tilley Road Industrial Park: Infrastructure including paved roads, utilities and storm facilities were installed at this location prior to the federal listing of the species. Soils on the site include Indianola loamy sand, 0 to 3% slopes; Everett very gravelly sandy loam, 0 to 3% slopes; and Yelm fine sandy loam, 0 to 3% slopes. Most of the undeveloped areas of the site are covered mainly by mixed conifer and deciduous forest that does not constitute potential habitat for the species. Gopher mounds have been observed in open areas, mainly along the road approaching the storm water pond and along the sidewalk running parallel to the right-of-way adjacent to Tilley Road SE. A habitat set-aside was established in 2012-2013 as required by City of Tumwater Municipal Code. Today approximately 1.29 acres of the site constitute potential habitat for the species.

88th Avenue Subdivision: This location is undeveloped and forested with a mixed native conifer and deciduous canopy. Understory vegetation includes sword fern and salal. Soils on the site consist of Indianola loamy sand, 0 to 3% slopes. Though suitable soil types are present they may not be available to gophers due to the forested cover. Pocket gophers have not been found on the site, and about 0.1 acres of the site might constitute potential habitat today.

I-5 Commerce: Most of this site has been cleared and graded, and preexisting uses on the site have compacted most of the soils. Soils on the site consist of Cagey loamy sand; Everett very gravelly sandy loam, 0 to 3% slopes; and Norma silt loam. Approximately 9 acres are covered with roads, compacted access pads, and gravel piles, or wetland/hydric soils that are saturated at or near the ground surface in wintertime. About 7.6 acres of the site are forested. The remaining approximately 29 acres is largely vegetated with non-native, weedy grasses and herbs including velvetgrass, sweet vernal grass, hairy cat's ear, oxeye daisy, and dock. Scot's broom is becoming established in many areas. No gophers have been documented at this site and the graded and compacted soils and seasonal high ground or surface water may limit the potential for gopher occupancy. Adjacent properties are currently occupied, so there is some potential that potential

habitat on the site could become occupied in the future. A total of approximately 5.5 acres of potential habitat remains on the site today

Lathrop Industrial Park: Most of this site is covered with existing warehouses and paved parking areas. The soils on site are mapped as Cagey loamy sand. The undeveloped 2.4-acre remainder of this site includes as existing storm water facility and associated drainage field. Dominant plants here include bentgrass, orchard grass, reed canary grass, bracken fern, hairy cat's ear, trailing blackberry, and salal. Gopher mounds were located in October 2014 in the storm water facility and in some of the landscaped border near the warehouses. The area of potential habitat on the site totals approximately 0.18 acres.

Union Mills Road: Most of this site is covered with gravelly soils that are compacted from past clearing, grading, and construction staging. Gravel stockpiles, pads, and road areas cover about 6 acres of the site. Approximately 6.8 acres is covered with dense Scot's broom thickets, and dense stands of Douglas spirea are also present, indicating that compacted soils in some areas retain water at or near the surface in wet winter months. The soils on the site consist of Spanaway gravelly sandy loam, 0 to 3% slopes; and Spana gravelly loam. No gophers have been documented on this site, and only about 3.05 acres of potential habitat remain at this location.

Though the project development sites within the range of this species comprise a total of approximately 168.97 acres, approximately 128.67 acres of these sites are composed of previously disturbed areas, acreage under impervious surfaces, and locations that do not provide any pocket gopher habitat. These areas do not provide the open undisturbed suitable soils where pocket gophers are typically found. Most of the currently undeveloped area on these sites has previously been cleared and graded and soil compaction has reduced habitat suitability on others. The species' preferred or accepted plant food items are not prevalent or available on many of the project development sites.

Most of the undeveloped areas consist of degraded grasslands with encroaching non-native and woody vegetation components that are not conducive to long-term pocket gopher occupancy. Observations of gopher mounds in regularly disturbed areas such as storm water detention and infiltration basins and road rights-of-way may represent temporary use or dispersal patterns since these areas are unlikely to provide viable habitat for more than very short periods (such as between rain and storm water events or until the available food plants within a road right-of-way is exhausted).

Many of the project development sites are adjacent to or are surrounded by areas that cannot support pocket gophers. Examples include areas with unsuitable or impacted soil types, areas with impervious surfaces, or landscapes significantly invaded by non-native or woody cover types. As activities on adjacent and nearby properties continue to degrade available habitat and isolate remaining pocket gophers, these small populations would be expected to face an increased risk of extirpation even in the absence of the proposed activities covered by this HCP.

Table 5. Estimated Area of Potential Habitat for Olympia Pocket Gopher to be Impacted

Appendix A Map #	Site Name	Olympia pocket gopher Range?	Species verified on site?	Potential habitat (in acres)	Habitat quality	Total Site Size (in acres)
Project Development Sites						
1A	Kaufman Industrial Park	Y	N	0.81	Poor: Dense grasses and Scot's broom	11.79
1B	79th Ave Business Park	Y	Y	0.78	Poor: Gophers only found in landscaped areas	5.19
2	Liberty Leasing/Trails End Industrial Park	Y	Y	2.67	Moderate: Site consists of degraded grassland	4.42
3	Deschutes Industrial Park	Y	Y	9.93	Moderate: Site consists of degraded grassland	19.29
4	Tumwater Commerce Place	Y	Y	15.99	Moderate: Site consists of degraded grassland	36.47
5A	Tilley Road Industrial Park	Y	Y	1.29	Poor: Gophers only found along road & ROW	27.87
5B	88th Avenue Subdivision	Y	N	0.1	Poor or no habitat: site is largely forested	3.08
6	I-5 Commerce	Y	N	5.5	Poor or no habitat: high seasonal groundwater and compacted soils	40.34
7	Lathrop Industrial Park	Y	Y	0.18	Poor: Gophers are only found in landscaped areas and in storm water facility	7.68
10	Union Mills Road	Y	N	3.05	Poor or no habitat: Dense shrubs and compacted soils	12.84
Totals				**40.3**		**168.97**

Individual pocket gophers in areas with degraded or limited food resources would be expected to require larger home ranges with more extensive burrow systems. Mazama pocket gophers are known to be antagonistic towards each other (except when breeding) which generally results in avoidance behavior that tends to distribute individuals across a landscape. This distribution behavior combined with the larger expected home ranges in areas of lower habitat suitability might result in impacts to fewer individuals when compared to habitat impacts in areas with higher relative habitat quality.

When construction is initiated on project development sites, habitat will be lost along with any individuals. Incidental take is expected to be highest during initial site clearing, grading, and excavation as these activities will extend below the ground and into burrow systems, natal nests, and food caches. Burrow systems may be destroyed and individual animals harmed during these construction activities. Harm to animals or burrow systems may also occur once sites are developed if gophers persist in landscaped areas and storm water facilities.

Take in the form of harm may occur during site clearing, excavation, and grading if equipment injures or kills individuals or if forage plants are removed and soils for burrow systems are removed or compacted. Take may occur in the form of harassment wherever suitable habitat is removed and covered with impervious surfaces. Harassment may occur when individuals experience a measurable disruption to their normal behavior when their forage resources are removed, they are disturbed, or there is an increased energetic demand from having to relocate and/or rebuild tunnel systems and food caches.

Observing or documenting instances of take will be difficult or impossible because Mazama pocket gophers remain underground for most of their lives. The loss of suitable habitat expected to occur on the project development sites will therefore serve as a surrogate for the amount of take anticipated over the term of the requested permit. All potential Mazama pocket gopher habitat on the 10 project development sites are likely to be lost due to development activities, except in habitat set-asides, storm facilities, and road corridor areas once all of the sites have been developed and construction is complete.

A total of approximately 40.3 acres of potential habitat have been identified on portions of the 10 project development sites within the range of the Olympia subspecies. These patches of remnant habitat vary in size and relative quality, and pocket gophers have only been found on six of these sites. The Applicants propose to offset all 40.3 acres of potential habitat scattered among the project development sites with a single large and permanently protected site that will be managed for the benefit of the species in perpetuity. The Applicants propose to mitigate for the entire amount of potential habitat on any site where pocket gophers have been documented at a rate of one acre of permanently conserved habitat for each acre that could be impacted. Of the approximately 40.3 acres of potential habitat, about 30.84 acres are located on sites where Olympia pocket gophers have been documented to be present.

Several factors, including previous land use history, landscape context (several of these sites are surrounded by paved roadways and parking lots or enclosed by existing commercial and industrial development), or other factors that reduce habitat suitability (such as shallow water tables that saturate surface soils for parts of each year) may preclude the potential habitat areas

on the four remaining project development sites from being occupied by the species now or in the future. Because any loss of potential habitat could preclude efforts to recover the species, the Applicants propose to mitigate for the remaining 9.46 acres of potential habitat within the range of the Olympia subspecies at a rate of one-half acre of permanently conserved habitat for each acre of potential habitat that has not been verified to be occupied. Under this approach 4.42 acres of habitat will be permanently protected to offset impacts from incidental take that may occur from covered activities on the sites where pocket gophers have not been verified to occur.

As a component of the conservation plan for this species, the Applicants propose to mow and manage all potential habitat on the project development sites to control woody and non-native vegetation including Scot's broom to enhance the habitat suitability of these sites for pocket gophers until each of the sites is developed. This may allow any resident pocket gophers a temporary refugium while Thurston County and others engaged in Mazama pocket gopher conservation and recovery efforts establish additional permanent conservation sites for this species.

The approximately 51.32-acre Deschutes Corridor tract (further described in Appendices A, B and D) is the proposed permanent conservation site for the Olympia subspecies. The Applicants propose to extinguish future development rights associated with this parcel and implement the attached management plan (Appendix D) with the goal of restoring and maintaining high quality Mazama pocket gopher habitat on this site.

The Deschutes Corridor site is mapped as containing Indianola loamy sand, 15 to 30% slopes; Everett very gravelly sandy loam, 0 to 3% slopes; Puget silt loam; and Spana gravelly loam soil types. Approximately 30 acres of the site are mapped as Nisqually fine loamy sand soils. Approximately 5 acres of the property contains slopes greater than 15% or are within a former gravel quarry and are not expected to provide habitat or support pocket gophers. About 46 acres of the site are therefore available to serve as mitigation for the impacts resulting from covered activities. The Applicants propose that 35.26 acres of credit from the Deschutes Corridor Conservation Site serve to offset the mitigation needs of the Project development sites within the range of the Olympia subspecies of Mazama pocket Gopher upon issuance of the ITP (30.84 acres to mitigate for sites that have been shown to be occupied, and 4.42 acres to offset potential habitat where pocket gophers have not been found). Because the mitigation site is larger than required to offset the Applicants' needs, the Applicants propose to manage all habitat on the site to generate additional habitat credits for this species which they may reserve for their own future use or to sell or trade to others with approval of the USFWS. Approximately 46 acres of the Deschutes Corridor site will be managed to the performance standards described in the Deschutes Corridor site management plan (Appendix D), leaving a total of 10 acres of available mitigation credit.

The Deschutes Corridor conservation site is adjacent to the Olympia Regional Airport and other sites known to be occupied by the species. Dedicating this site and ensuring ongoing management at this location permanently expands the amount of secure habitat for the largest known population of Olympia pocket gophers.

Ongoing site management, including control of invasive species and woody vegetation including trees, may result in short-term harm or harassment to individual gophers and habitat changes that may not initially benefit the species. However, the long-term conservation value and benefit to the covered species from the habitat enhancement proposed in this HCP are expected to exceed the impacts from the short-term harm and harassment of individuals resulting from these actions.

The establishment and long-term management of Deschutes Corridor, an approximately 51.32 acre site dedicated to providing high quality habitat for the Olympia pocket gopher, will provide habitat that is greater in value in terms of both quality and quantity than the disconnected habitat fragments that currently remains at the project development sites. Most of the existing habitat at project development sites is of poor to moderate quality would likely decline over time without dedicated management efforts to control encroaching invasive and non-native vegetation. In addition, these sites are positioned within a landscape that is increasingly fragmented by urban development.

The USFWS stated that "there are few data on historical or current population sizes of Mazama pocket gophers in Washington" in the final rule listing the species as threatened (79 FR 19775). Estimates of demographic-level responses to the loss of a portion of potential habitat are therefore difficult. However, the loss of a total of approximately 40.4 acres of poor to moderate quality potential habitat scattered across 10 sites over the course of the next 20 years is unlikely to result in a population or demographic-level response, given the hundreds of acres of publicly and managed lands (including those at the Olympia Regional Airport) where this species is known to occur.

Yelm subspecies of Mazama pocket gopher

Three of the project development sites (the Grand Mound Distribution Center, Sargent Road, and the Wichman/McCellan Properties site) (totaling 34.86 acres) and one of the permanent conservation sites (Leitner Prairie) (36.18 acres) are within the range of the Yelm subspecies of the Mazama pocket gopher.

Grand Mound Distribution Center: This undeveloped site consists of degraded grasslands dominated by thickets of dense Scot's broom, woody shrubs, and scattered Douglas fir trees. Approximately 5.6 acres of grass-dominated areas are located primarily within a right-of-way associated with an overhead electrical transmission line that bisects the tract. Soils on the site are mapped as Spanaway gravelly sandy loam, 0 to 3% slopes; Spanaway gravelly sandy loam, 3 to 15% slopes. Though active gopher mounds were surveyed and confirmed by WDFW in 2012 in the southwest corner of the site (Krippner 2012), much of the site is covered with dense Scot's broom thickets and is unlikely to provide habitat for gophers. The potential habitat remaining on the site consists of approximately 16.69 acres.

Sargent Road: The Sargent Road site is unlikely to currently be occupied by pocket gophers. The site includes two preexisting structures and a compacted soil area beneath a gravel pad that has been used for temporary storage and construction staging. The site is covered primarily with dense thickets of Scot's broom. Bentgrass and weedy herbs dominate a narrow strip of land along the State Route 12 right-of-way. The site is mapped as Spanaway gravelly sandy loam, 0

to 3% slopes; Spanaway gravelly sandy loam, 3 to 15% slope soil types. Though Mazama pocket gophers have not been confirmed on this site, a total of about 7.74 acres of potential habitat is present.

Wichman/McCellan Properties: Portions of these tracts were developed or covered with compacted gravelly fill prior to listing of the species. Soils are mapped as Spanaway gravelly sandy loam, 0 to 3% slopes; and Spanaway gravelly sandy loam, 3 to 15% slopes. Approximately 3 acres have not been developed, and these areas are covered primarily with non-native reed canary grass ~~(*Phalaris arundinacea*)~~. A mix of weedy herbs and grasses, including a small patch of native lupine, can be found growing in the fill soil on approximately one acre of the site. Approximately 3.23 acres of potential habitat exists at this location, through no pocket gophers have been found.

Table 6. Estimated Area of Potential Habitat for Yelm Pocket Gopher to be Impacted

Appendix A Map #	Site Name	Yelm pocket gopher Range?	Species verified on site?	Potential habitat (in acres)	Habitat quality	Total Site Size (in acres)
Project Development Sites						
8	Grand Mound Distribution Center	Y	Y	16.69	Poor: Small area of degraded grassland	18.89
9	Sargent Road	Y	N	7.74	Poor: Small area of degraded grassland	10.74
10	Wichman/McCellan Properties	Y	N	3.23	Poor: Fill soils and dense grasses	5.23
Totals				27.66		34.86

Each of these sites provides one or more characteristics suggesting that they could become occupied at some time during the duration of the permit. Because the life history characteristics of pocket gophers can make them difficult to detect, it is not possible to rule out possible incidental take of this species from the Covered Activities.

As with the Olympia subspecies, habitat will serve as a surrogate to estimate take for the Yelm subspecies of Mazama pocket gopher. For the purposes of this analysis, it is assumed that any Yelm pocket gophers on these three project development sites could be subjected to incidental take as a result of the Covered Activities. Because the life history habits and the Covered Activities are the same, the form and type of take for the Yelm subspecies is expected to be the same as previously described for the Olympia subspecies.

Given the existing habitat quality and apparent low potential occupancy of these sites, it is unlikely, but theoretically possible, that some small proportion of potentially available pocket gopher habitat on these project development sites could be occupied at any given time. Any of the individual Yelm pocket gophers that may be present on the project development sites are expected to be subjected to take in the form of death, harm, or harassment.

A total of approximately 27.66 acres of potential habitat have been identified on portions of the three project development sites within the range of the Yelm subspecies. Yelm pocket gophers have only been confirmed to be present on the Grand Mound site. The Applicants propose to offset all 27.66 acres of potential habitat on the three project development sites with a single large and permanently protected site that will be managed for the benefit of the Yelm subspecies.

The Applicants propose to mitigate for the habitat on the Grand Mound site where pocket gophers have been found at a rate of one acre of permanently conserved habitat for each acre that could be impacted. Though pocket gophers have not been found on the remaining sites, the Applicants propose to mitigate for the remaining 10.97 acres of potential habitat at a rate of one-half acre of permanently conserved habitat for each acre of potential habitat that has not been verified to be occupied. A total of 5.45 acres of habitat will be provided to offset impacts from incidental take that may occur from covered activities on these sites where pocket gophers have not been verified to occur.

The approximately 36.18-acre Leitner Prairie tract (further described in Appendices A, B and C) is proposed as the permanent conservation site to offset impacts to the Yelm subspecies of Mazama pocket gopher resulting from covered activities. The species has been confirmed on the site (WDFW 2012) and recent management of Scot's broom and other invasive species is expected to support the resident pocket gophers on the site. The Applicants propose to extinguish future development rights associated with this parcel and implement the management plan (Appendix C) with the goal of permanently maintaining high quality Mazama pocket gopher habitat on this site. Because the mitigation site could provide more mitigation credits than needed for the current proposal, the Applicants propose to manage all habitat on the site to the standards prescribed in this document to generate additional habitat credits which they may reserve for their own future use or to sell or trade to others. The Applicants propose that 22.14 acres of credit from the Leitner Prairie Conservation Site serve to offset the mitigation needs of the Project development sites within the range of the Yelm subspecies of Mazama pocket gopher upon issuance of the ITP (16.69 acres to mitigate for sites that have been shown to be occupied, and 5.45 acres to offset potential habitat that has not been shown to be occupied), and that the remaining acreage on the site (about 14 acres) be made available as mitigation credits so long as those acres are permanently managed to the performance standards described in the Leitner Prairie site management plan (Appendix C) with the approval of the USFWS.

To support the conservation of the Yelm pocket gopher, the Applicants propose to mow and manage all of the project development sites to control woody and non-native vegetation including Scot's broom to enhance the habitat suitability of these sites for pocket gophers until each of the sites is developed. This may allow any resident pocket gophers a temporary refugium while Thurston County and others engaged in Mazama pocket gopher conservation and recovery efforts establish additional permanent conservation sites for this species.

The USFWS stated that "there are few data on historical or current population sizes of Mazama pocket gophers in Washington" in the final listing rule (79 FR 19775). Estimates of demographic-level responses to the loss of a proportion of potential habitat are therefore difficult. However, the loss of a total of approximately 27.66 acres of poor to moderate quality potential habitat scattered across three sites over the course of the next 20 years is unlikely to result in a population or demographic-level response, given the hundreds of acres of publicly and privately managed lands (including those at Scatter Creek WLA, Rock Prairie, Upper and Lower Weir Prairie, and Tenalquot Prairie described in the species status account above) where this species is known to occur.

Conservation Program

The Conservation Program describes the Applicants' actions to provide for the conservation of the Covered Species.

The conservation program consists of six components:

1. Biological Goals
2. Biological Objectives
3. Minimization Measures
4. Mitigation Measures
5. Monitoring Plan
6. Adaptive Management Plan

1. Biological Goals

Biological goals are intended to be broad, guiding principles that clarify the purpose and direction of the Applicants' HCP (USFWS and NMFS 2000). These biological goals describe what the conservation plan aims to accomplish over the course of the permit term for each of the species covered by the plan.

1. The Applicants will contribute to conservation of Taylor's checkerspot butterfly with the goal of maintaining persistence of the species in the Permit area by establishing and permanently maintaining areas of sufficient size and plant species composition that can support foraging and reproduction of the species. The Applicants will also generate short-term benefits for the species by managing potential Taylor's checkerspot habitat that currently exists on the project development sites until such time as these sites are developed.
2. The Applicants will contribute to conservation of streaked horned lark with the goal of maintaining persistence of the species in the Permit area by creating and permanently maintaining suitable habitat that can support streaked horned lark foraging behavior. To accomplish this goal, the Applicants will restore and provide for the ongoing maintenance of streaked horned lark foraging habitat on the conservation sites. Short-term benefits will also be provided by maintaining potential foraging habitat that currently exists on the project development sites until such time as these sites are developed.

3. The Applicants will also contribute to the conservation of the Olympia and Yelm subspecies of Mazama pocket gophers by restoring and permanently managing sufficient habitat to maintain viable populations of these subspecies in the Permit area. The Applicants will also generate short-term benefits for the Olympia and Yelm subspecies of Mazama pocket gophers by managing and maintaining potential habitat on each project development site until such time as these sites are developed.

2. Biological Objectives

Biological objectives describe measurable performance targets to evaluate progress towards achieving the plan's biological goals. Objectives provide benchmarks for determining the effectiveness of the conservation program and inform effective adaptive management over the duration of the permit. Each of the specific measurable objectives identified here may be beneficial to more than one of the Covered Species, and each objective is therefore associated with the primary species it is intended to benefit.

1. Dedicate the approximately 36.18 acre Leitner Prairie conservation site for the permanent conservation of Taylor's checkerspot butterfly, the streaked horned lark, and the Yelm subspecies of Mazama pocket gopher.

2. Dedicate the approximately 51.32 acre Deschutes Corridor conservation site for the permanent conservation of Taylor's checkerspot butterfly, the streaked horned lark, and the Olympia subspecies of Mazama pocket gopher.

3. Control unauthorized access and activities on the permanent conservation sites to benefit the Covered Species for which they are managed. This objective will benefit Taylor's checkerspot butterfly, streaked horned lark, and both subspecies of Mazama pocket gophers on the Conservation Sites.

4. Manage invasive plant species, especially Scot's broom, on project development sites to achieve and maintain the following standards until such time as these properties are developed. Maintain a total areal cover of no more than 10% Scot's broom and woody vegetation greater than 12 inches in height. Management actions that will achieve these objectives are described in the Site Management Plans found in Appendices C, D, and E. This objective will benefit Taylor's checkerspot butterfly and both subspecies of Mazama pocket gophers where they exist on these sites.

5. Manage invasive plant species, especially Scot's broom, on the permanent conservation sites to the following performance standard. Ensure that no more than 10% of the area on these sites consists of Scots broom and woody vegetation greater than 12 inches in height in years 1-9, and no more than 5% cover of Scot's broom and woody vegetation greater than 12 inches in height thereafter. Management actions that will be implemented to achieve these objectives are described in the Site Management Plans found in Appendices C and D. This objective is intended to benefit all of the biological goals established for this HCP.

6. Establish and maintain areas that support plant species important for Taylor's checkerspot reproduction (including narrowleaf plantain, golden paintbrush, sea blush,

blue-eyed Mary, and dwarf owl-clover) and feeding (including common camas, nine-leaved lomatium, deltoid balsamroot, spring gold, wholeleaf saxifrage, and seablush) on the permanent conservation sites. Management will ensure that at least 10% of the area of the Leitner Prairie and Deschutes Corridor conservation sites will support these species by year 4 after permit issuance. Management will increase the cover of these species such that at least 20% of the area of these permanent conservation sites will support these species by year 10 after permit issuance, and will maintain at least this total cover by these species thereafter. Management actions that will be implemented to achieve these objectives are described in the Site Management Plans found in Appendices C and D. This objective supports biological goal 1 for Taylor's checkerspot butterfly.

7. Manage vegetation to establish mostly flat and sparsely vegetated open grassland suitable for streaked horned lark foraging. Create and maintain at least 20% of the area of each conservation site as a contiguous bare ground or open area covered primarily with lichens and moss, and/or low stature grasses and forbs (less than 12 inches tall) by year 4 after permit issuance. Manage vegetation to increase this habitat type to achieve and maintain at least 40% of the area of this site by year 10 after permit issuance, and maintain this thereafter. Management actions that will be implemented to achieve these objectives are described in the Site Management Plans found in Appendices C and D. This objective supports biological goal 2 for streaked horned lark.

8. Manage the permanent conservation sites to restore and maintain these sites as grasslands consisting of forb cover of at least 20% for the first three years after permit issuance, increasing to at least 40% from years four through nine, and at least 80% thereafter. This objective is intended to support biological goals 1 and 3 for Taylor's checkerspot butterfly and both subspecies of Mazama pocket gopher.

9. To further support Taylor's checkerspot butterfly and the two covered subspecies of Mazama pocket gophers, the permanent conservation sites will be managed to restore and maintain areas that meet the definition of high quality grasslands (as defined elsewhere in this document). By year four after permit issuance, at least 10% of the area at the Leitner Prairie and Deschutes Corridor sites will meet this standard, and by year 10, at least 20% will achieve this standard. These sites will be managed to maintain this standard thereafter. This objective is intended to support biological goals 1 and 3 for Taylor's checkerspot butterfly and both subspecies of Mazama pocket gopher.

10. Manage the permanent conservation sites to support Mazama pocket gophers by achieving at least 20% occupancy by the Yelm and Olympia subspecies at Leitner Prairie and Deschutes Corridor (based on mound presence), respectively, by year four after permit issuance. Manage these sites to increase this occupancy rate to achieve at least 30% occupancy by year 10 and thereafter. This objective is intended to support biological goal 3 for both subspecies of Mazama pocket gopher.

11. To support ongoing efforts to conserve the Olympia subspecies of Mazama pocket gopher, the Applicants will continue to manage the three existing on-site habitat set-asides for this species.

3. Minimization Measures

The Applicants will implement the following measures to minimize impacts to the Covered species. Minimization measures will be employed at project development sites until building and construction permits are received from the issuing local jurisdiction and site development begins at each individual site. Minimization measures at the permanent conservation sites will be implemented throughout and beyond the duration of the Permit as a component of the ongoing operations and maintenance of these sites for the benefit of the Covered Species.

Avoidance of impacts is always the most effective method to prevent harmful effects to Covered Species. The Applicants will seek to avoid areas known to be occupied or that may provide habitat for any of the Covered Species to the greatest extent possible.

Impacts may be reduced by scheduling the timing of certain activities to avoid Covered Species that are not present in the permit area year-round. Because Taylor's checkerspot butterflies and the Olympia and Yelm subspecies of Mazama pocket gophers are not migratory and have relatively small home ranges, they are likely to be present on sites where they are found throughout the year. Scheduling or planning the timing of Covered Activities is therefore unlikely to avoid impacts to these species. Streaked horned larks that breed in the south Puget Sound area, however, are migratory and are only present in the vicinity of the permit area in the spring and summer. Though this species has not been observed on any of the Permit area sites, and the Applicants believe that these sites are likely too small to provide breeding habitat for the species, it is not possible to rule out the possibility that streaked horned larks might be found on one or more of the Permit area sites seasonally during the duration of the permit.

Though very unlikely, it is still possible that streaked horned larks could use smaller areas with potentially suitable breeding habitat, including areas at the project development and conservation sites. As described previously, the streaked horned larks in the south Puget Sound are the migratory portion of the rangewide population and are only known to use much larger areas for breeding, though populations on the Columbia River and in the Willamette Valley in Oregon are known to use smaller habitat patches. Vegetation management activities (such as the use of brush cutters, rotary cutters, or riding mowers) can kill, harm or harass streaked horned larks or their eggs or chicks. These activities will not affect streaked horned larks when they have migrated out of the Permit area (usually September through February each year). These actions could impact the species if they are present in the Permit area during the spring and summer growing seasons when vegetation management activities are likely to take place. Field observations to determine if streaked horned larks are present on Permit area sites will be completed prior to initiating vegetation management activities during the species nesting season (April 1 through September 1). If project development sites are determined to be occupied by streaked horned larks before development and building permits are issued (i.e., while the project development sites are being maintained as suitable habitat for the Covered Species), the Applicants will notify the Service and suspend vegetation management and other disturbing activities on the site for the duration of that year's breeding season (until September 1) or until individual of the species are no longer present on the site. Vegetation management actions will resume after the end of the breeding season or when the species is determined to no longer be present on the site.

Taylor's checkerspot butterflies and Mazama pocket gophers both occur within near-surface soil horizons for parts or all of their lives. These species can therefore be adversely impacted or killed when the soils where they are found are compacted. The Applicants will reduce soil disturbance and compaction to minimize impacts to these species when engaging in vegetation management and other activities within the Permit area while these sites are being managed to maintain suitable habitat for the Covered Species (i.e., until such time as development and building permits are issued for each of the project development sites). The Applicants may utilize multiple strategies to minimize soil compaction or disturbance, such as specifying the use of rubber-wheeled equipment rather than metal-tracked equipment or requiring the use of "landing mats" to distribute the weight of heavy equipment over a broad surface area. The selection of the most appropriate measure will be site specific and will be based on site conditions at the time the work is performed. In each instance, however, the Applicants will select methods that minimize compaction of soils that could affect the Covered Species.

All four of the Covered Species are adversely affected by degradation or loss of habitat due to encroachment by invasive and non-native vegetation. The Applicants will manage vegetation on all of the Permit area sites to reduce the cover of invasive and non-native species to minimize exposure to this stressor. Vegetation management on the project management sites will maintain less than 10% cover of Scot's broom and woody vegetation greater than 12 inches in height until the local jurisdiction has issued the required building permits and site development and construction activities begin.

The three existing onsite habitat set-asides for Mazama pocket gophers (located on the Deschutes Industrial Park, Tumwater Commerce, and Tilley Road project development sites) will continue to be permanently managed for Mazama pocket gophers in accordance with pre-existing City of Tumwater and Thurston County permitting requirements as described in Appendix E.

USFWS has not authorized translocation of Mazama pocket gophers from occupied project development sites as a method to minimize impacts to the species at this time. The Applicants commit, however, to allow and support trapping and translocation actions if USFWS determines that this practice is beneficial or may aid species recovery efforts. The Applicants therefore agree to notify USFWS as early as is practicable when each of the project development sites is planned for development activities to facilitate USFWS translocation activities if these actions are authorized at some time during the term of the requested Permit. The Applicants have provided for funding of translocation activities (as detailed in the Funding Assurances section of this document) in the event that USFWS authorizes and agrees to allow these activities within the permit area.

4. Mitigation Measures

This HCP provides short-term and permanent mitigation measures intended to rectify, reduce, and compensate for the impacts of the incidental taking associated with the Covered Activities.

Short-term mitigation consists of invasive and woody vegetation management on all of the project development sites to restore, enhance, or maintain suitable habitat for Covered Species until construction permits are issued by the local jurisdiction and development of a site is initiated. The Applicants believe that this management will provide the Covered Species with temporary refugium sites while Thurston County and others engaged in conservation and

recovery efforts for these species establish additional permanent conservation sites throughout the area.

The two conservation sites will be permanently managed for the benefit of the Covered Species. Management of these sites will include restoration and enhancement of existing and potential habitat for the four species covered by this plan. The HCP provides for the ongoing management of these sites through a dedicated funding mechanism to endow future management efforts (detailed in the Funding Assurances section of this document and further described in Appendix F). Site management plans prescribing specific actions and measurable performance standards are attached for the Leitner Prairie and Deschutes Corridor conservation sites as Appendices C and D, respectively. The dedication of these two properties as permanent conservation sites will reduce the threat that these sites could be developed therefore contributing to additional fragmentation and loss of habitat for the Covered Species. These sites will directly contribute to the ongoing efforts of the USFWS, Thurston County, and others to secure permanent protections that will aid in the recovery of these species.

Provision of these sites serves to offset the loss of poor to moderate quality habitat scattered among multiple small sites with larger blocks of permanently managed lands that will expand the amount and quality of available habitats for the Covered Species.

Restoration activities included the removal of trees, shrubs, and woody vegetation and invasive species (including Scot's broom). Clearing of invasive species and woody vegetation is likely to be accomplished primarily with mechanical means such as brush cutters, rotary cutters, and riding mowers, or with the use of prescribed fire. Native seeding and planting may also be used in conjunction with other management techniques to enhance habitat for Covered Species and restore functioning prairie ecosystems. In addition to promoting the recovery of Covered Species, the ongoing management of these sites will contribute to regional strategies for conserving prairie ecosystems.

5. Monitoring Plan

USFWS has determined that monitoring is essential to determining and documenting the success of the plan's conservation program (50 CFR 17.22 and .32), informing adaptive management efforts, and collecting information needed to meet reporting requirements. Two types of monitoring are incorporated into HCPs. Compliance monitoring will document how the Applicants implement the terms and conditions of the requested Permit. Effectiveness monitoring will determine and document if the stated biological goals and objectives are being achieved.

Compliance monitoring will describe how the HCP is implemented, and will result in an annual report to the USFWS each year for the duration of the requested permit. Compliance monitoring describes implementation of: 1) the Covered Activities, and 2) the conservation strategy. Covered Activities monitoring describes how the avoidance and minimization measures previously described are implemented each year. Covered Activities monitoring also describes the amount of take occurring each year, in terms of individuals of each species when that can be determined, and in terms of the amount of habitat removed or converted. Conservation strategy monitoring documents the implementation of the plan's conservation measures. This portion of the annual report describes how and when each of the mitigation measures was performed each year.

Effectiveness monitoring determines if the biological goals and objectives of the plan are being achieved. Effectiveness monitoring collects data that will over time determine if the conservation measures are working and how the Covered Species are responding to these actions.

Effectiveness monitoring efforts are focused on ensuring that suitable habitat is maintained for the Covered Species. Annual monitoring of project development sites will document site conditions and determine the level of effort needed to manage woody or invasive species such as Scot's broom. An annual report summarizing existing conditions, management recommendations, other observations of Covered Species or their presence (such as gopher mounds) will be submitted to USFWS. Project development sites will be monitored annually until construction permits for these sites are issued by the local agency jurisdiction and site development begins.

Monitoring plans for each of the conservation sites and for the on-site habitat set-asides are described in detail in Appendices C, D, and E. Monitoring of the conservation sites includes quantitative measures of invasive plant species, vegetation cover that benefits the Covered Species, bare ground (that can be covered with moss and lichens). For the on-site habitat set-asides, existing conditions will be documented to ensure that a mix of forbs and grasses, the preferred forage for gophers, dominates each site, and that non-native invasive species including Scot's broom are being adequately managed. The presence of gopher mounds will also be recorded on the conservation sites and on-site habitat set-asides. Progressive performance standards to be met during the permit duration are designed to provide an increasing amount of suitable habitat for the Covered Species over time. Monitoring results will be used to make management recommendations and guide management activities.

Monitoring reports will be prepared and submitted to USFWS annually for 20 years until this HCP expires, and every three years after the HCP expires until the species are recovered or extinct. Monitoring reports for the conservation sites, on-site habitat set-aside, and project development sites (until construction) required in the HCP may be combined into one annual report for presentation to USFWS. The annual report will document what the Applicants did to comply with the terms and conditions of the ITP, and will address each of the permit terms and conditions.

An annual report including the monitoring reports will include:

1. Activity and date of conservation actions since last monitoring report.
2. Current on-site conditions that are or may be adversely affecting Covered Species and their habitat, as well as any actions being undertaken or contemplated to address such conditions.
3. An evaluation of how conservation goals and performance standards are being met; what activities need to be taken to meet them in future year; or recommendations for revisions to goals and performance standards if changed circumstances have occurred.
4. Conservation actions anticipated prior to the next monitoring report submission.

6. Adaptive Management Plan

The U.S. Department of the Interior defines adaptive management as a structured approach to decision making in the face of uncertainty that makes use of the experience of management and

the results of research in an embedded feedback loop of monitoring, evaluation, and adjustments in management strategies (Williams et al. 2009). Uncertainties may include a lack of biological information for the Covered Species, a lack of knowledge about the effectiveness of mitigation or management techniques, or doubt about the anticipated effects of the Project. Adaptive management is a required component of HCPs that allows for the incorporation of new information into conservation and mitigation measures during HCP implementation. Effective implementation of this approach requires explicit and measurable objectives, and identifies what actions are to be taken and when they are to occur. Adaptive management measures do not generally trigger the need for an amendment.

Adaptive management will be used in conjunction with site monitoring to adjust and improve management techniques as site conditions change over time and as new information on Covered Species and their management becomes available. The Applicants' qualified consultant, a third party manager, or another qualified ecologist assigned by the landowner (if lands are transferred to another conservation landowner as approved by USFWS) will monitor the conservation sites. The Applicants' qualified consultant will monitor the onsite habitat set-asides for the duration of the HCP and the project development sites until they are constructed. Site management plans that describe the baseline performance standards and initial management actions are in Appendices C, D, and E.

Adaptive management is intended to improve the effectiveness of ongoing management of the Covered Species and their respective habitats. To ensure that management actions remain focused on the biological goals and objectives specified in the conservation program, the Applicants will employ the following remedial actions if the conservation program's specified goals and objectives are not met:

If unauthorized human access or activities occur on the conservation sites, the Applicants will increase monitoring and patrol of these sites and install additional signage delineating property boundaries with trespass warnings. If these activities continue, improved fencing intended to restrict human access may be installed or other means may be used to prevent human entry. Fencing may include locked gates to control access points to the properties. Any fences and gates will be patrolled and maintained as necessary to continue to control unauthorized access.

For project development sites, increased frequency of mowing or other vegetation management actions will be employed if invasive plant species exceed 10% total areal cover or if woody vegetation exceeds 12 inches in height. These management standards will be applied to the conservation sites for the first 9 years after permit issuance. Thereafter, invasive and woody species control will be increased to ensure no more than 5% total areal cover on these sites. These actions will continue on each of these sites until they are developed.

Efforts intended to establish and maintain plant species important for Taylor's checkerspot butterfly reproduction and feeding will be increased annually if the biological objective targets are not met within the specified timeframes. Actions to establish or support these species may include (but are not limited to) altering timing of other management actions (such as avoiding mowing when these species are setting seed or actively vegetatively reproducing), using management that enhances reproduction and growth of these species (such as the use of prescribed fire), or planting or seeding to expand populations of these species. This standard will

be applied to the conservation sites to ensure that at least 10% support these species by year 4 after permit issuance, increasing to at least 20% of the area by year 10 and thereafter.

To maintain open areas suitable for streaked horned lark foraging on the conservation sites, the frequency of mowing or other management actions will be increased annually if the bare open ground and low statured grass and forb cover standards described in the biological objectives are not achieved within the specified timeframes (at least 20% as a contiguous bare ground or open area covered primarily with lichens and moss, and/or low stature grasses and forbs less than 12 inches in height by year 4 after permit issuance; and at least 40% of the area to this standard by year 10 after permit issuance and thereafter).

If forb cover to support Mazama pocket gophers does not reach the biological objective for this metric (at least 20% for the first three years after permit issuance, increasing to at least 40% from years four through nine, and at least 80% thereafter) on the conservation sites and habitat set-asides, management efforts such as altering timing of other actions (such as avoiding mowing when these species are setting seed or actively vegetatively reproducing), using management that enhances reproduction and growth of these species (such as the use of prescribed fire), or planting or seeding to expand populations of these species will be increased annually until these standards are maintained.

At least 10% of the area at the Leitner Prairie and Deschutes Corridor sites will meet the definition of high quality grasslands (defined previously) by year 4, and by year 10 and thereafter at least 20% will of the area of these sites will meet this standard. Management actions such as altering timing of other actions (such as avoiding mowing when desirable species are setting seed or actively vegetatively reproducing), using management that enhances reproduction and growth of these species (such as the use of prescribed fire), or planting or seeding to expand populations of these species will be increased annually until these standards are achieved and maintained.

Uncertainty regarding biological or ecological factors on the project development and conservation sites that can be affected with recurring management actions (such as new management techniques to control invasive and woody plant species) may be addressed by testing and comparing alternative approaches with control treatments. If field testing is conducted, results will be evaluated and subsequent management will be modified to reflect the improved understanding resulting from such testing. The study design, methods, results, and modifications to ongoing management activities will be described in the annual report. Any change/adaption to the management regime will be based on best available science and focused on ensuring that the biological goals described in the HCP are achieved.

Changed and Unforeseen Circumstances

Changed Circumstances

Changed circumstances include all reasonably foreseeable circumstances that could be anticipated to occur in the plan area within the duration of the proposed permit. This includes natural events that normally occur in the plan area (fire, flood, climate change, earthquake, new species invasions, disease, etc.), the listing of other species within the plan area that may be

affected by the covered activities, or other events that could affect the Applicants' ability to meet the biological goals and objectives described in this HCP.

If natural events, such as those listed above, or other events, such as a change in genetic taxonomy, that could affect the Applicants' ability to meet the biological goals and objectives described in this HCP occur at any of the monitored sites, then how these events have affected Covered Species and/or their habitat will be described and addressed in the annual monitoring plan. Site management actions will be altered/adapted using best available science to promote the continued goals and objectives of habitat conservation for the Covered Species.

If unplanned fire occurs at any of the sites, then additional management activities may be required to meet HCP and site management performance standards. Some invasive species such as Scot's broom that may be present in the seed bank can be stimulated to germinate by fire. Additional management actions such increased frequency of mowing may be necessary after an unplanned fire event to control these invasive plants. Native seeding or planting may also be necessary to help prevent colonization of bare soils by invasive species.

Flooding is unlikely on the project development and the conservation sites, as they are generally located on upland prairie areas containing well-drained soil types. If flooding that could affect listed species occurs, a changed external factor may be responsible and should be determined. If human activities have caused the flooding, the Applicants will take steps to address or remedy the source or cause of the concern if the cause is located on the Applicants' property or is within the Applicants' control. Actions that inadvertently alter drainage, surface flows, or groundwater tables are not considered Covered Activities under this HCP. In the unlikely event that changes to drainage conditions beyond those associated with site development activities become necessary, the Applicants will consult with USFWS to determine if such actions could result in take and therefore whether an amendment to the ITP would be required to provide take coverage before implementing any such actions. Shifts in seasonal ground water table over time may be more challenging to address. Because no remedial actions for such an occurrence are expected, they are not provided for in this HCP. If the Applicants determine that they need to take action to address this changed circumstance, they will consult with USFWS to determine if their proposed actions could result in take of listed species and therefore whether an amendment to the ITP would be necessary to provide take coverage before initiating those activities.

Climate change in this region is expected to result overall in warmer average temperatures across all seasons and in wetter winters and drier summers in future years (University of Washington 2012). Resulting changes in vegetation communities over time that could impact the Covered Species may require changes to management activities to ensure that the performance standards established in this HCP are achieved. Such changes could include altering timing or frequency of management activities described in the Site Management Plans. Actions beyond those discussed in this HCP are not covered, and the Applicants will consult with USFWS to determine if any proposed changes to management actions beyond such minor adjustments as changes to timing or frequency may result in take of listed species and therefore require an amendment to the ITP to provide take coverage.

A major earthquake could cause topographic uplift or subsidence. Changes to site conditions such as colonization of disturbed soil areas by invasive species or altered soil moisture conditions could result in shifting vegetation communities. The Applicants will adjust

management actions to ensure that the biological goals and objectives and the associated performance standards described in the HCP will continue to be achieved. Altered management actions could include changing the timing or frequency of management actions or planting and seeding native plant species important to the Covered Species for reproduction or feeding. Actions beyond those discussed in this HCP are not covered, and the Applicants will consult with USFWS to determine if any proposed changes to management actions beyond such minor adjustments may result in take of listed species.

If new invasive species are detected on a site, the Applicants will employ the Adaptive Management procedures described previously to evaluate and adapt management activities to ensure that the goals and objectives of the conservation program will be met.

If there is a change in taxonomy for any of the Covered Species, USFWS will be allowed to research the animals on any of the sites, if needed, to learn more about the taxonomy at these locations. However, a taxonomic change should not require specific site management changes.

If a newly listed species occurs within the permit area covered by this HCP, the Applicants will determine if that newly listed species might be affected by the Covered Activities. If effects to the newly listed species can be avoided, then no additional action is required. If effects to the species cannot be avoided, the Applicants will consult with USFWS before proceeding with development activities to determine if the permit can be amended to incorporate conservation actions for the newly listed species. Amending the HCP to incorporate an additional Covered Species would require additional analysis under the ESA and NEPA.

Unforeseen Circumstances and "No Surprises" Assurances

Unforeseen circumstances include circumstances that were not anticipated by the Applicants or USFWS during the preparation of the HCP that result in a substantial and adverse change in the status of the Covered Species. Unforeseen Circumstances are defined by Federal regulation (50 CFR §17.3) as "changes in circumstances affecting a species or geographic area covered by a conservation plan or agreement that could not reasonably have been anticipated by plan or agreement developers and the USFWS at the time of the conservation plan's or agreement's negotiation and development, and that result in a substantial and adverse change in the status of the covered species."

USFWS bears the burden of demonstrating that Unforeseen Circumstances exist, using the best scientific and commercial data available. If an Unforeseen Circumstance occurs during the term of the HCP, and if USFWS determines that additional conservation and mitigation measures are necessary to respond to such Unforeseen Circumstances, then USFWS may require more conservation measures of the Permittees, but only if such measures are limited to modifications within conserved habitat areas, if any, or the HCP's operating conservation program for the affected species, and if such measures maintain the original terms of the HCP to the maximum extent possible (50 CFR 17.22).

Notwithstanding the foregoing paragraph:

1. USFWS will clearly document any findings of Unforeseen Circumstances. In determining whether any event constitutes an unforeseen circumstance, USFWS will consider, but not be limited to, the following factors: 1) the extent of the current range of affected species, 2)

percentage of range adversely affected by the HCP, 3) the percentage of range of the affected species conserved by the HCP, 4) the ecological significance of that portion of the range affected by the HCP, 5) the level of knowledge about the affected species and habitat and the degree of specificity of the species' conservation program under the HCP, and 6) whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

2. USFWS will not require the commitment of additional land, water, or financial compensation without the consent of the Applicants or impose additional restrictions on the use of land, water, or natural resources otherwise available for use by the Applicants under the original terms of the HCP, including additional restrictions on covered actions that are permitted under the HCP.

3. Nothing in this HCP will be construed to limit or constrain USFWS or any other governmental agency or individual from taking additional actions at its own expense to protect or conserve a species included in the HCP.

In the event of Unforeseen Circumstances USFWS will provide written notice (except where there is substantial threat of imminent, significant adverse impacts to a Covered Species) to the Applicants with a detailed statement of the facts regarding the unforeseen circumstance involved, the anticipated impact(s) to the Covered Species and their habitat(s), and all information and data that supports the assertion. In addition, the notice will include any proposed conservation measure(s) that is believed would address the Unforeseen Circumstance, an estimate of the cost of implementing such conservation measure(s), and the likely effects upon the Applicants.

Evaluation of Unforeseen Circumstances
During the period necessary to determine the nature and location of additional or modified mitigation, the USFWS may perform an analysis of the Covered Species or its habitat. The Applicants may submit additional information to the USFWS. The USFWS may use requested or provided information to propose modifications or redirection of existing conservation measures.

The "No Surprises" Policy
The "No Surprises" policy (69 FR 71723) states that if the Applicants are properly implementing an HCP that has been approved by USFWS, no additional commitment of resources beyond that already specified in the plan will be required. "Properly implemented conservation plan" means any HCP and permit whose commitments and provisions have been and are being fully implemented by the Applicants and in which the Applicants are in full compliance with the terms and conditions of the permit, so the HCP is consistent with the agreed-upon operating conservation program for the project. A properly-implemented conservation plan for the HCP includes implementation of all elements of the conservation plan, including the Adaptive Management, Monitoring Program, and responses to Changed Circumstances.

The Applicants seek the regulatory (No Surprises) assurances for all Covered Species in the plan. In accordance with No Surprises, the Applicants will be responsible for implementing and funding adaptive management and remedial measures in response to any Changed Circumstances as described in the HCP. The Applicants would only be obligated to address Unforeseen Circumstances within the specified limits described above.

The Applicants understand that No Surprises assurances are contingent on the proper implementation of the ITP and the HCP. The Applicants also understand that USFWS may suspend or revoke the Federal permit, in whole or in part, in accordance with Federal regulations (50 CFR Section 13.27 and 13.28 and other applicable laws and regulations) in force at the time of such suspension.

Funding Assurances

The Applicants will establish an endowment to fund implementation of the conservation program including the short-term management actions on the project development sites and the ongoing management of the permanent conservation sites as described in the HCP. The endowment will fund implementation whether these sites are under the control of the Applicants or if the lands are transferred to a third party such as a government entity, a Non-Governmental Organization, or some other long-term land steward.

Prior to issuance of the requested 20-year ITP the Applicants will fund the endowment to cover all estimated expenses for the first ten years (Years 1-10) of program implementation. These expenses shall include administrative and management costs, insurance, licenses and fees, land maintenance, land monitoring, reporting, professional services, taxes, translocation costs, adaptive management or changed circumstances, and contingency fees for the project development and conservation sites. The remaining ten years of administrative and management costs (Years 11-20) will be deposited into the endowment no later than the end of the fifth year (Year 5) after permit issuance. Funding to provide for ongoing perpetual maintenance of the conservation sites, estimated for Years 21-100, will be deposited into the endowment no later than the end of the 15th year (Year 15) after permit issuance.

Annual costs for vegetation management and monitoring of the development sites and conservation sites have been estimated using the previous year's estimated costs plus an inflation rate of 2.5% per year (Appendix F). As project development sites are built out, less of these areas will be managed as habitat for listed species over time. The annual cost for the management and monitoring of these sites is therefore estimated to decrease by 5% each year of the 20-year permit term. An inflation rate of 2.5% per year is incorporated to estimate the annual cost of ongoing perpetual maintenance of the conservation sites (Years 21-100). The actual balances due at the end of Years 5 and 15 are subject to change based on actual expenses from Years 1-5 and Years 5-15, respectively, and will be adjusted for any shortfall or surplus in the cash balance due from investments being higher or lower than the estimated 5% return.

The Owners Association of each property that has an onsite habitat set-aside (Tilley Road, Tumwater Commerce, and Deschutes) will fund the annual vegetation management and monitoring required for their onsite habitat set-aside. This funding will be provided through the Owners Association on a per lot basis at each of the properties. The cost per landowner or tenant is based on the acreage of each lot. Funding is assured for the duration of the permit coverage (20 years). To assure perpetual funding for maintenance at habitat set-asides, authorization to collect fees for vegetation management and monitoring to comply with local jurisdiction HMP requirements will remain with the Owners Association after expiration of the permit.

The total estimated present value of the endowment for the 20-year permit term and ongoing perpetual maintenance beyond Year 20 is estimated to be $839,000. This cost estimate does not

include conservation site purchase costs and initial restoration activities which have already been funded by the Applicants. Proceeds from the sale of mitigation credits that remain at Deschutes Corridor (12 acres) and Leitner Prairie (8.5 acres) may be used by the Applicants to fund the costs of this HCP, including, but not limited to, initial restoration activities and the endowment.

The Applicants may transfer any of the project development or the conservation sites during the term of this HCP. Any conveyance of project development sites prior to expiration of the term of the requested ITP will contain restrictions requiring these properties to be managed to achieve the performance standards of this HCP for the remainder of the permit duration. If any management obligations associated with a project development site described in the HCP have not been completed prior to transfer, the rights and obligations associated with the ITP shall be maintained by the Applicants unless they are transferred to the new landowner in accordance with applicable USFWS regulations (50 CFR Parts 13 and 17. Any conveyance of the conservation sites shall require that they be managed according to the HCP and in compliance with the terms and conditions of the ITP. The rights and obligations associated with the ITP as they relate to the conservation sites shall also be maintained by the Applicants unless they are transferred to the new landowner in accordance with applicable USFWS regulations (50 CFR Parts 13 and 17). Conveyance of a property will not affect the required mitigation or change funding assurances for mitigation because the system put in place by the Applicants as a condition of conveyance or sale for funding the endowment will legally apply to a property when it is conveyed or sold.

The Applicants will hold the endowment and release funds as needed each year to meet the HCP permit requirements, regardless of who owns and manages the properties. Conservation sites will be managed and conserved in perpetuity. At the end of the 20-year permit term, the endowment fund will be transferred to the property owner(s) of the conservation sites with a legal agreement stating that these funds are to be used only for ongoing site management and monitoring in perpetuity (estimated as Years 20–100).

Annual costs to achieve the previously described performance standards are expected to vary over time, and are likely to be higher the first few years when more intensive methods like prescribed fire and seeding may be used to restore habitats or re-establish native prairie communities. Ongoing management costs are expected to decline over time once effective management actions are implemented on the project development and conservation sites. The Applicants anticipate that endowment fund expenditures reflecting actual costs of program implementation over the first five years will be used to adjust future endowment deposits due in years 5 and 15 after permit issuance.

Annual reporting during the permit term will include a status report of the endowment fund; including receipts, disbursements, earnings, and balance.

Alternatives to the Taking the Applicants Considered

An HCP is required to describe "what alternative actions to such taking the applicant considered and the reasons why such alternatives are not being utilized" (ESA §10(a)(2)(A)(iii)).

The only alternative that would completely avoid impacts to the Covered Species or their habitats would be to choose not to develop any of the project development sites where the listed

species may occur. The Applicants have decided not to forego development of the sites because they have already made significant investments in infrastructure including roadways, utilities, and storm water facilities in anticipation of developing these tracts at some time in the future. The infrastructure developed to support these tracts was completed prior to publication of the Final Rules listing the Covered Species as threatened or endangered. Choosing not to develop these sites would represent a loss of the value of the infrastructure previously constructed to facilitate development of these tracts. In addition, all of the project development sites are located within city or UGA boundaries that are compliant with the intent of the state Growth Management Act (GMA).

The construction of commercial development on the project development sites is an otherwise lawful activity and the Applicants have decided to develop these sites or to make them available for development at some time over the term of the requested permit.

There are no final design plans or construction timelines for most of the project development sites at this time. While some projects might be developed in a manner that could avoid impacts to listed species or their habitats, there is no way to know at the current time how each of these sites will eventually be developed.

To facilitate the widest range of possible development scenarios, the Applicants have proposed conservation measures intended to mitigate for the eventual loss of all individuals of the Covered Species and their respective habitats on the project development sites with the understanding that the development of each site will avoid impacts to the extent possible.

Such Other Measures that the Secretary May Require

Permit Amendments
It may be necessary at some time over the duration of the proposed permit for the USFWS and the Applicants to clarify provisions of the HCP or the requested ITP with respect to program implementation or the meaning and intent of language contained in these documents. Such clarifications should not change the substantive provisions of any of the documents in any way, but merely clarify and make more precise the existing provisions.

In addition, it may be necessary to make administrative changes or minor modifications to the documents at some time over the duration of the proposed permit. Such changes should not result in substantive changes to any provisions of the documents, but may be necessary or convenient to represent the overall intent of the Applicants and the USFWS. Examples of such administrative changes or minor modifications include correction of typographic errors in the documents, changes in the legal business name or mailing address of a permittee, or clarification of reporting procedures. Requests for administrative changes and minor modifications must be received in writing and may be reviewed and approved by the USFWS Regional Office or by the State USFWS Ecological Services Office in accordance with applicable regulations and policies (50 CFR 13).

Except as provided for above, the HCP and the ITP may not be amended or modified in any way without the written approval of the Applicants and the USFWS. Major amendments to the HCP or the ITP would be required for changes in location, covered activity, type or amount of take, or

covered species. Examples of changes requiring major amendments to the documents include the listing of a species not currently addressed in the HCP that may be affected by the Covered Activities; the modification of any Covered Activity, minimization, or mitigation measure under the HCP, including funding, that may affect the type or amount of take, the effects of the Covered Activities, or the nature or scope of the minimization or mitigation measures in a manner or to an extent not previously considered in issuing the ITP; or any other modification of the Covered Activities that causes an effect to the Covered Species or their designated critical habitat not considered in the original ITP.

Such major amendments will be processed by the USWFS in accordance with the provisions of the ESA, the applicable regulations (50 CFR 13 and 17), and will be subject to the appropriate level of environmental review under the provisions of NEPA.

Annual Reporting

An Annual Report describing Covered Activities and the conservation measures will be prepared by the Applicants and submitted to the USFWS Washington Fish and Wildlife Office in Lacey, Washington and the Regional office in Portland, Oregon no later than November 1 each year for the duration of the permit.

The report will summarize the following information:

- The development status of each of the project development sites.
- The Applicants' anticipated development timeline for each of the project development sites (if known).
- The date on which development and construction is completed for each of the project development sites (usually the date a Certificate of Occupancy is issued for the last structure completed on a site).
- On the first annual report date following completion of development of each parcel, the Applicants will describe the site as "completed" or "fully developed".
- Conservation measures implemented on the project development sites that have not yet been developed (the specific actions and the dates on which these measures were implemented).
- Conservation measures implemented on the conservation sites (include specific actions and dates).
- If any parcels (project development sites or conservation sites) are conveyed to a third party in fee, under easement, or through some other arrangement, the structure of the relationship and responsibility for ongoing management under the requirements in the HCP and the ITP will be defined. Copies of conservation easements or management agreements defining these roles and responsibilities will fulfill this requirement.
- Results of compliance monitoring describing how each of the requested permit terms and conditions was achieved. This serves to verify that the Applicants met all requirements during the permit year.

- Results of effectiveness monitoring describing progress towards achieving the biological goals and objectives of the HCP. This includes monitoring of the measurable performance standards in Appendices C, D, and E and may include description of the status and trends of the covered species and their habitats on the project development sites and on the conservation sites and on-site habitat set-asides.

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Appendix A. Existing Conditions Map Set

Vicinity/Index Map
Existing Conditions Map Set of project development sites and Conservation Sites

Map 1A	Kaufman Industrial Park
Map 1B	79th Ave Business Park
Map 2	Liberty Leasing/Trails End Industrial Park
Map 3	Deschutes Industrial Park
Map 4	Tumwater Commerce Place
Map 5A	Tilley Road Industrial Park
Map 5B	88th Avenue Subdivision
Map 6	I-5 Commerce
Map 7	Lathrop Industrial Park
Map 8	Grand Mound Distribution Center
Map 9	Sargent Road
Map 10	Union Mills Road
Map 11	Wichman/McCellan Tenino Properties
Map 12	Deschutes Corridor Conservation Site
Map 13	Leitner Prairie Conservation Site

Kaufman Properties HCP
Vicinity/Index Map

Map 1.
Kaufman Industrial Park
79th Ave Business Park

Map 2.
Liberty Leasing/Trails End Industrial Park

Map 3.
Deschutes Industrial Park

Map 4.
Tumwater Commerce Place

Map 5.
Tilley Road Industrial Park
88th Avenue Subdivision

Map 6.
I-5 Commerce

Map 7.
Lathrop Industrial Park

Map 8.
Grand Mound Distribution Center

Map9.
19635 Sargent (Rochester)

Map 10.
Union Mills Road

Map 11.
Wichman/McCellan Tenino Properties

Map 12.
Deschutes Corridor

Map 13.
Leitner Prarie

2.5 1.25 0 2.5 Miles

N

Sources:
Kaufman Construction & Development, Inc.: CAD drawings, 2014
Thurston County GIS: Parcels
ESRI: Base Map

Map Author: S. Krippner
Map Created: 7/14/2015

KRIPPNER Consulting, LLC

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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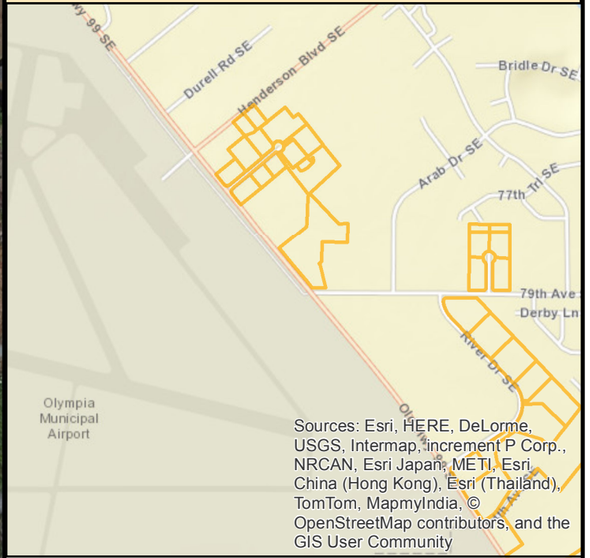
Kaufman Properties HCP 1

Map 1.
A - Kaufman Industrial Park
B - 79th Ave Business Park

Photo Points
Developed
Stormwater
Undeveloped - Degraded Grassland

250 125 0 250 Feet

N



Sources:
Kaufman Construction & Development, Inc.: CAD drawings, 2014
Krippner Consulting, LLC: field data, 2013, 2014, 2015
Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 3/26/2015

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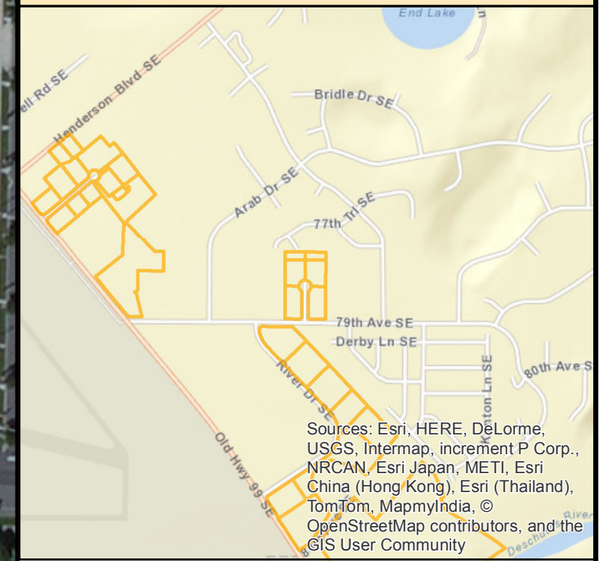
Kaufman Properties HCP 2

Map 2.
Liberty Leasing/Trails End Industrial Park

Photo Points
Developed
Stormwater
Undeveloped - Degraded Grassland

150 75 0 150 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 3/25/2015

KRIPPNER Consulting, LLC

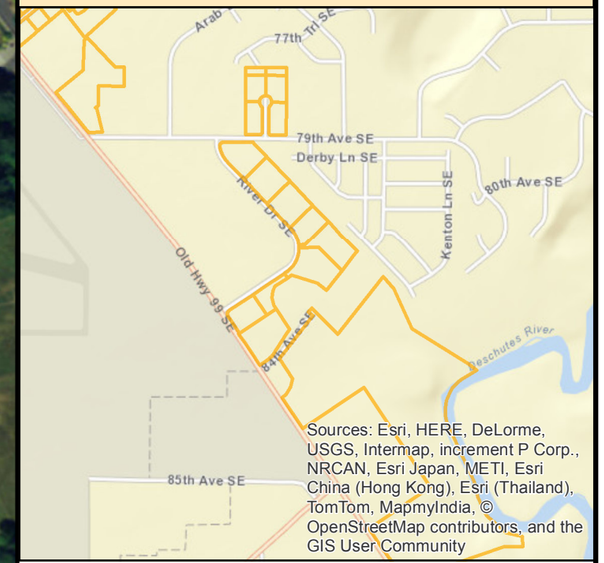
Kaufman Properties HCP 3

Map 3.
Deschutes Industrial Park

- Photo Points
- Developed
- Stormwater
- Habitat Set-aside
- Undeveloped - Degraded Grassland

400 200 0 400 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 7/14/2015

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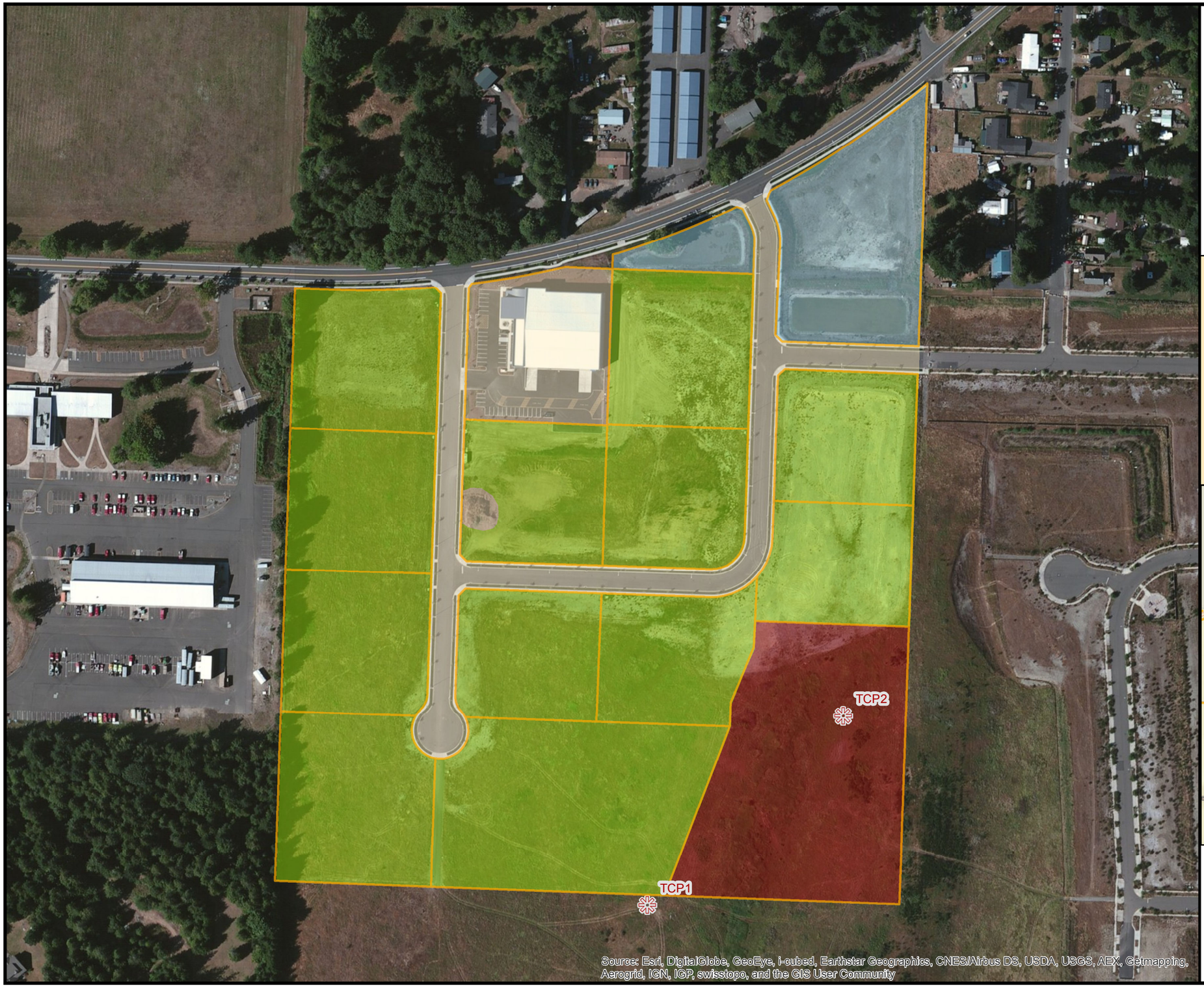
Kaufman Properties HCP 4

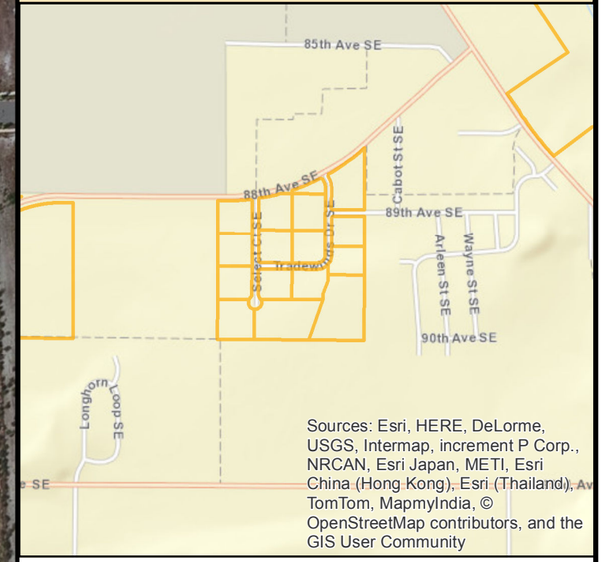
Map 4.
Tumwater Commerce Place



- Photo Points
- Developed
- Habitat Set-aside
- Stormwater
- Undeveloped - Degraded Grassland

250 125 0 250 Feet

N



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Krippner Consulting, LLC: field data, 2013, 2014
Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/22/2015

KRIPPNER Consulting, LLC

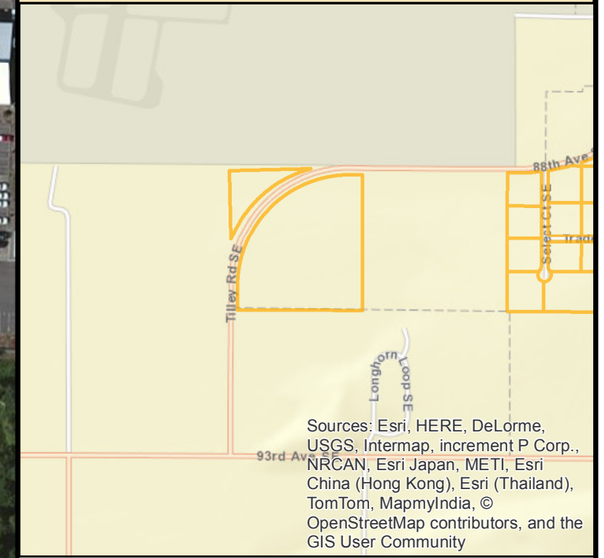
Kaufman Properties HCP 5

Map 5.
A - Tilley Road Industrial Park
B - 88th Avenue Subdivision

- Photo Points
- Developed
- Stormwater
- Habitat Set-aside
- Undeveloped - Tree

200 100 0 200 Feet

N



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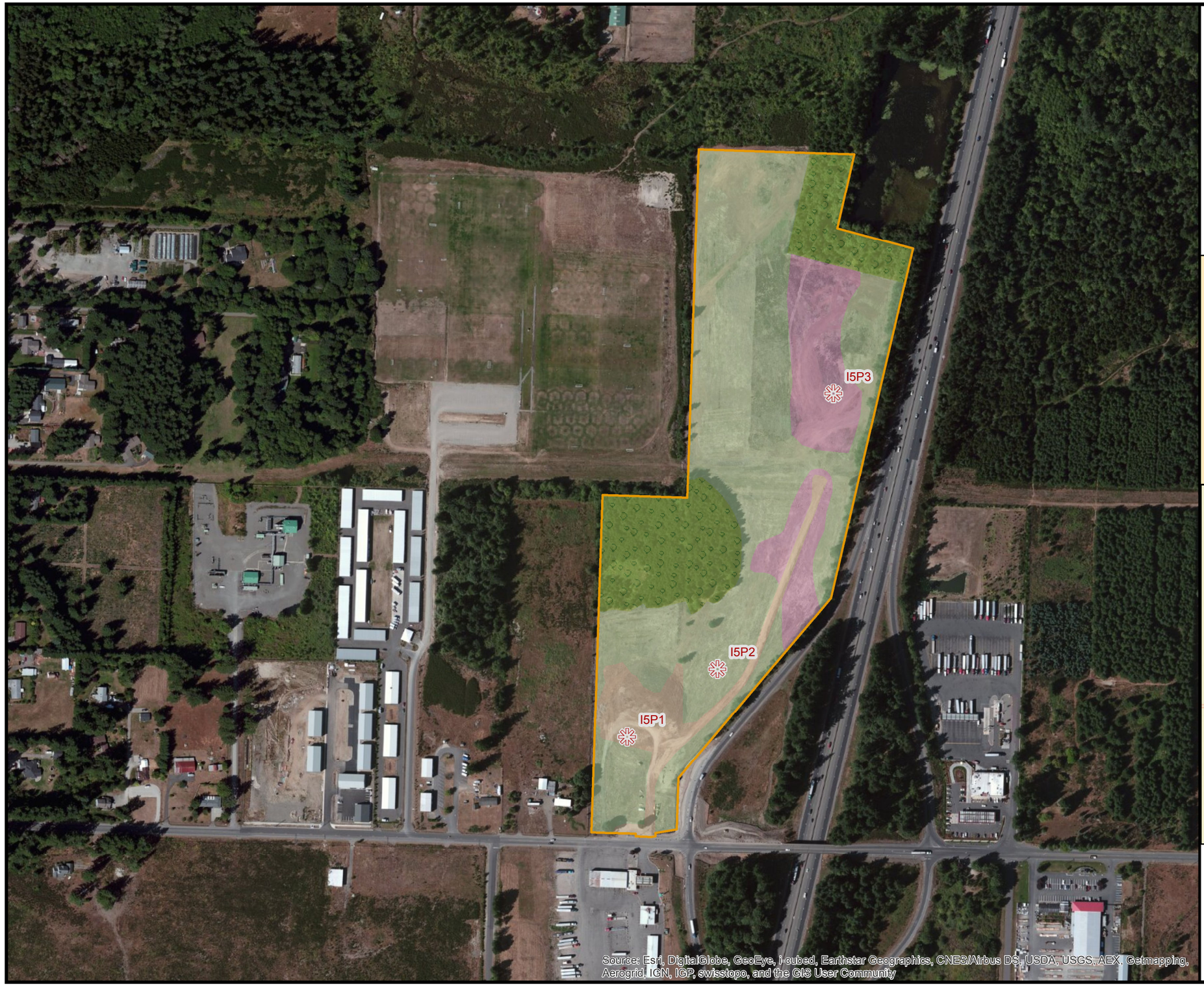
Sources:
Kaufman Construction & Development, Inc.: CAD drawings, 2014
Krippner Consulting, LLC: field data, 2013, 2014, 2015
Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 3/26/2015

KRIPPNER Consulting, LLC

Kaufman Properties HCP 6

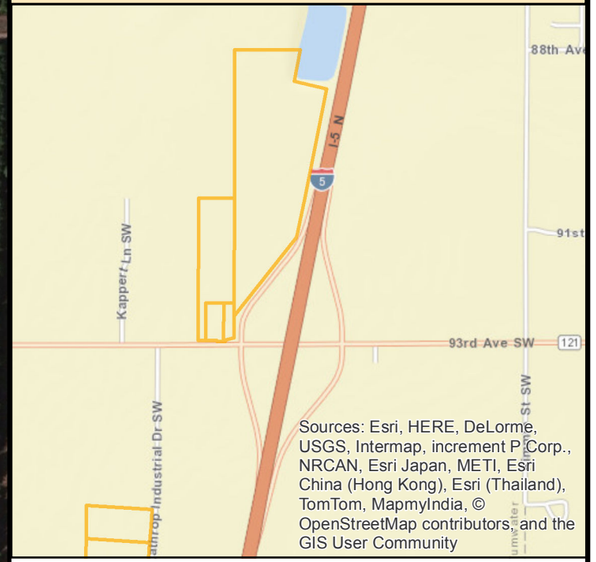
Map 6.
I-5 Commerce



- Photo Points
- Developed
- Undeveloped - Tree
- Undeveloped - Degraded Grassland
- Undeveloped - Unsuitable Conditions

500 250 0 500 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery, NRCS: Soils

Map Author: S. Krippner
Map Created: 1/26/2015

KRIPPNER Consulting, LLC

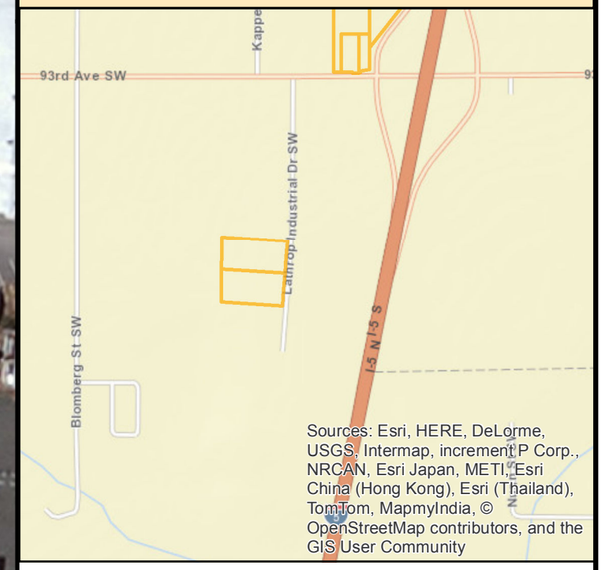
Kaufman Properties HCP 7

Map 7.
Lathrop Industrial Park

Photo Points
Developed
Stormwater
Undeveloped - Degraded Grassland

100 50 0 100 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/22/2015

KRIPPNER Consulting, LLC

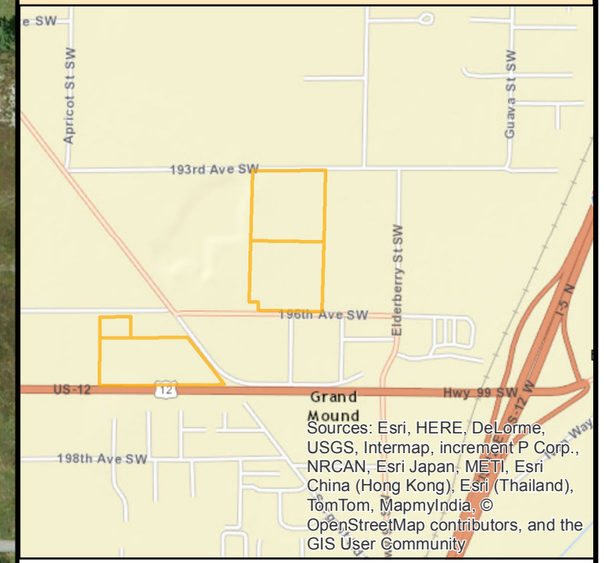
Kaufman Properties HCP 8

Map 8.
Grand Mound Distribution Center

Photo Points
Undeveloped - Degraded Grassland
Undeveloped - Shrub

300 150 0 300 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/22/2015

KRIPPNER Consulting, LLC

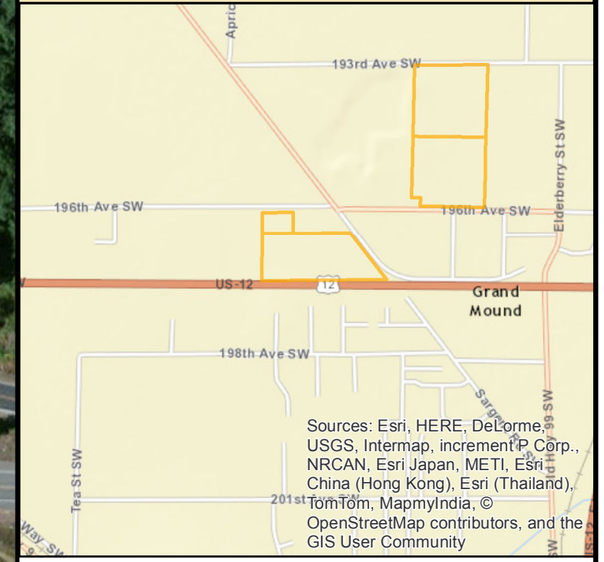
Kaufman Properties HCP 9

Map 9.
19635 Sargent (Rochester)

- Photo Points
- Developed
- Undeveloped - Degraded Grassland
- Undeveloped - Shrub

150 75 0 150 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/23/2015

KRIPPNER Consulting, LLC

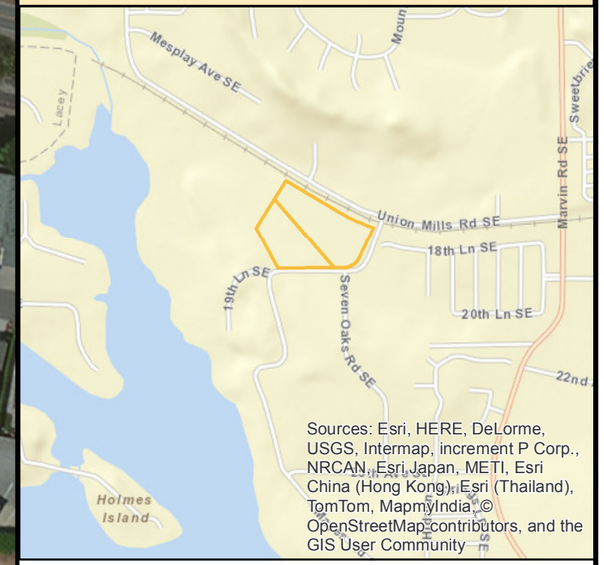
Kaufman Properties HCP 10

Map 10.
Union Mills Road

Photo Points
Developed
Undeveloped - Shrub

150 75 0 150 Feet

N



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ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/22/2015

KRIPPNER Consulting, LLC

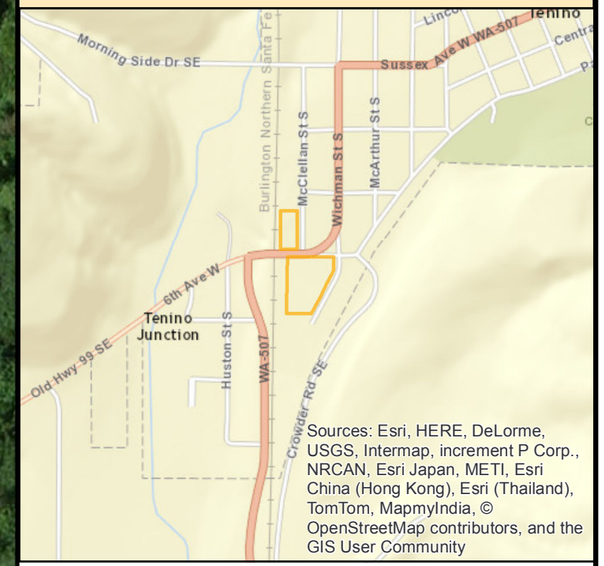
Kaufman Properties HCP 11

Map 11.
Wichman/McCellan Tenino Properties

Photo Points
Developed
Undeveloped - Degraded Grassland

150 75 0 150 Feet

N



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Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/22/2015

KRIPPNER Consulting, LLC

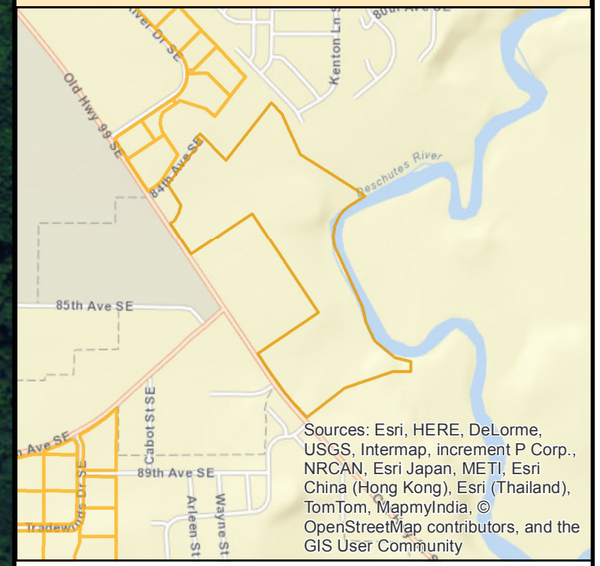
Kaufman Properties HCP 12

Map 12.
Deschutes Corridor

Photo Points
Undeveloped - Shrub
Undeveloped - Tree
Undeveloped - Sparsely Vegetated Ground

450 225 0 450 Feet

N



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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Sources:
Kaufman Construction & Development, Inc.; CAD drawings, 2014
Krippner Consulting, LLC: field data, 2013, 2014
Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 6/18/2015

KRIPPNER Consulting, LLC

Kaufman Properties HCP 13

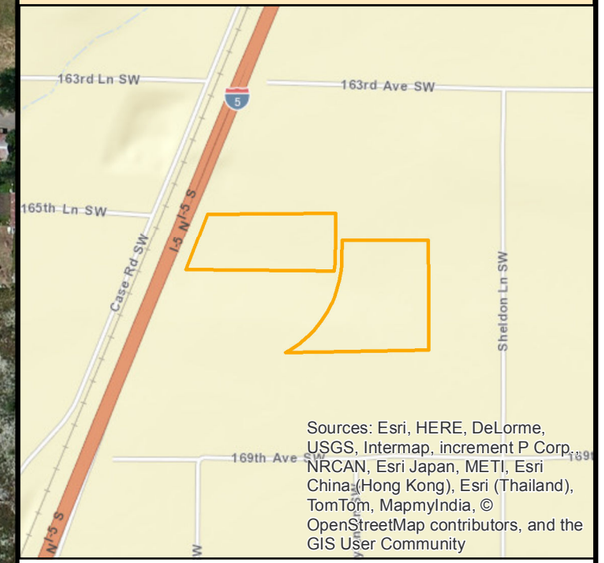
Map 13.
Leitner Prarie

Photo Points

Restored Grassland

300 150 0 300 Feet

N



Sources:
Kaufman Construction & Development, Inc.: CAD drawings, 2014
Krippner Consulting, LLC: field data, 2013, 2014
Thurston County GIS: Parcels
ESRI: Imagery

Map Author: S. Krippner
Map Created: 1/23/2015

KRIPPNER Consulting, LLC

Appendix B. Site Descriptions

Site descriptions for project development sites and Conservation Sites

Kaufman Industrial Park
79th Ave Business Park
Liberty Leasing/Trails End Industrial Park
Deschutes Industrial Park
Tumwater Commerce Place
Tilley Road Industrial Park
88th Avenue Subdivision
I-5 Commerce
Lathrop Industrial Park
Grand Mound Distribution Center
Sargent Road
Union Mills Road
Wichman/McCellan Properties
Deschutes Corridor Conservation Site
Leitner Prairie Conservation Site

Photo point locations are provided on the Existing Conditions Maps. Krippner Consulting conducted gopher mound surveys and observations unless otherwise noted.

<table>
<tr><td colspan="2">Site: Kaufman Industrial Park (Map 1)</td><td>Zoning: Light Industrial (LI)</td></tr>
<tr><td colspan="3">Address or Location: 741 Airport Ct. SE, Tumwater Urban Growth Area (UGA)</td></tr>
<tr><td colspan="2">Parcels: 57190000100; 57190000200; 57190000300; 57190000400; 57190000500; 57190000600; 57190000700; 57190000800; 57190000900; 57190001000; 57190001100; 57190001200</td><td>Size: 11.5 acres</td></tr>
<tr><td colspan="3">Existing conditions and vegetation: Most of this site is developed (10.3 acres or 93% of the site area) with parking lots and buildings, and on one lot soils are compacted from vehicle parking and turn around use. Remaining vegetated areas include two small lots (1-acre total) dominated by grasses (orchard grass and bentgrass), Scot’s broom, bracken fern and a variety of weedy herbs; and a mowed area (0.2 acre) with low grasses, narrowleaf plantain, mosses, hairy cat’s ear, vetch, and sorrel.</td></tr>
<tr><td colspan="3">Mapped soil types: Nisqually loamy fine sand (0 to 3% slopes)</td></tr>
<tr><td colspan="3">Gopher occupancy: No formal occupancy survey has been completed on this parcel, but occupancy was recorded by WDFW in 2008 on an adjacent parcel that is now fully developed. It is possible that gophers may occasionally disperse across Old Highway 99 from the nearby airport property to vegetated areas of this site where soils are not too compacted. However, given the small, isolated patches of vegetated habitat available, it is unlikely that there is any persistent population of gophers on this site or that they would persist in future years.</td></tr>
<tr><td colspan="3">USFWS Designated Subspecies Area: Olympia (Thomomys mazama pugetensis)</td></tr>
<tr><td colspan="3">Site-specific activities: Scot’s broom will be managed by mowing or targeted herbicides, as on other development sites. Current mowing practices in landscaped areas will continue.</td></tr>
<tr><td colspan="2"> 
KIP1 - View West (December 19, 2013)</td><td> 
KIP2 – View South (March 24, 2015)</td></tr>
<tr><td colspan="2"> 
KIP2 – View West</td><td> 
KIP3 – View East</td></tr>
</table>

Site: 79th Avenue Business Park (Map 1)	**Zoning**: Light Industrial (LI)
Address or Location: 810 to 816 - 79th Avenue SE, Tumwater UGA	
Parcels: 38400000104	**Size:** 5.19 acres
Existing conditions and vegetation: Approximately 3 acres (60%) of this site is developed with parking areas and buildings; one acre (20%) is a storm water facility; and one acre (20%) is a landscaped area with mowed lawn. Roads and high-density commercial development surround the site.	
Mapped soil types: Nisqually loamy fine sand (0 to 3% slopes)	
Gopher occupancy: Relatively fresh gopher mounds were observed in the landscaped area on December 19, 2013. However, commercial development and roads surround the small landscaped area and storm facility. Old Highway 99 with increasing traffic volumes is likely to become a more substantial barrier to gopher movement over time. Therefore, gophers are not likely to persist here or continue dispersing from airport habitat areas in future years.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: The landscaped area will continue to be managed by mowing until the site is re-developed. The storm water facility is permanent and will continue to be managed to comply with local regulations.	

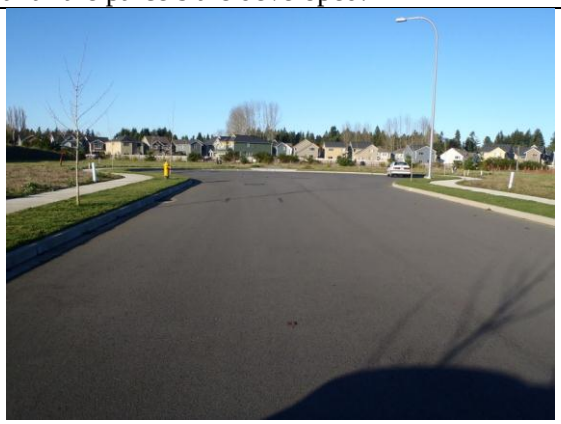
79P1 - View North (December 19, 2013)

79P1 – View East

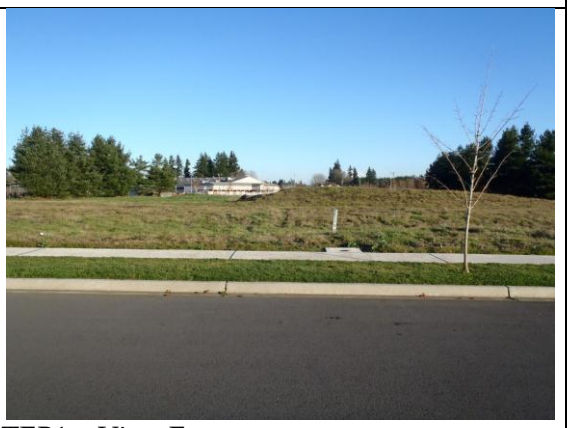
79P1 – View West

79P2 – View North

Site: Liberty Leasing/Trails End Industrial Park (Map 2)	**Zoning**: Light Industrial (LI)
Address or Location: Sweet Iron Lane SE, Tumwater UGA	
Parcels: 12712230301; 12712230302; 12712230303; 12712230304	**Size:** 4.42 acres
Existing conditions and vegetation: Site infrastructure including roads, utilities, and storm water facilities have been installed and the site has been cleared and graded. Undeveloped areas and the storm water facility, totaling approximately 3.4 acres or 77% of the site, are vegetated with weedy grasses and herbs. Roads, residential development, and land zoned commercial surround this site.	
Mapped soil types: Nisqually loamy fine sand (0 to 3% slopes)	
Gopher occupancy: Gophers mounds were observed on July 14, 2014 in some of the vegetated portions of this site and on the side slopes of the storm water facility. WDFW translocated approximately 30 gophers from Trails End to Wolfhaven, a prairie with mima mounds, in 2009 and/or 2010 (Schmidt 2012) with funding from Kaufman.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Site vegetation will continue to be managed by mowing or other means until the parcels are developed.	



TEP1 - View North (November 20, 2013)



TEP1 – View East

TEP1 – View West

Storm water facilities (View East)

Site: Deschutes Industrial Park (Map 3)	**Zoning**: Light Industrial (LI)
Address or Location: 8000 block River Road, Tumwater UGA	
Parcels: 44160001000; 44160001100; 44160001200; 44160001300; 44160001500; 44160001600; 44160001700; 44160100000; 31100000101	**Size:** 19.29 acres
Existing conditions and vegetation: Site infrastructure including roads, utilities, and storm water facilities have been installed and the site has been cleared and graded for development. Undeveloped areas and the storm water facility, encompassing approximately 17 acres or 90% of the site, are vegetated with weedy grasses and herbs. Grasses, mainly sweet vernal grass, red fescue, brome, orchard grass, and velvet grass dominate the site. Herbs found throughout the site include hairy cat's ears, long-leaf plantain, and vetch. Native lupine was found in some areas during the initial June 2011 survey for gopher mounds, and Roemer's fescue is established on the side slopes of the storm water facility. Scot's broom is being managed.	
Mapped soil types: Nisqually loamy fine sand (0 to 3% slopes); Nisqually loamy fine sand (3 to 15% slopes)	
Gopher occupancy: Gophers mounds have been observed on vegetated portions of this site during annual site monitoring since 2011.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Site vegetation will continue to be managed by mowing or other means until the parcels are developed. The 3.22-acre habitat set-aside will be managed as permanent habitat (includes 2.8 acres of well-drained slopes in the storm water facility and a 0.22 acre strip of land adjacent to the Bridlewood habitat set-aside as shown below).	

DIP1 - View Northwest (June 1, 2011)

DIP2 – View South (September 23, 2014)

DIP3 – View Southeast

DIP4 – View Northwest

Site: Tumwater Commerce Place (Map 4)	**Zoning**: Light Industrial (LI)
Address or Location: Select Court/Tradewinds Drive, Tumwater	
Parcels: 80630000001; 80630000002; 80630000003; 80630000100; 80630000200; 80630000300; 80630000400; 80630000500; 80630000600; 80630000700; 80630000800; 80630000900; 80630001000; 80630001100; 80630001200	**Size:** 36.47 acres
Existing conditions and vegetation: Site infrastructure including roads, utilities and storm facilities have been installed and the site has been cleared and graded for development. Undeveloped areas, encompassing approximately 32.6 acres or 90% of the site, are vegetated with weedy grasses and herbs. Storm water facilities are steep-sided and saturated in winter.	
Mapped soil types: Indianola loamy sand (0 to 3% slopes); Everett very gravelly sandy loam (30 to 50% slopes); Alderwood gravelly sandy loam (0 to 3% slopes)	
Gopher occupancy: Gopher mounds were observed on September 8, 2014 on some of the vegetated portions of this site. WDFW translocated approximately 170 gophers from Tumwater Commerce to Wolfhaven, a prairie with mima mounds, during four different dates spanning from October 2006 through January 2008 (Linders 2008) with funding from Kaufman.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Site vegetation will continue to be managed by mowing or other means until the parcels are developed. The 5.45-acre habitat set-aside is being managed as permanent habitat (includes an emergent wetland and upland buffer/potential gopher habitat).	
 TCP1 - View North (February 21, 2014)	 TCP2 – View North (November 20, 2013)
 TCP2 – View West	 Storm facilities, East from east entry road (November 20, 2013)

Site: Tilley Road (Map 5)	**Zoning**: Light Industrial (LI)
Address or Location: SE Corner of 88th Ave SE and Tilley Road SE, Tumwater	
Parcels: 12714310400	**Size:** 27.87 acres
Existing conditions and vegetation: Site infrastructure including roads, utilities and storm facilities have been installed. Undeveloped areas (approximately 21 acres or 75% of the site) are covered mainly by mixed conifer and deciduous forest.	
Mapped soil types: Indianola loamy sand (0 to 3% slopes); Everett very gravelly sandy loam (0 to 3% slopes); Yelm fine sandy loam (0 to 3% slopes)	
Gopher occupancy: Gopher mounds were observed in open areas on this site, mainly adjacent to Tilley Road SE on September 3, 2014. However, forested habitat limits gopher occupation in most undeveloped site areas. A 2.25-acre habitat set-aside was established in 2012-2013.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Scot's broom and other invasive species will be managed until the parcels are developed. The 2.25-acre habitat set-aside that includes 8-foot wide corridors along the south and east site boundaries will be managed as permanent habitat.	

TRP1 - View North (February 21, 2014)

TRP2 – View West (February 21, 2014)

TRP3 – View North (November 20, 2013)

TRP3 – View East (March 24, 2015)

TRP4 – View Southwest (November 20, 2013

TRP5 – View East (March 24, 2015)

Site: 88th Avenue Subdivision (Map 5)	**Zoning**: Light Industrial (LI)
Address or Location: 88th Avenue Subdivision, Tumwater	
Parcels: 12714310300	**Size:** 3.08 acres
Existing conditions and vegetation: This site is bounded by Tilley Road and undeveloped property owned by the Port of Olympia. It is undeveloped and forested with a mixed native conifer and deciduous canopy. Understory vegetation includes sword fern and salal.	
Mapped soil types: Indianola loamy sand (0 to 3% slopes)	
Gopher occupancy: Gophers may occupy open areas on this site, mainly adjacent to Tilley Road SE. However, forested habitat limits gopher occupation in most undeveloped site areas.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Scot's broom and other invasive species will be managed until the site is developed.	

88P1 - View Northwest (November 20, 2013)

88P1 – View Northeast

88P2 – View North

88P2 – View West

Site: I-5 Commerce (Map 6)	**Zoning**: Light Industrial (LI)
Address or Location: 2734 93rd Avenue SW, Tumwater UGA	
Parcels: 12716340100; 12716340101; 12716340102; 12716420000	**Size:** 40.34 acres
Existing conditions and vegetation: Most of this site has been cleared and graded, and soils are compacted. It has been used for gravel stockpiling, and there is an existing permit to continue this use on a 400x400 ft area (160,000 sq ft) of the site. Approximately 3 acres are covered with compacted gravel access pads, roads and gravel piles. Soils on approximately 6 acres are saturated at or near the ground surface in winter, shown as "unsuitable conditions" on Map 6. This area also includes NRCS wetland/hydric (Norma) soils. Another 7.6 acres (or 20% of the site) are forested. Non-native, weedy grasses and herbs including velvetgrass, sweet vernal grass, hairy cat's ear, oxeye daisy, and dock are common in open grassland areas encompassing approximately 29 acres or 70% of the site). Scot's broom is becoming established in many areas. I-5 bounds the site to the east, 93rd Avenue SW to the south, and undeveloped land zoned LI to the north and west.	
Mapped soil types: Cagey loamy sand; Everett very gravelly sandy loam (0 to 3% slopes); Norma silt loam	
Gopher occupancy: No gophers are known to occupy this site according to a WDFW-approved survey in 2013 (Krippner 2013). No other follow-up surveys have indicated the presence of gophers on this site. Gophers are known to occur in the area (adjacent parcels are occupied according to WDFW surveys). However, graded and compacted soils and seasonal high ground or surface water likely limit the potential for gopher occupancy.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Scot's broom and other invasive species will be managed until site development.	

I5P1 - View North (February 20, 2014)

I5P2 – View West

I5P3 – View North

I5P3 – View West

Site: Lathrop Industrial Park (Map 7)	**Zoning**: Light Industrial (LI)
Address or Location: 9631 and 9603 Lathrop Industrial Drive SW, Tumwater UGA	
Parcels: 58610000300; 58610000100	**Size:** 7.68 acres
Existing conditions and vegetation: Most of this site is already developed with warehouses and parking lots (approximately 5.3 acres). The remaining west portion of this site (approximately 2.4 acres or 30% of the site) consists of existing storm water facilities and an existing drainage field, located between the storm water facilities and south warehouse, that is being upgraded for new building tenants. Dominant plants here include bentgrass, orchard grass, reed canarygrass, bracken fern, hairy cat's ear, trailing blackberry, and salal. A small amount of native fescue is also present. Lathrop Industrial Drive SW bounds the site to the east, undeveloped land (zoned LI) to the north and west, and commercial development to the south.	
Mapped soil types: Cagey loamy sand	
Gopher occupancy: Gopher mounds were surveyed on October 23, 2014 in the existing storm water facility areas and in some of the landscaped and grassy areas bordering the warehouses, but not in the existing drain field for the buildings.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Scot's broom and other invasive species will be managed as required by Thurston County for maintaining landscaping and storm water facilities.	

LAP1 - View North (February 20, 2014)

LAP2 – View South (November 20, 2013)

LAP3 – View West

LAP4 – View East

Site: Grand Mound (Map 8)	**Zoning**: Planned Industrial Park (PID)
Address or Location: 6292 196th Avenue, Grand Mound UGA	
Parcels: 55700600000; 55701100000	**Size:** 18.89 acres

Existing conditions and vegetation: This site is undeveloped and includes areas of dense Scot's broom thickets, other shrubs, and scattered Douglas fir trees (approximately 13.3 acres or 70% of the site). Grass-dominated habitats (approximately 5.6 acres or 30% of the site) are located mainly in the powerline corridor. Dominant plant species include Scot's broom, bentgrass, red fescue, bracken fern, snowberry, Himalayan blackberry, evergreen blackberry, Douglas hawthorn, crabapple, cascara and Douglas fir. Two native violet species, common camas, and Roemer's fescue were observed on April 25, 2013; however, no areas on this site meet the Thurston County Code definition of a regulated prairie habitat. An overhead power transmission line runs north to south across the west portion of the site. Roads, low-density commercial and residential development, and undeveloped land zoned commercial and industrial border this site.

Mapped soil types: Spanaway gravelly sandy loam (0 to 3% slopes); Spanaway gravelly sandy loam (3 to 15% slopes)

Gopher occupancy: A few active gopher mounds were surveyed and confirmed by WDFW in 2012 in the southwest corner of the site (Krippner 2012b). Currently, much of the site is covered with dense Scot's broom thickets and is unlikely to provide habitat for gophers.

USFWS Designated Subspecies Area: Yelm (*Thomomys mazama yelmensis*)

Site-specific activities: Scot's broom and other non-native invasive species will be managed until the parcels are developed.

GMP1 – View North (February 21, 2014)

GMP1 – View West

GMP2 – View West

GMP3 – View West

Site: Sargent Road (Map 9)	**Zoning**: Light Industrial (LI); Arterial Commercial (AC)
Address or Location: 19635 Sargent Road SW, Grand Mound UGA	
Parcels: 55802600000; 55802400000	**Size:** 10.74 acres
Existing conditions and vegetation: Most of the undeveloped portion site is covered with dense Scot's broom thickets, encompassing approximately 6.4 acres or 60% of the site. The east portion of the site (approximately 3 acres) is a gravel pad used for temporary storage and construction staging. Grasses, mainly bentgrass, and weedy herbs, including hairy cat's ear, dominate a narrow strip of land along State Route 12 (approximately one acre or 10% of the site). Some native fescue is also present. Two buildings are also located on the east portion of the site. Roads, high-density commercial development, and undeveloped land zoned commercial and rural residential border this site.	
Mapped soil types: Spanaway gravelly sandy loam (0 to 3% slopes); Spanaway gravelly sandy loam (3 to 15% slopes)	
Gopher occupancy: No active gopher mounds have been confirmed on this site, though they are present in this general area and grassland habitat could provide habitat on the south portion of the site. Currently, most of the undeveloped areas are covered with dense Scot's broom thickets and unlikely to provide habitat for gophers.	
USFWS Designated Subspecies Area: Yelm (*Thomomys mazama yelmensis*)	
Site-specific activities: Scot's broom and other non-native invasive species will be managed until the parcels are developed.	

SGP1 – View West (February 21, 2014)

SGP2 – View West

SGP3 – View North (December 19, 2013)

SGP3 – View East

Site: Union Mills (Map 10)	**Zoning**: Light Industrial (LI)
Address or Location: 1821 Mayes Road SE, Lacey UGA	
Parcels: 76100004602; 76100004603	**Size:** 12.84 acres
Existing conditions and vegetation: Most of this site is covered with gravelly soils that are compacted from past clearing, grading, and construction staging. Gravel stockpiles, pads, and road areas are estimated cover at least 6 acres of the site. They cover the entire west parcel. The east parcel is mostly covered with dense Scot's broom thickets, encompassing approximately 6.8 acres or 50% of the site. Dense stands of Douglas spirea are also present, indicating that compacted soils in some areas retain water at or near the surface in wet winter months. Roads, commercial and residential development, and some undeveloped forest and open habitats border this site.	
Mapped soil types: Spanaway gravelly sandy loam (0 to 3% slopes); Spana gravelly loam	
Gopher occupancy: No gophers are known to be present on this site. Though gophers are present in the vicinity, habitat here is likely limited due to compacted, gravelly soils. The closest known site of gopher occupancy is approximately 0.6 miles north, and is separated from this site by busy roads and high-density residential development.	
USFWS Designated Subspecies Area: uncertain, but if present likely Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Scot's broom and other non-native invasive species will be managed until the parcels are developed.	

UMP1 - View Northeast (November 20, 2013)

Gravel road bed on east parcel (February 21, 2014)

Typical dense shrub vegetation on east parcel (September 4, 2014)

View west of east and west parcels (February 6, 2014)

Site: Wichman/McCellan (Map 11)	**Zoning**: Industrial (I)
Address or Location: 449 Wichman Street S, Tenino	
Parcels: 74903700300; 74904500100	**Size:** 5.23 acres
Existing conditions and vegetation: The undeveloped portion of this site on the south parcel is covered with dense reed canarygrass (approximately 3 acres or 60% of the site). Parts of the east and south portions of the south parcel are developed and the north parcel is covered with a few feet of compact, gravelly fill soil. Therefore, approximately 2 acres of this site have been developed to the extent that they do not provide suitable soils for gophers. A mix of weedy herbs and grasses, including a small patch of native lupine, are growing on the fill soil next to the rail line on the north parcel (on approximately one acre or 20% of the site). A building and car-wrecking yard are on the south parcel. An elevated rail line bounds this site to the west, roads to the east, and commercial development to the north, south and east.	
Mapped soil types: Spanaway gravelly sandy loam (0 to 3% slopes); Spanaway gravelly sandy loam (3 to 15% slopes)	
Gopher occupancy: No active gopher mounds have been observed on this site. Though gophers are found in the site vicinity, they are unlikely to occupy this site because there is no direct connection to any known occupied site; fill soils from roads, the rail line and other commercial developments surround the site; and the onsite habitat conditions do not appear to be suitable for gophers. Dense reed canarygrass is cut for hay in summer on the south parcel and the north parcel has been covered with compacted, gravelly fill soil.	
USFWS Designated Subspecies Area: Yelm (*Thomomys mazama yelmensis*)	
Site-specific activities: Scot's broom and other non-native invasive species will be managed until the parcels are developed. Reed canarygrass on the south parcel will continue to be cut for hay until development.	

WIP1 – View North (February 20, 2014)

WIP1 – View East

WIP1 – View South

WIP2 – View North (December 19, 2013)

Site: Deschutes Corridor (Map 12)	**Zoning:** Light Industrial (LI); Single-family Low Density Residential (SFL); Rural/Residential Resource 1/5 (RRR 1/5); Open Space (OS)
Address or Location: 8406 Old Hwy 99 SE, Tumwater UGA	
Parcels: 12713220100 (most of this parcel)	**Size:** 51 acres
Existing conditions and vegetation: Invasive, non-native plants are dominant across much of this site. On the north end of the site the Scot's broom thicket is dense and more than 6 feet tall. In other areas the Scot's broom thickets are not as dense and less than 4 feet tall. Other invasive plants found in smaller patches include reed canarygrass, Japanese knotweed, and Himalayan blackberry. The moss and lichen cover is dense in many areas more sparsely covered with Scot's broom. The total shrub cover is estimated to be 25 acres or 50% of the site. A row of large Douglas fir trees extends across the north portion of the site. Red alder has colonized disturbed soil areas along the east boundary and gravel quarry areas. The total tree cover is estimated to be 21 acres or 40% of the site. Sparsely vegetated, gravelly soils cover the rest of the site (5 acres or 10% of the site). Soils in these areas have been disturbed by past gravel quarry operations, and there are areas of standing water in quarry areas at the south end of the site. A wetland that was created or modified by quarry operations is located in the southeast corner of the site. The southwestern-most portion of the parcel is in the floodplain of the Deschutes River. This site is connected with adjacent areas zoned as OS, increasing the overall habitat and conservation value of this site for many native species. In addition, development is not allowed by local ordinances within the buffer of the Deschutes River, or within or near wetlands prevalent in other parts of this corridor.	
Mapped soil types: Nisqually loamy fine sand (0 to 3% slopes); Indianola loamy sand (15 to 30% slopes); Everett very gravelly sandy loam (0 to 3% slopes); Puget silt loam; Spana gravelly loam; pits, gravel	
Gopher occupancy: Gophers are likely to occupy this site to some extent because it is located in close proximity to the Olympia airport and soils across much of the site (approximately 30 acres) are mapped as Nisqually loamy fine sand.	
USFWS Designated Subspecies Area: Olympia (*Thomomys mazama pugetensis*)	
Site-specific activities: Scot's broom and other non-native invasive species will be managed in accordance with this HCP. The row of Douglas fir trees and other woody vegetation in potential gopher habitat areas will be removed. Once this HCP has expired, future management will continue to be based upon the conservation needs of gophers and other listed prairie species.	

DCP1 – View North, home is on Bush Prairie Farm (January 16, 2015)

DCP2 – View East

Deschutes Corridor Photos Continued (January 16, 2015)

DCP2 – View West

DCP3 – View North

DCP4 – View East

DCP5 – View West

DCP6 – View South

DCP7 – View North of Deschutes River

Site: Leitner Prairie (Map 13)	**Zoning:** Rural/Residential Resource 1/5 (RRR 1/5)
Address or Location: 16721 and 16722 Leitner Road SW, Thurston County	
Parcels: 09200011008; 12630110600	**Size:** 36.18 acres
Existing conditions and vegetation: Much of this site was covered with Scot's broom thickets, other shrubs, and scattered Douglas fir trees before it was restored by mowing and tree removal in 2013 and 2014. The diversity of native prairie wildflowers in more open, grassy areas of this site is relatively high in comparison to other sites in this area. Some areas likely meet the definition of native prairie habitat as described in Thurston County Code Title 24, and would therefore be regulated by Thurston County. The two parcels are divided by Leitner Road SW, and bounded by Interstate-5 on the west. They are situated amongst relatively undeveloped parcels zoned RRR 1/5.	
Mapped soil types: Spanaway gravelly sandy loam (0 to 3% slopes); Spanaway-Nisqually complex. Low-rise mima mounds are present on both parcels.	
Gopher occupancy: A few active gopher mounds were surveyed and confirmed by WDFW in 2012 on the side slope of the storm water facility. Now that the Scot's broom is being managed and the site has been restored to be an area dominated by grasses and herbs, the gopher population is likely to expand across this site.	
USFWS Designated Subspecies Area: Yelm (*Thomomys mazama yelmensis*)	
Site-specific activities: A conservation easement has been placed on these parcels for creating a permanent habitat area for gophers. Scot's broom and other non-native invasive species will be managed in accordance with this HCP. Once this HCP has expired, future management will continue to be based upon the conservation needs of gophers and other listed prairie species.	
 View East from center of east parcel before restoration (September 26, 2012)	 View South from center of east parcel before restoration
 View Northwest of west parcel from storm pond facility before restoration	 View Southeast from Northwest corner of west parcel before restoration

Leitner Prairie Photos continued (September 23, 2014 – post restoration)

LPP1 (east parcel) – View North

LPP1 – View East

LPP1 – View South

LPP2 (west parcel) – View North

LPP2 – View South

LPP2 – View West

FINAL DRAFT

Appendix C

Leitner Prairie Conservation Site Management Plan

Appendix C of the
Kaufman Habitat Conservation Plan
for Taylor's Checkerspot Butterfly (*Euphydyas editha taylori*);
Streaked Horned Lark (*Eremophila alpestris strigata*);
and two subspecies of Mazama Pocket Gopher
(*Thomomys mazama pugetensis* and *Thomomys mazama yelmensis*);
in Thurston County, Washington

Prepared for
Kaufman Holdings, Inc.
Kaufman Real Estate, LLC
Liberty Leasing & Construction, Inc.

U.S. Fish and Wildlife Service Reference Number:
XXXX

August 2015

Prepared by:

Krippner Consulting, LLC
PO Box 17621
Seattle, Washington 98127

Table of Contents

Introduction

Purpose of Establishment

Leitner Prairie was established by the Applicants to compensate for unavoidable impacts from development to listed species and habitat regulated under Federal, state, and county law. Specifically it was established to permanently provide habitat for the state and federally listed (threatened) Yelm pocket gopher (*Thomomys mazama yelmensis*), a subspecies of the Mazama pocket gopher (*Thomomys mazama*). Leitner Prairie may provide habitat for other listed species, in particular Taylor's checkerspot butterfly (*Euphydyas editha taylori*) and streaked horned lark (*Eremophila alpestris strigata*), in the future.

Purpose of this Management Plan (Plan)

The purpose of this Plan is to describe the objectives and priorities of conserving the site performance standards, restoration and management actions, and monitoring and reporting requirements. This Plan describes actions that will be carried out through the 20-year permit term for the Habitat Conservation Plan and beyond. It includes conservation measures that have been completed to date and ongoing land management that will continue now that initial site restoration activities have been completed.

This Plan is based on the current ecological conditions present at Leitner Prairie, which will change over time as restoration and management actions are implemented. As these ecological conditions change, the Plan may need updating to reflect changing management needs. While the overarching conservation goals, specific performance standards, and strategy will remain intact, on-the-ground management techniques may need to be updated. Annual updates to this Plan will occur as part of the annual monitoring report, which will likely be necessary every year for the first five years while the site is being restored to suitable habitat conditions for the Covered Species. Thereafter, it is expected that the Plan can be updated less frequently as site conditions will stabilize and require less rigorous maintenance activities. See Appendix 1 for description of the maintenance activities, their frequency, and duration.

Land Manager and Responsibilities

The Applicants are currently the landowner and partially fulfill the role as the land manager for Leitner Prairie. The Applicants established a conservation easement and funded a perpetual endowment that is held by Capitol Land Trust. Using funding from this endowment, Capitol Land Trust manages the property to comply with the terms of the conservation easement and provides annual reports to the Applicants that describe current site conditions. The Applicants have completed habitat restoration activities to date, and their consultant monitors the site each year to comply with Thurston County Habitat Management Plan conditions.

The Applicants intend to sign the deed to Leitner Prairie over to a long-term land-steward that will maintain the site in perpetuity in habitat suitable for the Covered Species.

The Land Manager will be responsible for:

- Implementing this management Plan.
- Managing and monitoring the site.
- Restoring and maintaining habitat and conservation goals in accordance with the performance standards in this document.
- Reporting to the USFWS.

The Applicants will assure funding while management is under their purview and once land ownership is transferred to a long-term land steward by creating an endowment for the sole purpose of managing and implementing HCP conservation measures.

The administrative and management costs, insurance, licenses and fees, land maintenance, land monitoring, reporting, professional services, taxes, translocation costs, adaptive management or changed circumstances, and contingency fees will be funded for the first ten years (Years 1-10) of the HCP term up front by the Applicants. The remaining ten years (Years 11-20) will be funded at the end of the fifth year (Year 5). Perpetual maintenance of the conservation sites, estimated for Years 21-100, will be funded at the end of the 15th year (Year 15).

The Applicants may transfer Leitner Prairie to another owner during the term of this HCP. Any conveyance will contain a restriction requiring the property to be managed consistent with the terms of this HCP for the remainder of the permit duration. Conveyance of a property will not affect the required mitigation or change funding assurances for mitigation because the system put in place by the Applicants as a condition of conveyance or sale for funding the endowment will legally apply to a property when it is conveyed or sold.

The Applicants will hold the endowment and release funds as needed each year to meet the HCP permit requirements, regardless of who owns and manages the properties. Leitner Prairie will be preserved in perpetuity. At the end of the 20-year permit term, the endowment fund will be transferred to the property owner with a legal agreement stating that these funds are to be used only for ongoing site management and monitoring in perpetuity (estimated as Years 20–100).

The current Land Manager will be responsible for providing any required report to USFWS describing the monitoring and management activities for the prior and upcoming year and the status of the Conservation Land.

Property Description

Location and Access

Leitner Prairie is a 36-acre site located in south Thurston County immediately east of Interstate 5 (I-5). It includes two parcels; #09200011008 is west of and #12630110600 is east of Leitner Road SW, between 169th Avenue SW and 163rd Avenue SW at 16721 and 16722 Leitner Road SW (Figure 1).

Site access is from Leitner Road SW. To access the property from Olympia, take I-5 South to Exit 95 for WA-121 N. Turn right onto WA-121 N/Maytown Rd SW and continue for 2.6 miles.

Turn right onto Tilley Road and continue for 3.9 miles. Turn right onto Goddard Road and continue for 2.0 miles. Turn left on Leitner Road SW and the property will be on either side of Leitner Road SW after approximately 0.3 miles.

Land Use

Leitner Prairie is located in an area identified as Violet Prairie within the larger named Mound Prairie. Land uses in the general vicinity include rural residential development, agriculture, forestry and conservation lands. Other managed conservation lands are located nearby. They include Scatter Creek Wildlife Recreation Area, owned by Washington State Fish and Wildlife (WDFW), and Glacier Heritage Preserve, owned by Thurston County. Both properties are located immediately west of I-5, opposite from Leitner Prairie.

Leitner Prairie does not appear to have been used for grazing or agriculture in recent years. However, disturbed soil conditions on the northeast portion of the west parcel indicate that gravel mining has likely occurred in the past on this portion of the site (Capitol Land Trust 2013a). In addition, a Thurston County storm water facility was constructed along the southeast boundary of the west parcel circa 2006 around the same time that Leitner Road SW was constructed. No other soil disturbances are apparent. Since pocket gophers mounds have been identified on the side slope of the storm water facility (Krippner 2012; Figure 2), and soil conditions are expected to improve over time in both areas of previous disturbance, all site areas should provide suitable habitat for the Covered Species long term.

Before initial site restoration activities commenced in 2013, dense Scot's broom thickets dominated the vegetation community on Leitner Prairie (approximate percent cover shown in Figure 2), limiting habitat for the Covered Species. Other invasive plant species present included Himalayan blackberry and thistle. Douglas fir trees and native shrubs were patchily distributed throughout the site.

Leitner Prairie is a mounded prairie with a mix of sandy loam and gravelly sandy loam soils. A relatively wide diversity of native prairie plants has been observed on this site throughout the spring and summer months. The site is occupied by Yelm pocket gophers, and has suitable habitat for Taylor's checkerspot butterfly. As site management continues, suitable habitat for streaked horned lark should also be created here.

This site now contributes to a larger reserve design intended to preserve a system of prairie habitat at the landscape scale. Preserving this site will improve the baseline conditions for the Covered Species and influence future conservation decisions regarding mitigation land selection.

Topography and Hydrology

Leitner Prairie is relatively flat with the slopes being generally less than 15% percent throughout the site. Low-rise mima mounds are located throughout the east parcel and on the northeast portion of the west parcel. An excavated depression and spoils pile is also located in the northeast portion of the west parcel, indicating probable past mining activities (Capitol Land Trust 2013a).

A very small depression dominated by slough sedge was observed in September 2012 on the west parcel in the vicinity of a possible old home site. Other than this area and the bottom of the storm facility in winter and spring, the site is has no standing water in summer and no wetlands.

Soils

Soils on the site are mapped as Spanaway gravelly sandy loam (0 to 15%) and Spanaway-Nisqually complex (2 to 10%)(USDA NRCS 2012). During brief trapping efforts for pocket gophers in November 2012 with WDFW staff, it was clear that soils in some areas were loamy sand, and other areas were better described as gravelly sandy loams.

Existing Easements

The Applicants entered into a conservation easement agreement in 2013 with Capitol Land Trust to ensure that Leitner Prairie is permanently protected as a habitat reserve. The conservation easement agreement is binding on all future owners. According to this easement all uses that would disturb the land are prohibited (Capitol Land Trust 2013a and 2013b). These include development, agriculture, mining, domestic animals, and others as listed in the easement agreement. Permitted uses include prairie restoration, storm water facility maintenance, educational and scientific uses, passive recreation, placement of conservation-related signs, emergency actions, and roads and trails for purposes of restoration. Capitol Land Trust ensures that the terms of the conservation agreement are met and monitors the site on an annual basis. A brief monitoring summary of existing conditions and land uses is provided to the owner each year (Capitol Land Trust 2014).

Habitat Description and Species Abundance

Biological Resources Surveys

Capitol Land Trust and Krippner Consulting have conducted baseline surveys and have monitored the site since 2012. Krippner surveyed Mazama pocket gophers mounds and general site conditions in September-October 2012 before site restoration activities commenced (Krippner 2012). Capitol Land Trust conducted a baseline survey of each parcel in Spring 2013 (Capitol Land Trust 2013a and 2013b). Baseline survey reports describe vegetation community conditions, mound survey findings, and other general wildlife and habitat observations. Monitoring reports were prepared in 2013 and 2014 to describe existing conditions and site restoration activities each year (Krippner 2013 and 2014).

Before site restoration activities, grasses and Scot's broom dominated the vegetation communities, with some areas dominated mainly by dense grass and others by dense thickets of Scot's broom. The density of Scot's broom in different areas of the site varied widely before restoration activities commenced (Figure 2). Bracken fern was also common. Douglas fir trees were found in small stands near the south and northeast boundaries of the west parcel and they were found individually and in small stands, mainly in the southwest and northeast portions of the east parcel. Native shrubs including Douglas hawthorn, snowberry, serviceberry and rose were present near trees. Some Canada thistle, a noxious weed, occurs in a few small patches. Other weedy herbs were present, such as hairy cat's ears, narrowleaf plaintain and dandelion, but these are not classified as noxious weeds and they provide forage for gophers and native butterflies.

Survey results indicate that the baseline composition is as follows (approximations):

- 0 percent high-quality native grassland,
- 0 percent native grassland,

- 60 percent degraded grassland,
- 33 percent shrub-dominated habitat,
- 5 percent tree-dominated habitat
- 2 percent non-prairie (e.g., bare ground, quarry spalls, river riparian, etc.).

Despite the presence of dense Scot's broom, native prairie plants persist here. After Scot's broom was removed, native plants were documented on the site the following year (no seeding was required). A very important attribute of this site is its value as a reservoir of native biodiversity in a region that has lost most of its native prairie lands due to human activities. A relatively high diversity of native prairie plants has been observed at Leitner Prairie during baseline and monitoring surveys since 2011 (Table 1). Non-native plants on Leitner Prairie are listed in Table 2.

A variety of wildlife species and their sign were observed during baseline and monitoring surveys. Birds included red-tailed hawk (*Buteo jamaicensis*), owl (pellets)(likely from great horned owl [*Bubo virginianus*]), red-breasted nuthatch (*Sitta canadensis),* chestnut-backed chickadee (*Poecile rufescens*), Bewick's wren (*Thryomanes bewickii*), and white-crowned sparrow (*Zonotrichia leucophrys*). Mammals included mole (*Scapanus spp.*), vole (*Microtus spp.*), deer mice (*Peromyscus maniculatus*), Yelm pocket gopher, mountain beaver (*Aplodontia rufa*), Roosevelt elk (*Cervus elaphus roosevelti),* coyote (*Canis latrans*), and black-tailed deer (*Odocoileus hemionus columbianus*). Moles, voles, and mice appeared to be abundant throughout the site. Pacific treefrogs (*Pseudacris regilla*) were also observed.

Presence and Location of Listed Species

Mazama pocket gopher mounds were confirmed by WDFW on the side slope of the storm water facility in 2012 (Krippner 2012; Figure 2). Although other surveyors have recorded gopher mounds at other locations, no additional mound locations have been formally confirmed by a regulatory agency. Trapping was conducted by WDFW in November 2012 at trail camera monitoring and other suspect sites identified by Krippner in October 2012, but no gophers were trapped during this two-day effort.

Now that the shrub thickets and trees have been removed and the site is dominated by a variety of native and non-native forbs and grasses, the gopher population is expected to expand and eventually occupy most, if not all, areas of this site. Gopher densities are expected to be highest in areas with loamy sand soils, and lower where soils are more gravelly on this site.

Managing the vegetation as proposed by this Plan is expected to improve habitat conditions for Taylor's checkerspot butterfly and streaked horned lark. It is not known whether or not remnant populations of Taylor's checkerspot may be present here. There was suitable habitat at Leitner Prairie and in the vicinity, even before restoration activities commenced, to support them. Depending on the quality of the surrounding adjacent areas, it is possible that streaked horned lark may forage or nest on the site in the future.

Although the restoration goals and management objectives are not explicitly directed at improving conditions for species other than the Covered Species, the site may provide suitable habitat for other listed species in the future. The possible introduction of listed and/or priority species would require a separate analysis of suitability and would require additional funding and commitments that are not included or discussed in the HCP or this Plan.

Habitat Development/Performance Standards

Primary Goal

The primary goal for Leitner Prairie is to: **Maintain, in perpetuity, fully functional grassland that provides suitable habitat for the Covered Species included in the HCP.** Leitner Prairie is a fully protected and actively managed conservation site that will add to the portfolio of protected prairie sites in the South Sound. It will permanently conserve habitat that is capable of sustaining the Yelm subspecies of Mazama pocket gopher in perpetuity and provide suitable habitat for the streaked horned lark and Taylor's checkerspot butterfly.

To meet this goal site restoration and management will continue in phases, improving the conservation value of the site over time. As partial fulfillment of the requirements of the HCP, sufficient funding assurances are in place to allow adequate perpetual management at any stage of restoration and/or maintenance. This is particularly essential when all credits are used because sufficient funds must be in place to ensure the site is managed and contains suitable habitat conditions in perpetuity. Leitner Prairie is expected to progress through stages of lower conservation value requiring more intensive management to having higher conservation value with lower maintenance requirements.

Restoration vs. Management

Initial restoration accomplished in 2013 and 2014 included the removal of dense Scot's broom thickets and all other woody vegetation including large Douglas fir trees. The entire site was mowed each year in late summer to ensure continued control of Scot's broom and to stimulate the growth of forbs and grasses that are important for improving habitat conditions for the Covered Species.

The Applicants performed the initial removal of Scot's broom in July-August 2013 just after blooming, but before seed was set. In accordance with the Thurston County (2009) fact sheet on Scot's broom, "*mechanical methods can be used on larger infestations with the use of brush cutters, tractor-mounted mowers, or backhoes. Cutting stems in the spring and early summer will result in new shoot production and poor control. However, up to 80% mortality can be achieved by cutting down plants when they are drought stressed (July through September*)." Ground disturbance was kept to a minimum. The brush debris resulting from mechanical cutting mulched quickly on-site.

Douglas fir trees were removed by cutting, logs were removed, and slash was burned in 2014. The removal of tree stands and individual trees was accomplished to provide a larger habitat area for prairie species and to help prevent future establishment of woody vegetation on the site.

Vegetation at Leitner Prairie will continue to be managed to keep invasive species such as Scot's broom and woody vegetation from degrading habitat conditions. Invasive species management will be accomplished by mowing, targeted application of herbicides, prescribed fire, or by other means.

Phased Restoration - Goals and Performance Standards

Goals and performance standards are based on habitat requirements for the Covered Species. Restoration and management activities are expected to improve site conditions each year, and they will vary by year depending upon how ecological conditions change over time. The

following goals and performance standards are phased in time with the long term goal being a site that provides habitat for the Covered Species, requiring little to no ongoing maintenance each year. No maintenance may be needed in a given year if all of the performance standards have been met for the previous three years, and when no management issues are identified during monitoring that might degrade habitat in the foreseeable future.

Initial Phase (Years 0-3)

The main goal for Years 0-3 is to control any shrubs or trees that may try to become re-established at the site. Monitoring efforts will also be focused on the need for the site to provide a diverse mix of forbs and grasses for forage for gophers.

The plant resources inventory will be updated throughout the monitoring period, contributing to the regional goal of preserving prairie lands. In particular, if this site is used in the future as a sustainable source of native seeds, roots, or bulbs.

The performance standards for each phase are summarized in Table A (below).

Table A: Performance standards during each of project phases.

Data from belt transects and other field observations each year will be used to estimate whether or not the standards below for providing habitat for the Covered Species are met.

	% Scot's Broom & woody veg. > 12 inches	% Grassland with forbs at >10% cover	% Bare ground, moss, lichens and/or grassland <12 inches high	% High quality native grassland	% TCB plants larval/ nectar in 4 m^2 patches	% Gopher Occupied
Initial Phase 1-3 yrs	<10	>20	n/a	n/a	n/a	n/a
Intermediate Phase 4-9 yrs	<10	>40	>20	>10	>10/>10	>20
Final Phase 10-20 yrs	<5	>80	>40	>20	>20/>20	>30

The performance standards for Years 1-3 are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 20% of the site.

The cover of high quality native grassland is recorded. High quality native grassland is defined as areas with at least 30% cover of herbaceous vegetation, which include native annual and perennial grasses and forbs, less than 25% shrub cover, and less than 5% tree cover. No specific performance standard for this measure is required during this phase.

Active gopher mounds are observed on the site. No specific performance standard for this measure is required during this phase.

Plants known to provide oviposition sites, larval forage, and nectar sources for Taylor's checkerspot butterfly are recorded and cover estimated during monitoring for guiding future management decisions. No specific performance standard for this measure is required during this phase.

The amount of open ground, or ground covered with mosses and lichens and low stature grassland (less than 12 inches high), is estimated during monitoring for guiding future management decisions. No specific performance standard for this measure is required during this phase.

Intermediate Phase (Years 4-9)

The goals for Years 4-9 include continued management of invasive species, and measured improvement in specific habitat conditions for Covered Species.

The performance standards for Years 4-9 are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 40% of the site.

The cover of high quality native grassland is estimated to be at least 10% of the total site area.

Evidence gathered from belt transects or other field observations indicate that gophers occupy at least 20% of the site area.

Plants known to provide oviposition sites, larval forage, and nectar sources for Taylor's checkerspot butterfly are present in sufficient densities to support this species on at least 10% of the site. Plant patches at least 4 m^2 in size of oviposition sites/larval food and nectar sources are recorded in at least 10% of the belt transects, or other field observations indicate that this density of plant patches is present.

The amount of open ground, or ground covered with mosses and lichens and low stature grassland (less than 12 inches high) is estimated to be at least 20% of the total site area.

Final Phase (Years 10 and beyond)

The goals for Years 10 and beyond include continued management of invasive species, and the achievement of meeting specific habitat conditions for Covered Species.

The performance standards for Years 10 and beyond are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 5%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 80% of the site.

The cover of high quality native grassland is estimated to be at least 20% of the total site area.

Evidence gathered from belt transects or other field observations indicate that gophers occupy at least 30% of the site area.

Plants known to provide oviposition sites, larval forage, and nectar sources for Taylor's checkerspot butterfly are present in sufficient densities to support this species on at least 20% of the site. Plant patches at least 4 m^2 in size of oviposition sites/larval food and nectar sources are

recorded in at least 20% of the belt transects, or other field observations indicate that this density of plant patches is present.

The amount of open ground, or ground covered with mosses and lichens and low stature grassland (less than 12 inches high), is estimated to be at least 40% of the total site area.

Management

Management includes actions needed to maintain the conservation value of the site, while meeting the performance standards. See Appendix 1 for a table of management actions, frequency, schedule, cost (in terms of labor hours), duration, etc.

Management actions include:

- Vegetation and habitat management (e.g., mowing, herbicide, burning)
- Site management (e.g., controlling illegal dumping, trespassing, unauthorized ATV use)
- Biological monitoring (e.g., vegetation and habitat surveys)
- Reporting and Planning

Vegetation and Habitat Management

The assumption made in this site management Plan and in the Funding Assurances section of the HCP is that mowing, or an effort similar in cost to mowing, may be required each year to both manage invasive plants and restore habitat conditions required by the Covered Species. Mowing may not be recommended every year, and other treatments during a given year may be more effective in restoring the site conditions described above in the Goals and Performance standards (phases).

Continued mowing in late summer is the default conservation measure for Leitner Prairie and does not require special approval from USFWS unless the site becomes occupied by nesting streaked horned larks. If nesting is occurring on the site, mowing and maintenance activities will need to be coordinated with the USFWS to prevent loss of young and reduced reproductive success of adults.

Other conservation actions may be employed in addition to, or instead of mowing to manage vegetation on portions of, or across the entire site. These other actions may include prescribed fire, targeted application of herbicides, or other methods approved by USFWS. A detailed description of any alternative proposed methods must be presented to USFWS at least three months in advance for their review and approval.

Mowing

Annual mowing in late summer is the default treatment for controlling invasive plants and keeping the site dominated by a variety of grasses and forbs. Each year the effectiveness of this treatment method will be reviewed and alternative methods will be recommended following spring monitoring. It is likely that mowing will not be required every year.

If monitoring in spring indicates that habitat conditions on the site would benefit from mowing in late summer, this will be done so that the site continues to be dominated by grasses and herbs, in an early successional stage. In this way, habitat conditions preferred by Yelm pocket gophers,

and the open grassland conditions required for Taylor's checkerspot butterflies and streaked horned larks will be maintained. Because it promotes the growth of preferred forage plants (herbs and grasses), regular mowing is likely to encourage the emigration of pocket gophers into this site. Pocket gophers are known to aerate soils and increase plant diversity (Hartway and Steinberg. 1997; Mielke, 1977). Therefore, even if habitat management is limited to mowing in late summer, soil conditions should improve, prairie plants may spread, and habitat for the Covered Species will continue to be enhanced and conserved.

Targeted Herbicide Use

Targeted use of herbicides to control invasive plant species may be recommended for managing Scot's broom, or for reducing the cover of dense, rhizomatous grasses if mowing alone is not enough to achieve performance standards for habitat restoration. Prairie restoration practitioners in this region have successfully employed the use of grass-specific herbicides that kill non-native grasses with minimal impacts to native forbs and grasses to open areas up for colonization of native species (Stanley et al., 2011). If native vegetation is not already present in the general area, grass-specific herbicide treatment may need to be followed with native seeding. Or this treatment may be used to create areas of bare ground for colonization by mosses and lichens, provided there is low risk of colonization by another invasive species.

To minimize potential impacts to Covered Species, lower toxicity herbicides shall be used whenever possible. Selective herbicide application will occur rather than broadcast application treatments.

Prescribed Fire

Prescribed fire has been recommended by regional prairie restoration practitioners to prevent invasion of woody vegetation (Dunwiddie and Bakker 2011). Fire is also known to stimulate the germination and growth of native prairie species, and would likely improve habitat conditions for the Covered Species. However, prescribed fire would also stimulate the germination of Scot's broom (Dennehy et al. 2011), possibly creating the need for more intensive management of this species by targeted herbicide or additional mowing. Care must also be taken that areas made bare by fire are not colonized by Scot's broom or other invasive species. Follow-up seeding or planting of native plants may be required following fire if no native seed source is present in the general area or likely to be present in the seed bank.

If prescribed fire is used in any given year, no more than 1/3 of the site area may be burned that year since this activity can temporarily remove or disturb habitat for the Covered Species.

Native Seeding and Planting

Native seeding and/or planting is most likely to be recommended if a grass-specific herbicide or fire is used to clear areas of dense grasses or invasive species and there are few native plants in the area to become re-established in the cleared area. Native seeding or planting may also be recommended if it is deemed necessary to meet the performance standard for providing oviposition sites, larval food, or nectar sources for Taylor's checkerspot butterfly.

High Intensity Short Duration Grazing

High intensity grazing early in the growing season is being used on some prairies in South Puget Sound to control the growth of non-native rhizomatous grasses and increase coverage by native

prairie plants. If this method proves to be an effective mechanism for prairie restoration and if it is clear that dense rhizomatous grasses are limiting prairie vegetation on Leitner Prairie, then this type of grazing may be considered as another tool that is used in future years to enhance habitat conditions for the Covered Species. This management tool is also likely to be beneficial to gophers because it should act to decrease overall grass cover and promote the growth of forbs, their preferred forage plants (as long as soils do not become compacted).

Site Management

Capitol Land Trust manages property access and human use of the site in accordance with the permanent conservation agreement for this site.

Site Inspection

The site is inspected annually or when Capitol Land Trust is notified of any problems. Signs of human activities are recorded, and corrective measures for any problems that are found are implemented to ensure that the terms of the easement agreement are met. For example, property signs that go missing are replaced, trash is removed, and barriers to ATV use are put into place to prevent further access.

Fences, Gates, Roads

The site boundaries are marked with Capitol Land Trust property signs. The main site access is next to the Thurston County storm water facility where there is an area of compacted, bare soil (not paved or graveled) suitable for parking a car. There are no roads on this site, and the only fences are along the I-5 corridor and along the south boundary of the east parcel. Concrete barriers have been used to some extent in recent years to prevent vehicle access on both parcels.

Public Access

There is no official public access on this site. Passive recreational uses do occur on this site, though they are not explicitly encouraged here since the site is privately owned. A trail for walking is well worn on the east parcel.

Biological Monitoring

Biological monitoring will be conducted to determine if conservation goals and performance standards are being met, and to recommend conservation actions for the current and future years. The entire site will be explored to note any problems with invasive species, or other ecological changes. Photo documentation and updates to plant lists (Tables 1 and 2) will be completed. The survey protocol described in Appendix 2 will be followed in order to evaluate whether or not performance standards are met each year.

A general description of dominant plant species will be recorded, and habitat conditions will be evaluated during monitoring. If streaked horned larks or Taylor's checkerspot butterfly occupy the site in the future, then conservation activities may need to be modified to accommodate their habits (land manager will coordinate with USFWS). This will be addressed in the monitoring report prepared for USFWS. USFWS must approve conservation actions proposed for promoting these species before they are implemented.

Surveys for percent cover of vegetation types and pocket gopher mounds will be conducted every year from June 1 through October 31 for the first 10 years, then every 2 years from year 10

through 20. Surveys for native prairie plants (to assess TCB habitat) will be conducted between April 1 and June 15 on the same annual schedule (every year for the first 10 years, then every 2 years from year 10 through 20). Survey area coverage is approximately 5 percent of the entire Conservation Site.

Reporting and Planning

Monitoring reports will be prepared and submitted to USFWS annually for 20 years until this HCP expires.

Monitoring reports will include the following:

5. Activity and date of conservation actions since last monitoring report.
6. Current on-site conditions that are or may be adversely affecting Covered Species and their habitat, as well as any actions being undertaken or contemplated to address such conditions.
7. An evaluation of how conservation goals and performance standards are being met; what activities need to be taken to meet them in future year; or recommendations for revisions to goals and performance standards if changed circumstances have occurred.
8. Conservation actions anticipated prior to the next monitoring report submission.

Monitoring reports for other conservation sites (Deschutes Corridor and on-site habitat set-asides) and the development sites (until construction) required in the HCP may be combined into one annual report for presentation to USFWS.

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Tables

Table 1. Native Plant Species (Observed at Leitner Prairie)

Scientific Name	Common Name	Observed by	Notes
Viola adunca	Early blue violet	CL; KC	C
Viola nuttallii	Yellow prairie violet	CL; KC	
Claytonia perfoliata	Miner's lettuce	CL	
Festuca idahoensis	Roemer's fescue	KC	P
Fritillaria lanceolata	Chocolate lily	CL; KC	
Pteridium aquilinum	Western bracken fern	CL; KC	P
Dodecatheon hendersonii	Henderson's shooting star	CL; KC	P
Castilleja spp.	Paintbrush	CL	O; N
Sisyrinchium idahoensis	Idaho blue-eyed grass	CL; KC	
Potentilla gracilis	Slender cinquefoil	CL; KC	
Achillea millefolium	Yarrow	CL; KC	N
Galium aparine	Catchweed bedstraw	CL; KC	
Ranunculus occidentalis	Western buttercup	CL; KC	
Eriophyllum lanatum	Oregon sunshine	KC	C; N
Camassia quamash	Common camas	CL; KC	C; N
Delphinium sp.	Larkspur	KC	
Fragaria vesca	Wild strawberry	CL; KC	N
Cardamine oligosperma	Little western bittercress	CL	
Festuca rubra	Red fescue	CL; KC	Na?
Silene scouleri	Scouler's catchfly	KC	
Lupinus sp.	Lupine	KC	N
Collinsia parviflora	Blue-eyed mary	KC	L
Lomatium sp.	Biscuitroot	KC	N
Campanula rotundifolia	Harebell	KC	

Observed by: KC – Krippner Consulting, LLC; CL – Capitol Land Trust

Note abbreviations: C – common throughout the site; P – patchily distributed; O – known oviposition site and larval food for Taylor's checkerspot butterfly; L – known larval food for Taylor's checkerspot butterfly; N – known nectar source for Taylor's checkerspot butterfly; Na? – may be a native or non-native variety on the site, or both.

Native trees and shrubs that were removed during initial restoration activities are not included on this list because the intent of ongoing management is to continue to remove trees and shrubs before any become re-established.

Table 2. Non-native and Invasive Plant Species (Observed at Leitner Prairie)

Scientific Name	Common Name	Observed by	Notes
Phleum pretense	Timothy grass	CL	
Senecio jacobaea	Tansy ragwort	CL	
Plantago lanceolata	Narrowleaf plantain	CL; KC	C; O; N
Plantago major	Common plantain	CL	
Rubus armeniacus	Himalayan blackberry	CL; KC	P
Cytisus scoparius	Scot's broom	CL; KC	C
Cirsium arvense	Canada thistle	KC	P; N
Leucanthemum vulgare	Oxeye daisy	KC	P
Hypochaeris radicata	Hairy cat's ear	KC	N
Taraxacum officinale	dandelion	CL; KC	

Observed by: KC – Krippner Consulting, LLC; CL – Capitol Land Trust

Note abbreviations: C – common throughout the site; P – patchily distributed; O – known oviposition site and larval food for Taylor's checkerspot butterfly; N – known nectar source for Taylor's checkerspot butterfly

Figures

Figure 1. Vicinity Map

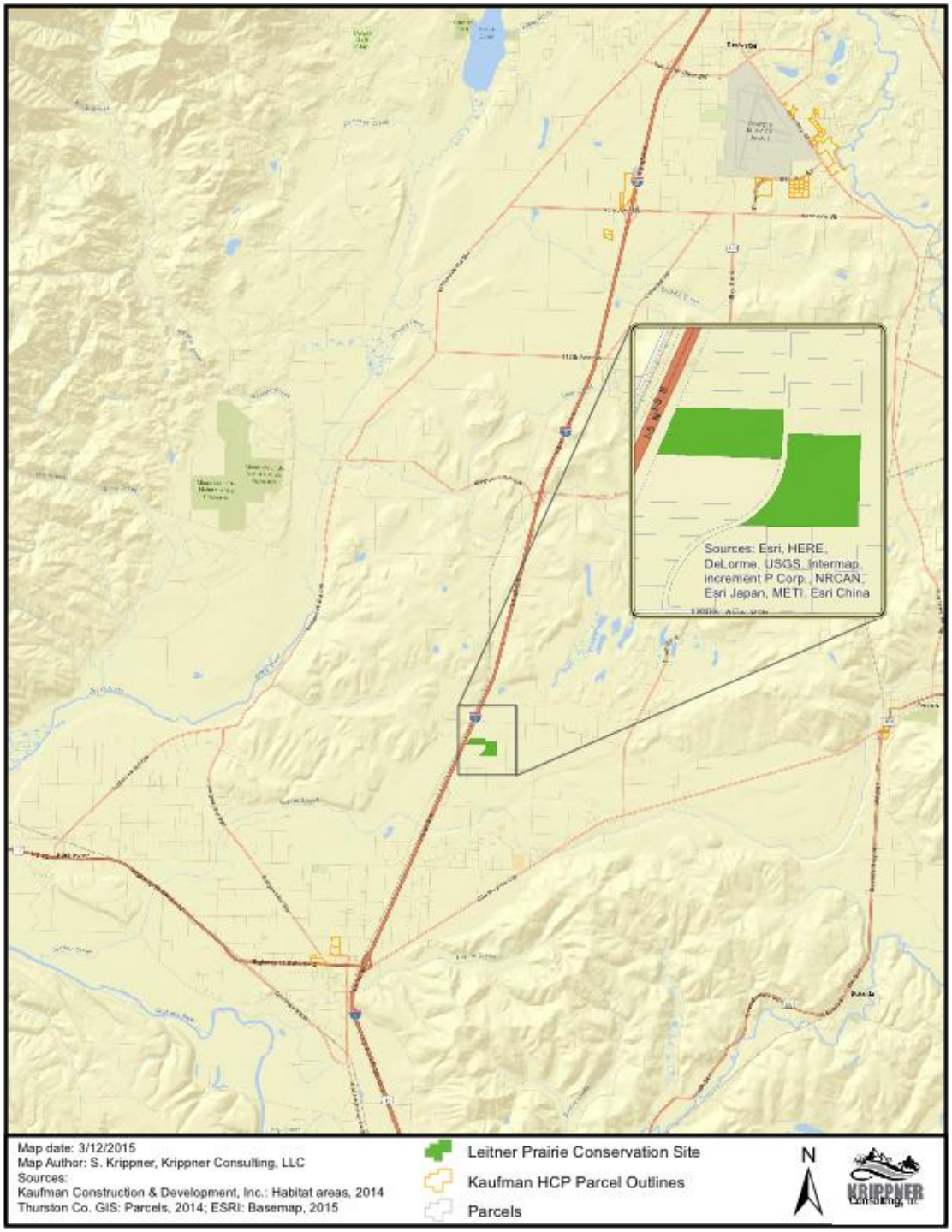
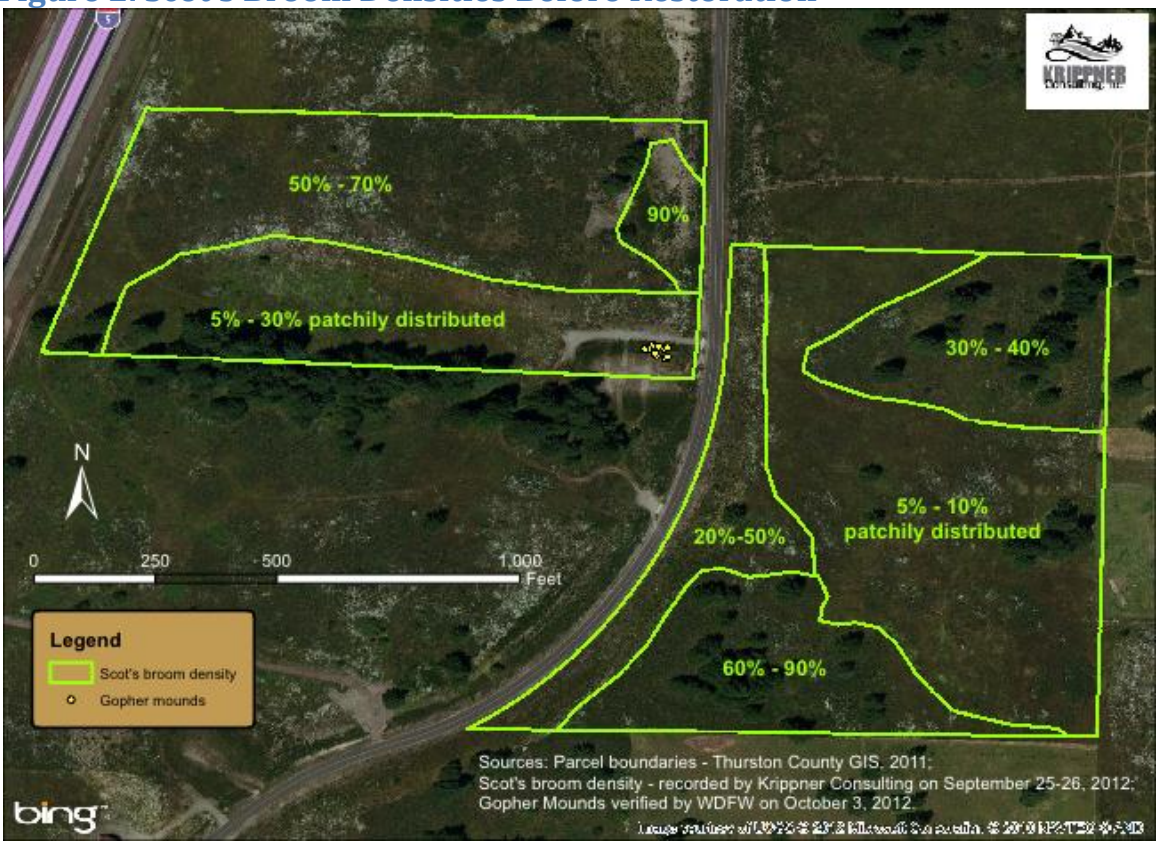


Figure 2. Scot's Broom Densities Before Restoration



Appendix 1: Management and Monitoring Actions by Phase.

Management Summary				
Initial Phase (Years 1-3)				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 hours per year	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	16 hours per year	1 time per year	1 time per year following monitoring
Conduct biological performance monitoring	Belt transect data collection and photo monitoring	20 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work Plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	16 hours per year	1 time each year	Due November 1
Update management Plan	Update management Plan as needed.	10 hours per year	As needed	Year end

Intermediate Phase (Years 4-9)				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 total hours	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	16 hours per year	1 time per year	1 time per year following monitoring
Prescribed burning or other prairie restoration actions	Crew to complete burn unit operation	40 hours per treatment year	Every 3 years	Fall
Seeding of burn unit or other cleared areas with native seed mix	Seeding using broadcast seeder	24 hours per treatment year	Every 3 years	Fall
Conduct biological performance monitoring	Belt transect data collection and photo monitoring	16 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work Plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	12 hours per year	1 time each year	Due November 1
Update management Plan	Update management Plan as needed.	5 hours per year on average	As needed	Year end

Final Phase (Years 10–20)				
Access control/garbage removal	Keep property in orderly condition	8 total hours	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	8 hours per year	1 time per year	1 time per year following monitoring
Prescribed burning or other prairie restoration actions	Crew to complete burn unit operation	24 hours per treatment year	Every 4 years	Fall
Seeding of burn unit or other cleared areas with native seed mix	Seeding using broadcast seeder	12 hours per treatment year	Every 4 years	Fall
Conduct biological performance monitoring	Belt transect data collection every other year; photo monitoring and general site observations every year	12 hours per year on average	1 time per year	Spring to early Summer
Prepare annual monitoring report and work Plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	10 hours per year on average	1 time per year	Due November 1
Update management Plan	Update management Plan as needed.	5 hours per year on average	As needed	Year end

Appendix 2: Survey Protocol

Introduction

This survey protocol is intended to provide a standardized approach for assessing whether the conservation program outlined in the HCP is being successful implemented. Indicators of successful implementation are measured by the percent cover of the vegetation type, presence and distribution of pocket gopher mounds, and other habitat features that characterize habitat suitability for the species covered in the HCP. The data collected in accordance with this survey protocol indicates whether suitable habitat exists for the streaked horned lark, Taylor's checkerspot butterfly, and Mazama pocket gopher.

Survey Timing and Frequency

Surveys for percent cover of vegetation types and pocket gopher mounds will be conducted every year from June 1 through October 31 for the first 10 years, then every 2 years from year 10 through 20. In alternating years from years 10 through 20, the sites will still be monitored for any signs of problems in terms of human access, habitat modifications, or noxious weeds.

Surveys for native prairie plants (to assess TCB habitat) will be conducted between April 1 and June 15 on the same annual schedule as the other parameters.

Survey Coverage

Survey area coverage should be approximately 5 percent of the Conservation Site.

For Leitner Prairie, which is 36.18 acres, to survey 5 percent (1.8 acres) of the 36.18 acres with survey plots that are 15 by 15 meters (225 m^2 or 0.056 acre) in size and there should be a total of 32 plots because the total of 1.8 acres divided by 0.056 acre (225 m^2) equals 32 plots. Now draw the transect lines spacing the parallel belt transect lines 50 meters apart, determine the length of the line using GIS, and divide it by 32 to determine how far between plots to place them. See Figure A for an example of how the transect line is drawn on a site.

Field Materials

Field notebook

Meter tape

PVC pipes for temporary staking of 15 by 15 meter plots during survey

GPS

Camera

Field data sheets

Aerial imagery map (described below)

Procedures for Collecting Field Data

Prepare an aerial photo of the survey site and randomly select a different cardinal direction/orientation for the continuous transect line every year.

Belt transect lines are spaced parallel to each other and 50 meters apart.

Transect lines are continuous throughout the site.

Import the belt transect route onto a GPS unit for consistency in the field or use another method that ensures transects are spaced and placed appropriately.

Survey plots are 15 meters by 15 meters, placed on alternating sides of the belt transect evenly spaced along the entire length of the belt transect (See example in Figure A).

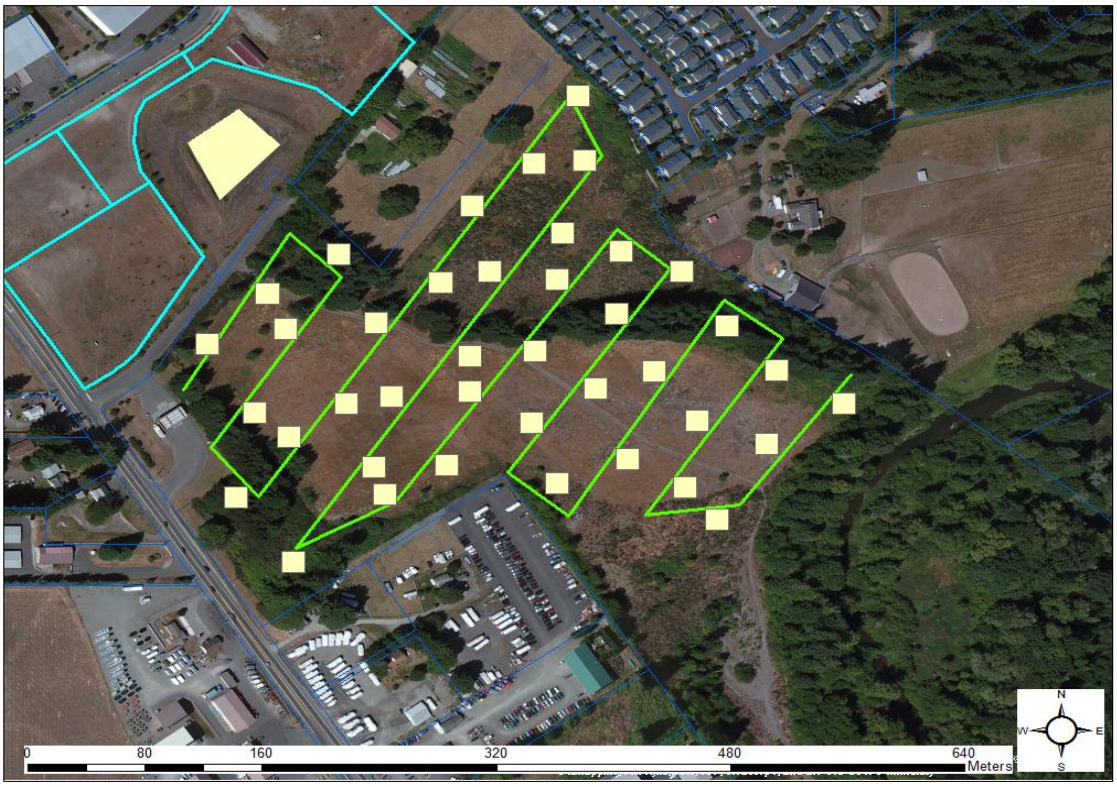


Figure A. Example of continuous transect line and 15 by 15 meter plots every 60 meters at Deschutes Corridor.

Aerial photo of the survey site should include north arrow, scale bar, survey area boundary, and parcel boundaries (if relevant), overlaid on recent, high-resolution aerial imagery.

Print copies of aerial photo and field survey form for use in the field, and/or collect field data electronically in accordance with the field form.

At each plot record percent cover or presence/absence data as specified on the field data form for: Scot's broom and/or all other woody vegetation greater than 12 inches in height; grassland with >10% forbs; high quality native grassland; bare ground, moss, lichen, low stature grassland less than 12 inches high; plant patches that support Taylors' checkerspot butterfly larva and adult stages; and gopher mounds. Also record gopher mounds observed outside of plot areas.

Record GPS point location at the center of each plot (approximate center).

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Field Data Form for Leitner Prairie

Date:
Surveyor:
General Notes:

Notes about gopher mounds observed on site between plot locations:

Data to Record in Each 15 x 15 m Plot	Plot 1	Plot 2	Plot 3
% Scot's broom / woody cover > 12" tall (0-4; 5-9; 10-19; 20-49; 50-100)			
% Grassland with forbs at >10% cover (0-4; 10-19; 20-39; 40-79; 80-100)			
% High quality grassland (0-4; 5-9; 10-19; 20-49; 50-100)			
% Bare ground, moss, lichen, grassland <12 inches high (0-4; 5-9; 10-19; 20-49; 50-100)			
Gopher mounds present (yes or no)			
TCB oviposition and larval host plants ($4\ m^2$ patch present, yes or no) Note which plant species is present			
TCB nectar plants ($4\ m^2$ patch present, yes or no) Note which plant species is present			

TCB plant species list may be updated regularly.

TCB Oviposition and larval host plants:
Collinsia parviflora, C. grandiflora, Plectritis congesta, Triphysaria pusilla, Castilleja levisecta, and C. attenuate, Plantago lanceolata, Veronica scutella, V. beccabunga var. americana, V. serpyllifolia

TCB nectar species:
Achillea millefolium, Armeria maritima, Balsamorhiza deltoidea, Castilleja hispida, Camassia quamash, Cerastium arvense, Eriophyllum lanatum, Fragaria virginiana, Hypochaeris radicata, Lepidium campestre, Lomatium triternatum, Lomatium utriculatum, Lupinus lepidus, Plectritus congesta, Potentilla gracilis, Ranunculus occidentalis, Saxifraga integrifolia

FINAL DRAFT

Appendix D

Deschutes Corridor Conservation Site Management Plan

Appendix D of the
Kaufman Habitat Conservation Plan
for Taylor's Checkerspot Butterfly (*Euphydyas editha taylori*);
Streaked Horned Lark (*Eremophila alpestris strigata*);
and two subspecies of Mazama Pocket Gopher
(*Thomomys mazama pugetensis* and *Thomomys mazama yelmensis*);
in Thurston County, Washington

Prepared for
Kaufman Holdings, Inc.
Kaufman Real Estate, LLC
Liberty Leasing & Construction, Inc.

U.S. Fish and Wildlife Service Reference Number:
XXXX

August 2015

Prepared by:

Krippner Consulting, LLC
PO Box 17621
Seattle, Washington 98127

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Introduction

Purpose of Establishment

Deschutes Corridor was established by the Applicants to compensate for unavoidable impacts from development to listed species and habitat regulated under Federal, state, and county law. Specifically it was established to permanently provide habitat for the state and federally listed (threatened) Olympia pocket gopher (*Thomomys mazama pugetensis*), which is a subspecies of the Mazama pocket gopher (*Thomomys mazama*). The Deschutes Corridor was selected as a conservation site because it is strategically located in close proximity to the Olympia airport grounds where the largest known population of Olympia pocket gophers is found, and it is connected to other suitable habitat that is protected, including large tracts adjacent to the Deschutes River. Upon restoration, the Deschutes Corridor will also provide suitable habitat for other listed species, in particular streaked horned lark (*Eremophila alpestris strigata*) and Taylor's checkerspot butterfly (*Euphydyas editha taylori*).

Purpose of this Management Plan (Plan)

The purpose of this Plan is to describe the objectives and priorities of conserving the site, performance standards, restoration and management actions, and monitoring and reporting requirements. This Plan describes actions that will be carried out through the 20-year permit term for the Habitat Conservation Plan and beyond. It includes conservation measures for initial site restoration and for ongoing land management.

This Plan is based on the current ecological conditions present at Deschutes Corridor, which will change over time as restoration and management actions are implemented. As these ecological conditions change, the Plan may need updating to reflect changing management needs. While the overarching conservation goals, specific performance standards, and strategy will remain intact, on-the-ground management techniques may need to be updated. Annual updates to this Plan will occur as part of the annual monitoring report, which will likely be necessary every year for the first five years while the site is being restored to suitable habitat conditions for the Covered Species. Thereafter, it is expected that the Plan can be updated less frequently as site conditions will stabilize and require less rigorous maintenance activities. See Appendix 1 for a description of the activities, their frequency, and duration.

Land Manager and Responsibilities

The Applicants are currently the landowner and fulfill the role as the land manager for Deschutes Corridor.

The Applicants intend to sign the deed to Deschutes Corridor over to a long-term land-steward that will maintain the site in perpetuity in habitat suitable for the Covered Species.

The Land Manager will be responsible for:

- Implementing this management Plan.
- Managing and monitoring the site.
- Restoring and maintaining habitat and conservation goals in accordance with the performance standards in this document.
- Reporting to the USFWS.

The Applicants will assure funding while management is under their purview and once land ownership is transferred to a long-term land steward by creating an endowment for the sole purpose of managing and implementing HCP conservation measures.

The administrative and management costs, insurance, licenses and fees, land maintenance, land monitoring, reporting, professional services, taxes, translocation costs, adaptive management or changed circumstances, and contingency fees will be funded for the first ten years (Years 1-10) of the HCP term up front by the Applicants. The remaining ten years (Years 11-20) will be funded at the end of the fifth year (Year 5). Perpetual maintenance of the conservation sites, estimated for Years 21-100, will be funded at the end of the 15th year (Year 15).

The Applicants may transfer Deschutes Corridor to another owner during the term of this HCP. Any conveyance will contain a restriction requiring the property to be managed consistent with the terms of this HCP for the remainder of the permit duration. Conveyance of a property will not affect the required mitigation or change funding assurances for mitigation because the system put in place by the Applicants as a condition of conveyance or sale for funding the endowment will legally apply to a property when it is conveyed or sold.

The Applicants will hold the endowment and release funds as needed each year to meet the HCP permit requirements, regardless of who owns and manages the properties. Deschutes Corridor will be preserved in perpetuity. At the end of the 20-year permit term, the endowment fund will be transferred to the property owner with a legal agreement stating that these funds are to be used only for ongoing site management and monitoring in perpetuity (estimated as Years 20–100).

The current Land Manager will be responsible for providing any required report to USFWS describing the monitoring and management activities for the prior and upcoming year and the status of the Conservation Land.

Property Description

Location and Access

Deschutes Corridor is a 51-acre site located in the Tumwater Urban Growth Area (UGA) immediately southeast of the Olympia airport and Old Highway 99 SE. It encompasses most of Parcel #12713220100 and is located at 8406 Old Hwy 99 SE (Figures 1 and 2).

Site access is from Old Hwy 99 SE. To access the property from Olympia, take Interstate 5 (I-5) South to Exit 102 onto Trosper Road SW. Turn left onto Trosper Road SW for 0.2 miles to cross over I-5 then turn right onto Capitol Boulevard SW. Follow Capitol Boulevard SW which turns into Old Hwy 99 SE for approximately 2.9 miles. Turn left onto 84th Avenue SE. Access the site (at the north end) by turning right on a gravel drive located opposite storm water facilities on the Deschutes Industrial Park site.

Land Use

Deschutes Corridor is located in an area identified as Bush Prairie in the Tumwater UGA. Land uses in the general vicinity include commercial, low and high density residential, airport operations, agriculture, forestry and conservation lands. There are no structures built on the site,

but there some old semi-paved single lane roads. The southern portion of the site was a former gravel quarry operation.

In the former gravel quarry portion of the site, the soils have been disturbed or removed by previous quarry operations, and there are areas of standing water (at the south end of the site). Soil conditions throughout the entire site are expected to improve over time in areas of previous disturbance. Eventually all Deschutes Corridor areas that still contain suitable soils and/or could be restored to suitable habitat conditions are expected to provide suitable habitat for the Covered Species long term.

This site is connected with adjacent areas zoned as Open Space (OS), increasing the overall habitat and conservation value of this site for many native species. In addition, development is not allowed by local ordinances within the buffer of the Deschutes River, or within or near wetlands prevalent in other parts of this corridor.

This site now contributes to a larger reserve design intended to preserve a system of prairie habitat at the landscape scale. Preserving this site will improve the baseline conditions for the Covered Species and influence future conservation decisions regarding mitigation land selection.

Topography and Hydrology

The overall topography is undulating. The slopes are generally less than 3 percent throughout the site, except on the south portion of the site where gravelly soils have been stockpiled. In these areas there are also flat areas of compact gravelly soils that pond water in winter months. A wetland that was created or modified by quarry operations is located in the southeast corner of the site. The southwestern-most portion of the parcel is in the floodplain of the Deschutes River.

Soils

Soils on the site are mapped as Nisqually loamy fine sand (0 to 3% slopes); Indianola loamy sand (15 to 30% slopes); Everett very gravelly sandy loam (0 to 3% slopes); Puget silt loam; Spana gravelly loam; and pits, gravel (USDA NRCS 2012). Nisqually loamy fine sand is highly suitable for gophers because the soil properties drain well due to moderately rapid permeability; these soils cover approximately 30 acres of the 51-acre site. Although soils are compacted in some areas from former human activities, over time biological processes are expected to loosen topsoil, increasing habitat suitability and functions for the Covered Species.

Existing Easements

There are no existing easements on this site. Rather this site will be managed long term for the Covered Species in accordance with this site management Plan and as part of a binding agreement between USFWS and the long term land steward and owner, once the Applicants have deeded the land to the land steward.

Habitat Description and Species Abundance

Biological Resources Surveys

Existing (pre-restoration) vegetation communities are shown in Figure 2; however, currently, invasive, non-native plants are dominant across much of this site, which is not reflected in Figure 2. On the north end of the site the Scot's broom thicket is dense and more than six feet tall (cover

varies from 80 to 100 percent). In other areas the Scot's broom thickets are not as dense and are less than four feet tall (cover varies from 30 to 50 percent). Other invasive plants found in smaller patches include reed canarygrass, Japanese knotweed, and Himalayan blackberry. The moss and lichen ground cover is dense in many areas that are more sparsely covered with Scot's broom. A row of large Douglas fir trees extends across the north portion of the site. Red alder has colonized disturbed soil areas along the east boundary and gravel quarry areas. Soils have been disturbed by past gravel quarry operations, and there are areas of standing water in quarry areas at the south end of the site. The quarry area also has large stockpiles of quarry materials and is mostly bare ground.

Survey results indicate that the baseline composition is as follows (approximations):

- 0 percent high-quality native grassland,
- 0 percent native grassland,
- 0 percent degraded grassland,
- 50 percent shrub-dominated habitat,
- 40 percent tree-dominated habitat, and
- 10 percent non-prairie (e.g., bare ground, quarry spalls, river riparian, etc.).

Presence and Location of Listed Species

Gopher mounds have not been surveyed for nor documented on the site. The Olympia Airport and Deschutes development site are both directly adjacent to the Deschutes Corridor site and have documented occupancy of Olympia pocket gophers. We expect that Olympia pocket gophers are very likely to occupy Deschutes Corridor once habitat is restored because it is directly connected to occupied habitat and the site contains suitable soils for gophers.

Once shrub thickets and trees are removed and the site is dominated by a variety of native and non-native forbs and grasses, the gopher population is expected to expand into Deschutes Corridor and eventually occupy most, if not all, areas of this site that contain suitable soils. Gopher densities are expected to be highest in areas with loamy sand soils, and lower where soils are more gravelly, friable, and well-drained on this site.

Managing the vegetation as proposed by this Plan is expected to improve habitat conditions for Taylor's checkerspot butterfly and streaked horned lark. We do not expect Taylor's checkerspot and streaked horned lark to be present on the site currently because of the unsuitable habitat conditions; however, it is possible that streaked horned lark may forage or nest on the site once it is restored to suitable habitat conditions because they nest across the street on the Olympia Airport. Taylor's checkerspot could be introduced once suitable habitat for this species is restored.

Although the restoration goals and management objectives are not explicitly directed at improving conditions for species other than the Covered Species, the site may provide suitable habitat for other listed species in the future. The possible introduction of listed and/or priority species or covering additional listed species would require a separate analysis of suitability and would require additional funding and commitments that are not included or discussed in the HCP or this Plan.

Habitat Development/Performance Standards

Primary Goal

The primary goal for Deschutes Corridor is to: **Maintain, in perpetuity, fully functional grassland that provides suitable habitat for the Covered Species included in the HCP.** Deschutes Corridor is a fully protected and actively managed conservation site that will add to the portfolio of protected prairie sites in the South Sound. It will permanently conserve habitat that is capable of sustaining the Olympia subspecies of Mazama pocket gopher in perpetuity and provide suitable habitat for the streaked horned lark and Taylor's checkerspot butterfly.

To meet this goal site restoration and management will continue in phases, improving the conservation value of the site over time. As partial fulfillment of the requirements of the HCP, sufficient funding assurances are in place to allow adequate perpetual management at any stage of restoration and/or maintenance. This is particularly essential when all credits are used because sufficient funds must be in place to ensure the site is managed and contains suitable habitat conditions in perpetuity. Deschutes Corridor is expected to progress through stages of lower conservation value requiring more intensive management to having higher conservation value with lower maintenance requirements.

Restoration vs. Management

Initial restoration will include the removal of dense Scot's broom thickets and other woody vegetation, where possible, including large Douglas fir trees. Woody vegetation in wetland buffers and the Deschutes River riparian buffer may need to remain to comply with local buffer protection regulations, and it may not be safe to access and remove woody vegetation growing on steep-sided soil piles.

Woody vegetation will be removed by mechanical means. In accordance with the Thurston County (2009) fact sheet on Scot's broom, "*mechanical methods can be used on larger infestations with the use of brush cutters, tractor-mounted mowers, or backhoes. Cutting stems in the spring and early summer will result in new shoot production and poor control. However, up to 80% mortality can be achieved by cutting down plants when they are drought stressed (July through September*)." Ground disturbance will be kept to a minimum by using rubber-wheeled or low-compaction equipment whenever possible. The brush debris resulting from mechanical cutting of Scot's broom is expected to mulch quickly on-site. Brush debris will be piled and burned, or mulched on-site if it remains for longer than one year.

Douglas fir, red alder, and other trees and shrubs will be removed by cutting, large logs will be removed, and slash will be burned on-site. The removal of tree stands and individual trees will provide a larger habitat area for prairie species and help prevent future establishment of woody vegetation on the site.

Vegetation at Deschutes Corridor will continue to be managed each year to improve habitat conditions and to keep invasive species such as Scot's broom and woody vegetation from degrading habitat conditions. Vegetation management will be accomplished by mowing, targeted application of herbicides, prescribed fire, or by other means. Species-specific management may also be needed for controlling Japanese knotweed, reed canarygrass, and Himalayan blackberry, now found in a few patches on the site.

Phased Restoration - Goals and Performance Standards

Goals and performance standards are based on habitat requirements for the Covered Species. Restoration and management activities are expected to improve site conditions each year, and they will vary by year depending upon how ecological conditions change over time. The following goals and performance standards are phased in time with the long term goal being a site that provides habitat for the Covered Species, requiring little to no ongoing maintenance each year. No maintenance may be needed in a given year if all of the performance standards have been met for the previous three years, and no management issues are identified during monitoring that might degrade habitat in the foreseeable future.

Initial Phase (Years 1-3)

The main goal for Years 1-3 is to perform the initial removal of trees and shrubs, where possible, and to control any shrubs or trees that may try to become re-established at the site. Monitoring efforts will also be focused on the need for the site to provide a diverse mix of forbs and grasses for forage for gophers.

The plant resources inventory will be updated throughout the monitoring period, contributing to the regional goal of preserving prairie lands. In particular, if this site is used in the future as a sustainable source of native seeds, roots, or bulbs.

The performance standards for each phase are summarized in Table A (below).

Table A: Performance standards during each of project phases.

Data from belt transects and other field observations will be used to estimate whether or not the standards below for providing habitat for the Covered Species are met.

	% Scot's Broom & woody veg. > 12 inches	% Grassland with forbs at >10% cover	% Bare ground, moss, lichens and/or grassland <12 inches high	% High quality native grassland	% TCB plants larval/ nectar in 4 m^2 patches	% Gopher Occupied
Initial Phase 1-3 yrs	<10	>20	n/a	n/a	n/a	n/a
Intermediate Phase 4-9 yrs	<10	>40	>20	>10	>10/>10	>20
Final Phase 10-20 yrs	<5	>80	>40	>20	>20/>20	>30

The performance standards for Years 1-3 are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 20% of the site.

The cover of high quality native grassland is recorded. High quality native grassland is defined as areas with at least 30% cover of herbaceous vegetation, which include native annual and perennial grasses and forbs, less than 25% shrub cover, and less than 5% tree cover. No specific performance standard for this measure is required during this phase.

Active gopher mounds are observed on the site. No specific performance standard for this measure is required during this phase.

Plants known to provide oviposition sites, larval forage, and nectar sources for Taylor's checkerspot butterfly are recorded and cover estimated during monitoring for guiding future management decisions. No specific performance standard for this measure is required during this phase.

The amount of open ground, or ground covered with mosses and lichens and low stature grassland (less than 12 inches high), is estimated during monitoring for guiding future management decisions. No specific performance standard for this measure is required during this phase.

Intermediate Phase (Years 4-9)

The goals for Years 4-9 include continued management of invasive species, and measured improvement in specific habitat conditions for Covered Species.

The performance standards for Years 4-9 are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 40% of the site.

The cover of high quality native grassland is estimated to be at least 10% of the total site area.

Evidence gathered from belt transects or other field observations indicate that gophers occupy at least 20% of the site area.

Plants known to provide oviposition sites, larval forage, and nectar sources for Taylor's checkerspot butterfly are present in sufficient densities to support this species on at least 10% of the site. Plant patches at least 4 m^2 in size of oviposition sites/larval food and nectar sources are recorded in at least 10% of the belt transects, or other field observations indicate that this density of plant patches is present.

The amount of open ground, or ground covered with mosses and lichens and low stature grassland (less than 12 inches high), is estimated to be at least 20% of the total site area.

Final Phase (Years 10 and beyond)

The goals for Years 10 and beyond include continued management of invasive species, and the achievement of meeting specific habitat conditions for Covered Species.

The performance standards for Years 10 and beyond are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 5%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 80% of the site.

The cover of high quality native grassland is estimated to be at least 20% of the total site area.

Evidence gathered from belt transects or other field observations indicate that gophers occupy at least 30% of the site area.

Plants known to provide oviposition sites, larval forage, and nectar sources for Taylor's checkerspot butterfly are present in sufficient densities to support this species on at least 20% of the site. Plant patches at least 4 m^2 in size of oviposition sites/larval food and nectar sources are

recorded in at least 20% of the belt transects, or other field observations indicate that this density of plant patches is present.

The amount of open ground, or ground covered with mosses and lichens and low stature grassland (less than 12 inches high), is estimated to be at least 40% of the total site area.

Management

Management includes actions needed to maintain the conservation value of the site, while meeting the performance standards. See Appendix 1 for a table of management actions, frequency, schedule, cost (in terms of labor hours), duration, etc.

Management actions include:

- Vegetation and habitat management (e.g., mowing, herbicide, burning)
- Site management (e.g., controlling illegal dumping, trespassing, unauthorized ATV use)
- Biological monitoring (e.g., vegetation and habitat surveys)
- Reporting and Planning

Vegetation and Habitat Management

The assumption made in this site management Plan and in the Funding Assurances section of the HCP is that mowing, or an effort similar in cost to mowing may be required each year to both manage invasive plants and restore habitat conditions required by the Covered Species. Mowing may not be recommended every year, and other treatments during a given year may be more effective in restoring the site to these conditions.

Continued mowing in late summer is the default conservation measure for Deschutes Corridor and does not require special approval from USFWS unless the site becomes occupied by nesting streaked horned larks. If nesting is occurring on the site, mowing and maintenance activities will need to be coordinated with the USFWS to prevent loss of young and reduced reproductive success of adults.

Other conservation actions may be employed in addition to, or instead of mowing to manage vegetation on portions of, or across the entire site. These other actions may include prescribed fire, targeted application of herbicides, or other methods approved by USFWS. A detailed description of any alternative proposed methods must be presented to USFWS at least three months in advance for their review and approval.

Mowing

Annual mowing in late summer is the default treatment for controlling invasive plants and keeping the site dominated by a variety of grasses and forbs. Each year the effectiveness of this treatment method will be reviewed and alternative methods will be recommended following spring monitoring. It is likely that mowing will not be required every year.

If monitoring in spring indicates that habitat conditions on the site would benefit from mowing in late summer, this will be done so that the site continues to be dominated by grasses and herbs, in an early successional stage. In this way, habitat conditions preferred by Olympia pocket gophers,

and the open grassland conditions required for Taylor's checkerspot butterflies and streaked horned larks will be maintained. Because it promotes the growth of preferred forage plants (herbs and grasses), regular mowing is likely to encourage the spread of pocket gophers on this site. Pocket gophers are known to aerate soils and increase plant diversity (Hartway and Steinberg. 1997; Mielke, 1977). Therefore, even if habitat management is limited to mowing in late summer, soil conditions should improve, prairie plants may spread, and habitat for the Covered Species will continue to be enhanced and conserved.

Targeted Herbicide Use

Targeted use of herbicides to control invasive plant species may be recommended for managing Scot's broom and Japanese knotweed, or for reducing the cover of dense, rhizomatous grasses, including reed canarygrass, if mowing alone is not enough to achieve performance standards for habitat restoration. Prairie restoration practitioners in this region have successfully employed the use of grass-specific herbicides that kill non-native grasses with minimal impacts to native forbs and grasses to open areas up for colonization of native species (Stanley et al., 2011). If native vegetation is not already present in the general area, grass-specific herbicide treatment may need to be followed with native seeding. Or this treatment may be used to create areas of bare ground for colonization by mosses and lichens, provided there is low risk of colonization by another invasive species.

To minimize potential impacts to Covered Species, lower toxicity herbicides shall be used whenever possible. Selective herbicide application will occur rather than broadcast application treatments.

Prescribed Fire

Prescribed fire has been recommended by regional prairie restoration practitioners to prevent invasion of woody vegetation (Dunwiddie and Bakker 2011). Fire is also known to stimulate the germination and growth of native prairie species, and would likely improve habitat conditions for the Covered Species. However, prescribed fire would also stimulate the germination of Scot's broom (Dennehy et al. 2011), possibly creating the need for more intensive management of this species by targeted herbicide or additional mowing. Care must also be taken that areas made bare by fire are not colonized by Scot's broom or other invasive species. Follow-up seeding or planting of native plants may be required following fire if no native seed source is present in the general area or likely to be present in the seed bank.

If prescribed fire is used in any given year, no more than 1/3 of the site area may be burned that year since this activity can temporarily remove or disturb habitat for the Covered Species.

Native Seeding and Planting

Native seeding and/or planting is most likely to be recommended if a grass-specific herbicide or fire is used to clear areas of dense grasses or invasive species and there are few native plants in the area to become re-established in the cleared area. Native seeding or planting may also be recommended if it is deemed necessary to meet the performance standard for providing oviposition sites, larval food, or nectar sources for Taylor's checkerspot butterfly.

High Intensity Short Duration Grazing

High intensity grazing early in the growing season is being used on some prairies in South Puget Sound to control the growth of non-native rhizomatous grasses and increase coverage by native prairie plants. If this method proves to be an effective mechanism for prairie restoration and if it is clear that dense rhizomatous grasses are limiting prairie vegetation on Deschutes Corridor, then this type of grazing may be considered as another tool that is used in future years to enhance habitat conditions for the Covered Species. This management tool is also likely to be beneficial to gophers because it should act to decrease overall grass cover and promote the growth of forbs, their preferred forage plants (as long as soils do not become compacted).

Site Management

The property owner and land steward will manage property access and human use of the site.

Site Inspection

The site is inspected annually or when the owner is notified of any problems. Signs of human activities are recorded, and corrective measures for any problems that are found are implemented. For example, property signs that go missing are replaced, trash is removed, and barriers to ATV use are put into place to prevent further access.

Fences, Gates, Roads

Site boundaries will be marked with conservation site signs. There are no formal roads, gates, or fences on this site.

Public Access

Currently there is no official public access on this site, and no signs of public use are apparent. Limited public access may be granted in the future, as long as use is passive and limited to designated trails that may be used to access the river and connect to a regional trail system.

Biological Monitoring

Biological monitoring will be conducted to determine if conservation goals and performance standards are being met, and to recommend conservation actions for current and future years. The entire site will be explored to note any problems with invasive species, or other ecological changes. Photo documentation and updates to plant lists will be completed. The survey protocol described in Appendix 2 will be followed in order to evaluate whether or not performance standards are met each year.

A general description of dominant plant species will be recorded, and habitat conditions will be evaluated during monitoring. If streaked horned lark or Taylor's checkerspot butterfly occupy the site in the future, then conservation activities may need to be modified to accommodate their habits (land manager will coordinate with the USFWS). This will be addressed in the monitoring report prepared for USFWS. USFWS must approve conservation actions proposed for promoting these species before they are implemented.

Surveys for percent cover of vegetation types and pocket gopher mounds will be conducted every year from June 1 through October 31 for the first 10 years, then every 2 years from year 10 through 20. Surveys for native prairie plants (to assess TCB habitat) will be conducted between April 1 and June 15 on the same annual schedule (every year for the first 10 years, then every 2

years from year 10 through 20). Survey area coverage is approximately 5 percent of the entire Conservation Site.

Reporting and Planning

Monitoring reports will be prepared and submitted to USFWS annually for 20 years until this HCP expires.

Monitoring reports will include the following:

9. Activity and date of conservation actions since last monitoring report.
10. Current on-site conditions that are or may be adversely affecting Covered Species and their habitat, as well as any actions being undertaken or contemplated to address such conditions.
11. An evaluation of how conservation goals and performance standards are being met; what activities need to be taken to meet them in future year; or recommendations for revisions to goals and performance standards if changed circumstances have occurred.
12. Conservation actions anticipated prior to the next monitoring report submission.

Monitoring reports for other conservation sites (Leitner Prairie and on-site habitat set-asides) and the development sites (until construction) required in the HCP may be combined into one annual report for presentation to USFWS.

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Figures

Figure 1. Vicinity Map

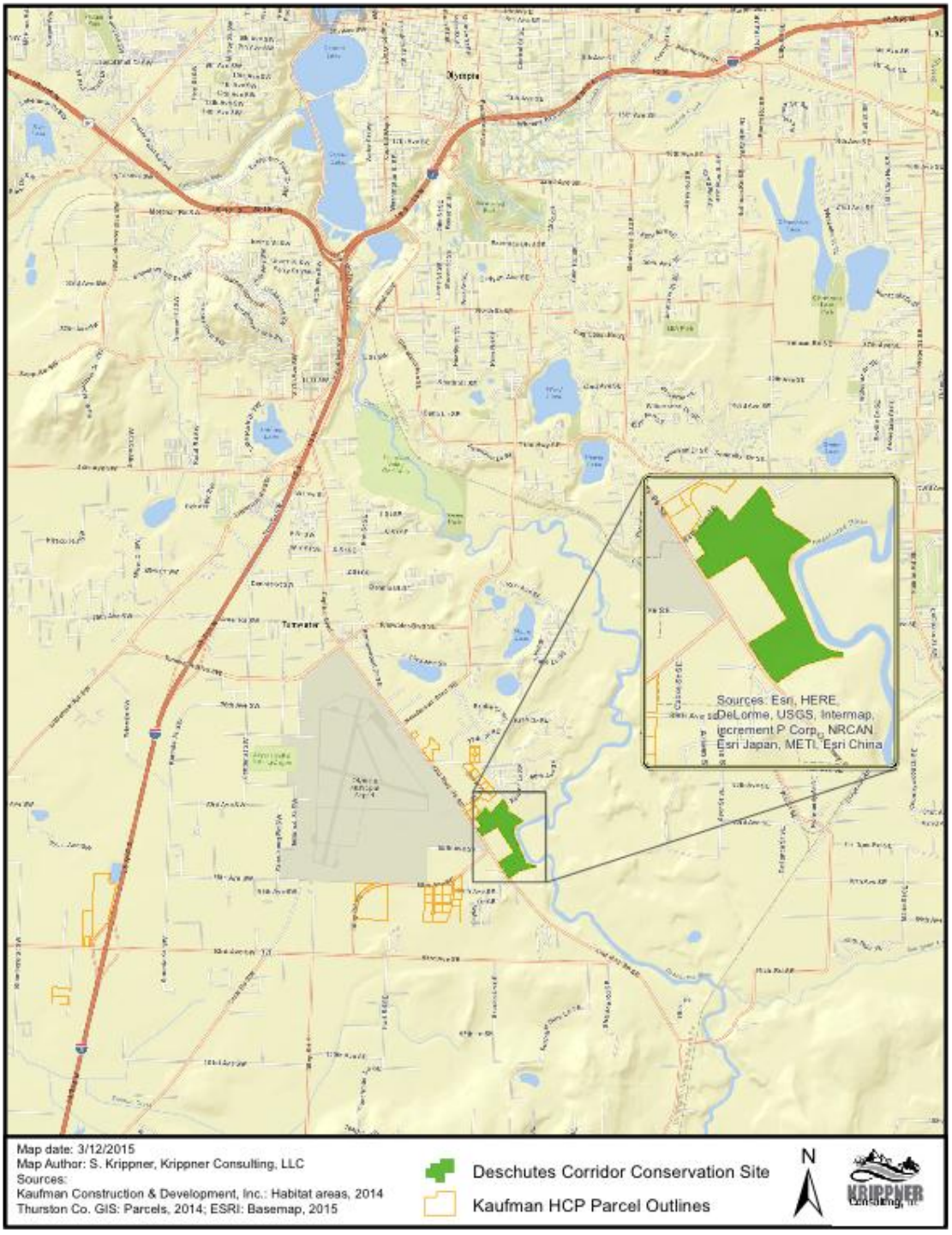

Figure 2. Deschutes Corridor – Pre-Restoration/Existing Vegetation Communities

Appendix 1: Management and Monitoring Actions by Phase.

Management Summary				
Initial Phase (Years 1-3)				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 hours per year	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	16 hours per year (60 hours for Year 1 for initial restoration activities)	1 time per year	1 time per year following monitoring
Conduct biological performance monitoring	Belt transect data collection and photo monitoring	20 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work Plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	16 hours per year	1 time each year	Due November 1
Update management Plan	Update management Plan as needed.	10 hours per year	As needed	Year end

Intermediate Phase (Years 4-9)				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 total hours	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	16 hours per year	1 time per year	1 time per year following monitoring
Prescribed burning or other prairie restoration actions	Crew to complete burn unit operation	40 hours per treatment year	Every 3 years	Fall
Seeding of burn unit or other cleared areas with native seed mix	Seeding using broadcast seeder	24 hours per treatment year	Every 3 years	Fall
Conduct biological performance monitoring	Belt transect data collection and photo monitoring	16 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work Plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	12 hours per year	1 time each year	Due November 1
Update management Plan	Update management Plan as needed.	5 hours per year on average	As needed	Year end

Final Phase (Years 10–20)				
Access control/garbage removal	Keep property in orderly condition	8 total hours	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	8 hours per year	1 time per year	1 time per year following monitoring
Prescribed burning or other prairie restoration actions	Crew to complete burn unit operation	24 hours per treatment year	Every 4 years	Fall
Seeding of burn unit or other cleared areas with native seed mix	Seeding using broadcast seeder	12 hours per treatment year	Every 4 years	Fall
Conduct biological performance monitoring	Belt transect data collection every other year; photo monitoring and general site observations every year	12 hours per year on average	1 time per year	Spring to early Summer
Prepare annual monitoring report and work Plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	10 hours per year on average	1 time per year	Due November 1
Update management Plan	Update management Plan as needed.	5 hours per year on average	As needed	Year end

Appendix 2: Survey Protocol

Introduction

This survey protocol is intended to provide a standardized approach for assessing whether the conservation program outlined in the HCP is being successful implemented. Indicators of successful implementation are measured by the percent cover of the vegetation type, presence and distribution of pocket gopher mounds, and other habitat features that characterize habitat suitability for the species covered in the HCP. The data collected in accordance with this survey protocol indicates whether suitable habitat exists for the streaked horned lark, Taylor's checkerspot butterfly, and Mazama pocket gopher.

Survey Timing and Frequency

Surveys for percent cover of vegetation types and pocket gopher mounds will be conducted every year from June 1 through October 31 for the first 10 years, then every 2 years from year 10 through 20. In alternating years from years 10 through 20, the sites will still be monitored for any signs of problems in terms of human access, habitat modifications, or noxious weeds.

Surveys for native prairie plants (to assess TCB habitat) will be conducted between April 1 and June 15 on the same annual schedule as the other parameters.

Survey Coverage

Survey area coverage should be approximately 5 percent of the Conservation Site.

For example, the Deschutes Corridor is 44 acres. To survey 5 percent (2.2 acres) of the 44 acres survey plots should be 15 by 15 meters (225 m^2 or 0.056 acre) in size and placed approximately every 60 meters along the transect and there should be a total of 40 plots if transects belts are 50 meters apart (parallel lines and belt transect total length of 2,364 linear feet).

The total of 2.2 acres divided by 0.056 acre (225 m^2) = 39.3 rounded up to 40 plots.

Field Materials

Field notebook

Meter tape

PVC pipes for temporary staking of 15 by 15 meter plots during survey

GPS

Camera

Field data sheets

Aerial imagery map (described below)

Procedures for Collecting Field Data

Prepare an aerial photo of the survey site and randomly select a different cardinal direction/orientation for the continuous transect line every year.

Belt transect lines are spaced parallel to each other and 50 meters apart.

Transect lines are continuous throughout the site.

Import the belt transect route onto a GPS unit for consistency in the field or use another method that ensures transects are spaced and placed appropriately.

Survey plots are 15 meters by 15 meters, placed on alternating sides of the belt transect every 60 meters along the entire length of the belt transect (See example in Figure A).

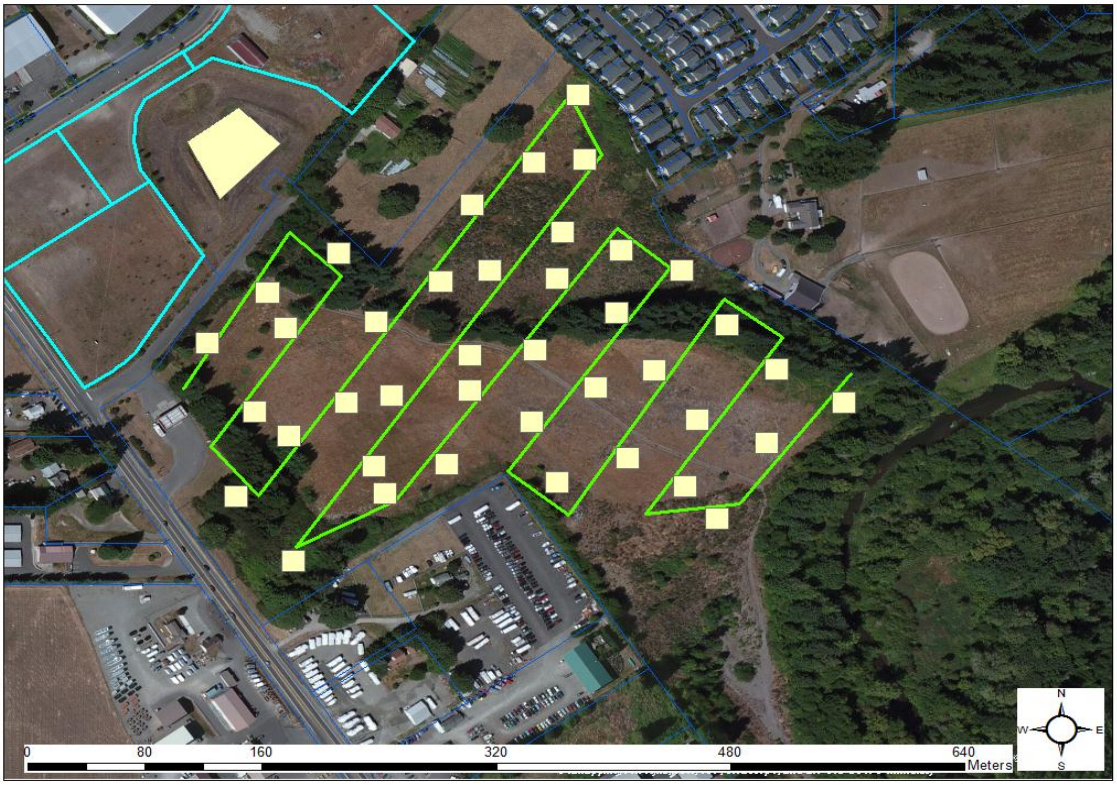

Figure A. Example of continuous transect line and 15 by 15 meter plots every 60 meters at Deschutes Corridor.

Aerial photo of the survey site should include north arrow, scale bar, survey area boundary, and parcel boundaries (if relevant), overlaid on recent, high-resolution aerial imagery.

Print copies of aerial photo and field survey form for use in the field, and/or collect field data electronically in accordance with the field form.

At each plot record percent cover or presence/absence data as specified on the field data form for: Scot's broom and/or all other woody vegetation greater than 12 inches in height; grassland with >10% forbs; high quality native grassland; bare ground, moss, lichen, low stature grassland less than 12 inches high; plant patches that support Taylors' checkerspot butterfly larva and adult stages; and gopher mounds. Also record gopher mounds observed outside of plot areas.

Record GPS point location at the center of each plot (approximate center).

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Field Data Form for Deschutes Corridor

Date:
Surveyor:
General Notes:

Notes about gopher mounds observed on site between plot locations:

Data to Record in Each 15 x 15 m Plot	**Plot 1**	**Plot 2**	**Plot 3**
% Scot's broom / woody cover > 12" tall (0-4; 5-9; 10-19; 20-49; 50-100)			
% Grassland with forbs at >10% cover (0-4; 10-19; 20-39; 40-79; 80-100)			
% High quality grassland (0-4; 5-9; 10-19; 20-49; 50-100)			
% Bare ground, moss, lichen, grassland <12 inches high (0-4; 5-9; 10-19; 20-49; 50-100)			
Gopher mounds present (yes or no)			
TCB oviposition and larval host plants ($4\ m^2$ patch present, yes or no) Note which plant species is present			
TCB nectar plants ($4\ m^2$ patch present, yes or no) Note which plant species is present			

TCB plant species list may be updated regularly.

TCB Oviposition and larval host plants:
Collinsia parviflora, C. grandiflora, Plectritis congesta, Triphysaria pusilla, Castilleja levisecta, and C. attenuate, Plantago lanceolata, Veronica scutella, V. beccabunga var. americana, V. serpyllifolia

TCB nectar species:
Achillea millefolium, Armeria maritima, Balsamorhiza deltoidea, Castilleja hispida, Camassia quamash, Cerastium arvense, Eriophyllum lanatum, Fragaria virginiana, Hypochaeris radicata, Lepidium campestre, Lomatium triternatum, Lomatium utriculatum, Lupinus lepidus, Plectritus congesta, Potentilla gracilis, Ranunculus occidentalis, Saxifraga integrifolia

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Appendix E

On-Site Habitat Set-Aside Area Management Plan

Appendix E of the
Kaufman Habitat Conservation Plan
for Taylor's Checkerspot Butterfly (*Euphydyas editha taylori*);
Streaked Horned Lark (*Eremophila alpestris strigata*);
and two subspecies of Mazama Pocket Gopher
(*Thomomys mazama pugetensis* and *Thomomys mazama yelmensis*);
in Thurston County, Washington

Prepared for
Kaufman Holdings, Inc.
Kaufman Real Estate, LLC
Liberty Leasing & Construction, Inc.

U.S. Fish and Wildlife Service Reference Number:
XXXX

August 2015

Prepared by:

Krippner Consulting, LLC
PO Box 17621
Seattle, Washington 98127

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Introduction

Purpose of Establishment

Three on-site habitat set-aside areas have been established by the Applicants on three of their development sites: Tilley Road Industrial Park, Tumwater Commerce Place, and Deschutes Industrial Park, to compensate for unavoidable impacts to listed species and habitat regulated under Federal, state, and county law. Specifically they were established to permanently provide habitat for the state and federally listed (threatened) Olympia subspecies of the Mazama pocket gopher (*Thomomys mazama pugetensis*). These sites are located in close proximity to the Olympia Airport grounds where the largest known population of Olympia pocket gophers is found. Two of the sites connect to other suitable gopher habitat that is protected. The set-aside on Deschutes Industrial Park connects to the newly protected 51-acre Deschutes Corridor conservation site, also established by the Kaufman's. The set-aside on Tumwater Commerce connects with protected habitat areas on the adjacent Sagewood residential development in process.

The on-site habitat set-aside areas are relatively small in size and are located in an urbanizing area. They are unlikely to provide habitat for other listed species, such as streaked horned lark (*Eremophila alpestris strigata*) and Taylor's checkerspot butterfly (*Euphydyas editha taylori*), now or in the future, because the biological needs of the lark and butterfly (e.g., large open habitats for the lark and specific oviposition sites and larval food sources for the butterfly) are unlikely to be met in the current fragmented landscape.

The development sites will also be managed to improve habitat conditions for the Covered Species until they are developed. Improving the habitat on the development sites is expected to benefit to the listed species presently occupying these sites until they are developed. In some cases, development is not planned for some time, and improving habitat in the interim will provide better living conditions in the interim. The management of the development sites is described in this report, including Land Manager and Responsibilities (see that section in this document), what activities will occur on these areas for management purposes (See Appendix 1, the last Management table), and how these sites will be surveyed (Appendix 2 under the final heading: Survey Protocol for Development Sites). The remainder of this report discusses only the on-site habitat set-asides.

Purpose of this Management Plan (Plan)

The purpose of this Plan is to describe the objectives and priorities of conserving the on-site habitat set-aside areas, the performance standards, restoration and management actions, and monitoring and reporting requirements. This Plan describes actions that will be carried out through the 20-year permit term for the Habitat Conservation Plan and beyond. It includes conservation measures for initial site restoration and for ongoing management of the on-site habitat set-aside areas.

This Plan is based on the current ecological conditions of the on-site habitat set-aside areas, which will change over time as restoration and management actions are implemented. As ecological conditions change, the plan may need updating to reflect changing management needs. While the overarching conservation goals, specific performance standards, and strategy will remain intact, on-the-ground management techniques may need to be updated. Annual

updates to this Plan will occur as part of the annual monitoring report, which will likely be necessary every year for the first five years while the sites are being restored to suitable habitat conditions for the Covered Species. Thereafter, it is expected that the Plan can be updated less frequently as site conditions will stabilize and require less rigorous maintenance activities.

Land Manager and Responsibilities

The Owners Association of each property that has an onsite habitat set-aside (Tilley Road, Tumwater Commerce, and Deschutes) will fund the annual vegetation management and monitoring required for their onsite habitat set-aside. This funding will be provided through the Owners Association on a per lot basis at each of the properties. The cost per landowner or tenant is based on the acreage of each lot. Funding is assured for the duration of the permit coverage (20 years). To assure perpetual funding for maintenance at habitat set-asides, authorization to collect fees for vegetation management and monitoring to comply with local jurisdiction HMP requirements will remain with the Owners Association after expiration of the permit. Owners Associations will hire a Land Manager to manage the sites and implement this plan.

The funding for management of the project development sites until they are developed will be assured by creating an endowment for the purpose of managing and implementing HCP conservation measures. The Applicants will hold the endowment and release funds as needed each year to meet the HCP permit requirements, regardless of who owns and manages the properties.

The administrative and management costs, insurance, licenses and fees, land maintenance, land monitoring, reporting, professional services, taxes, and translocation costs, for the project development sites will be funded for the first ten years (Years 1-10) of the HCP term up front by the Applicants. The remaining ten years (Years 11-20) will be funded at the end of the fifth year (Year 5). Project development sites will be managed by a Land Manager.

The Land Manager is responsible for:

- Implementing this management plan.
- Managing and monitoring the site.
- Restoring and maintaining habitat and conservation goals in accordance with the performance standards in this document.
- Reporting to the USFWS.

The Land Manager will be responsible for providing any required report to USFWS describing the monitoring and management activities for the prior and upcoming year and the status of the Conservation Land (e.g., habitat set-asides and remaining undeveloped portions of the Covered Properties).

Property Description

Location and Access

The three habitat set-asides are located immediately southeast of the Olympia Airport (Figure 1). Deschutes Industrial Park is located at the 8000 block on River Road SE in the Tumwater Urban Growth Area (UGA) of Thurston County. Deschutes Industrial Park habitat set-aside (3.22 acres)

includes areas around the storm pond facilities (Parcel #44160100000) and a 10-foot wide corridor along the backside of Parcels #44160001000, -1100, -1200, and -1300 (Figure 2). Tumwater Commerce Place habitat set-aside (5.45 acres) is located on Parcel #80630000003 at 8952 Tradewind Drive SE in the City of Tumwater (Figure 3). Tilley Road habitat set-aside (2.25 acres), on Parcel #12714310400, is located at the southeast corner of 88th Avenue SE and Tilley Road SE (Figure 4).

To access the properties from Olympia, take Interstate 5 (I-5) South to Exit 102 onto Trosper Road SW. Turn left onto Trosper Road SW for 0.2 miles to cross over I-5 then turn right onto Capitol Boulevard SW.

For Deschutes Industrial Park follow Capitol Boulevard SW for 1.9 miles which turns into Old Hwy 99 SE for 0.9 mile, then turn left on River Drive SE. The habitat set-aside surrounds the storm facilities south of River Drive SE, and includes a 10-foot corridor along the northeast boundary of the four lots located east of River Drive SE after the road turns to the northwest (Figure 2).

For Tumwater Commerce Place follow Capitol Boulevard SW for 1.9 miles which turns into Old Hwy 99 SE for 1.0 mile, then turn right onto 88th Avenue SE for 0.3 mile, turn left onto Tradewinds Drive SE for 0.2 mile until the road curves to the right. The habitat set-aside is left of the curve (Figure 3).

For Tilley Road follow Capitol Boulevard SW for 1.9 miles which turns into Old Hwy 99 SE for 1.0 mile, then turn right onto 88th Avenue SE and continue for approximately 0.9 mile to a curve in the road where 88th Avenue turns into Tilley Road and turn left into the entrance to Tilley Road Industrial Park. The habitat set-aside includes areas surrounding the storm water facilities and 8-foot wide corridors extending along the south and east boundaries from the storm facilities out to Tilley Road and 88th Avenue SE (Figure 4).

Land Use

The habitat set-asides are located in an area identified as Bush Prairie in the City of Tumwater and Tumwater UGA. Land uses in the general vicinity include commercial, low and high density residential, airport operations, agriculture, forestry and conservation lands. Other lots on the properties will be developed for commercial uses. There are no buildings built on the site, but the Deschutes and Tilley Road set-asides include the periphery of the stormwater retention ponds built for the surrounding land parcels. Tumwater Commerce set-aside includes a palustrine emergent wetland and it's protective buffer.

Deschutes Industrial Park was previously a tree nursery, Tumwater Commerce was used for grazing and haying, and Tilley Road was forested.

Deschutes habitat set-aside is connected to the Deschutes Corridor conservation area and should contribute to a larger reserve design intended to preserve a system of prairie habitat at the landscape scale.

Tumwater Commerce habitat set-aside connects with approximately 30 acres of habitat that has been designated as protected gopher habitat, wetland, and wetland buffers as part of the Sagewood residential subdivision (previously Tumwater Highlands) (Hatton Godat Pantier 2007).

Tilley Road habitat set-aside is located across the road from the Olympia Airport. The two habitat corridors are designed for gopher dispersal to and from airport grounds and maintained roadside habitats.

Ongoing management and monitoring of these habitat set-asides will contribute to knowledge of how human activities and development may affect the persistence of gopher populations over time. Assuming that gopher populations are able to persist at these locations, the habitat set-asides will be contributing directly towards the conservation and recovery of the Olympia pocket gopher.

Topography and Hydrology

The land slopes gradually or is flat (0 to 3% slopes) on the habitat set-asides. Soils generally drain well, especially on the side slopes of the Deschutes storm water facilities (50% slopes). The only exception is at Tumwater Commerce Place where there is a narrow, depressional emergent wetland extending north to south across the west portion of the set-aside that is saturated to the surface in the winter.

Soils

Soils on the Deschutes set-aside are mapped as Nisqually loamy fine sand (0 to 3% slopes and 3 to 15% slopes)(USDA NRCS 2013). Though soils in the storm water facility have been disturbed by excavation and grading, they still appear to be providing suitable loamy soil for gophers.

Soils on the Tumwater Commerce set-aside are mapped as Indianola loamy sand (0 to 3% slopes); Alderwood gravelly sandy loam (0 to 3% slopes); and Everett very gravelly sandy loam (3 to 15% slopes)(USDA NRCS 2013). Further study will be conducted to determine whether or not the soil mapping is accurate on this site.

Soils on the Tilley Road set-aside are mapped as Indianola loamy sand (0 to 3% slopes); Everett very gravelly sandy loam (0 to 3% slopes); and Yelm fine sandy loam (0 to 3% slopes (USDA NRCS 2013). Soils will be evaluated further during site monitoring.

Existing Easements

The habitat set-asides are legally protected from future development as part of the deed restrictions for each development site.

Habitat Description and Species Abundance

Biological Resources Surveys

The three habitat set-asides were designated to comply with local laws protecting state threatened species and habitats, in particular the state threatened Mazama pocket gopher. Habitats were described and gopher mounds surveyed at the habitat set-asides for site development review and local permitting. This information is found in Habitat Management Plans (HMPs) that have been prepared and approved by local permit authorities, Thurston County and City of Tumwater, for each of these sites (Krippner 2012; Krippner 2011; PE Consulting 2005). The management and monitoring requirements in this site management plan support, update, and replace those found in the HMPs for these sites (Appendix G).

At Deschutes Industrial Park habitat set-aside grasses are relatively sparse, and weedy forbs such as hairy cat's ear and narrowleaf plantain are common. Native plants include lupine, Roemer's fescue (on the disturbed slopes of the storm facility), and bracken fern. Moss cover is also relatively high in some portions of the storm facility. Grass is denser and likely to grow more vigorously in the 10-foot habitat corridor. These vegetation cover characteristics, particularly in the storm facility area, match the profile of suitable habitat for the Covered Species.

Survey results indicate that the baseline composition is as follows (approximations):

- 0 percent high-quality native grassland,
- 0 percent native grassland,
- 100 percent degraded grassland,
- 0 percent shrub-dominated habitat,
- 0 percent non-prairie.

At Tumwater Commerce habitat set-aside tall, dense rhizomatous grasses are dominant, and a few shrubs are present, including Scot's broom. This area may not have been prairie in the past. No prairie plants have been reported or observed to date on this site. The soil mapping indicates that the cover type was forest here before the land was cleared for grazing.

Survey results indicate that the baseline composition is as follows (approximations):

- 0 percent high-quality native grassland,
- 0 percent native grassland,
- 80 percent degraded grassland,
- 20 percent shrub-dominated habitat,
- 0 percent non-prairie.

At Tilley Road habitat set-aside, soils disturbed recently by the construction of the storm facilities and road infrastructure have been seeded with a mix of grasses and clover. The areas have been mowed on a regular basis since seeding. Douglas fir and big leaf maple trees have been limbed up in the habitat set-aside, allowing grasses and forbs to grow beneath them. Scot's broom is prevalent on this site and it is colonizing the recently disturbed and seeded areas. Herbicide treatment has recently been applied to Scot's broom in the storm facility. This site was forested and no prairie plants were previously observed here.

Survey results indicate that the baseline composition is as follows (approximations):

- 0 percent high-quality native grassland,
- 0 percent native grassland,
- 80 percent degraded grassland,
- 20 percent shrub-dominated habitat,
- 0 percent non-prairie.

Presence and Location of Listed Species

Mazama pocket gophers occupy the three development sites, and gopher mounds have been surveyed on the habitat set-asides. Conservation of the Olympia subspecies of Mazama pocket gopher is the main goal and purpose for protecting, managing, and monitoring these habitat set-asides.

Although vegetation management practices should also improve habitat conditions for Taylor's checkerspot butterfly and streaked horned lark, these species are very unlikely to occur on these sites now or in the future, except perhaps for occasional use by streaked horned lark for foraging. The urban nature and small size of these sites is not likely to allow the space needed for supporting the life history of these species. It is unlikely that any of these sites would be chosen as a site for re-introduction of Taylor's checkerspot butterfly. Though if they were introduced to sites nearby, these sites may serve as additional sites for dispersal if suitable habitat for this species is present.

Although the restoration goals and management objectives are not explicitly directed at improving conditions for species other than the Covered Species, the sites may provide suitable habitat for other prairie species in the future. The possible introduction of listed and/or priority species would require a separate analysis of suitability and would require additional funding and commitments that are not included or discussed in the HCP or this Plan.

Habitat Development/Performance Standards

Primary Goal

The primary goal for Deschutes Corridor is to: **Maintain, in perpetuity, fully functional grassland that provides suitable habitat for the Covered Species, namely the Olympia pocket gopher, included in the HCP.** The habitat set-asides are fully protected and actively managed conservation sites that will add to the portfolio of protected prairie sites in the South Sound. They will permanently conserve habitat that is capable of sustaining the Olympia subspecies of Mazama pocket gopher in perpetuity.

To meet this goal site restoration and management will continue in phases, improving the conservation value of the sites over time. As partial fulfillment of the requirements of the HCP, sufficient funding assurances are in place to allow adequate perpetual management at any stage of restoration and/or maintenance. The set-asides are expected to progress through stages of lower conservation value requiring more intensive management to having higher conservation value with lower maintenance requirements.

Restoration vs. Management

Initial restoration will include the removal Scot's broom and other woody vegetation where it may occur in the habitat set-asides and annual mowing to maintain a low stature grass community.

Scot's broom and other shrubs will be removed by mechanical means. In accordance with the Thurston County (2009) fact sheet on Scot's broom, "*mechanical methods can be used on larger infestations with the use of brush cutters, tractor-mounted mowers, or backhoes. Cutting stems in the spring and early summer will result in new shoot production and poor control. However, up to 80% mortality can be achieved by cutting down plants when they are drought stressed (July through September*)." Ground disturbance will be kept to a minimum by using rubber-wheeled or low-compaction equipment whenever possible. The brush debris resulting from mechanical cutting is expected to mulch quickly on-site.

Vegetation will continue to be managed each year to improve habitat conditions and to keep invasive species such as Scot's broom and woody vegetation from degrading habitat conditions. Vegetation management will be accomplished by mowing, targeted application of herbicides, prescribed fire, or by other means. Species-specific management may also be needed for controlling reed canarygrass, an invasive species, now found at Tumwater Commerce.

Goals and Performance Standards

Goals and performance standards are based on habitat requirements for the Covered Species. Restoration and management activities are expected to improve site conditions each year, and they will vary by year depending upon how ecological conditions change over time. The following goals and performance standards are phased in time with the long term goal being a site that provides habitat for the Covered Species, requiring little to no ongoing maintenance each year. No maintenance may be needed in a given year if all of the performance standards have been met for the previous three years, and no management issues are identified during monitoring that might degrade habitat in the foreseeable future.

Initial Phase (Years 1-3)

The main goal for Years 1-3 is to control any shrubs that are present and shrubs and trees that may try to become re-established at the sites. Monitoring efforts will be focused on the need for the sites to provide a diverse mix of forbs and grasses for forage for gophers.

Plants will be inventoried at each site. The plant resources inventory for each site will be updated throughout the monitoring period to help guide future management activities and to contribute to the larger effort of protecting native prairie lands in the region.

The performance standards for each phase are summarized in Table A (below).

Table A: Performance standards during each time phase.

Data from belt transects and other field observations will be used to estimate whether or not the standards below for providing habitat for the Covered Species are met.

	% Scot's Broom & woody veg. > 12 inches	% Grassland with forbs at >10% cover	% Gopher Occupied
Initial Phase 1-3 yrs	<10	>20	n/a
Intermediate Phase 4-9 yrs	<10	>40	>20
Final Phase 10-20 yrs	<5	>80	>30

The performance standards for Years 1-3 are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 20% of the site.

Active gopher mounds will be documented, contributing to ongoing research on the interaction of gopher populations and urban development. No specific performance standard for this measure is required.

Intermediate Phase (Years 4-9)

The goals for Years 4-9 include continued management of invasive species, and measured improvement in specific habitat conditions for Covered Species.

The performance standards for Years 4-9 are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 40% of the site.

Evidence gathered from belt transects or other field observations indicate that gophers occupy at least 20% of the site area. Survey area will represent a total of 5 percent of the site by using a plot method that is appropriate to the size and configuration of each of the on-site habitat set-aside areas.

Final Phase (Years 10 and beyond)

The goals for Years 10 and beyond include continued management of invasive species, and the achievement of meeting specific habitat conditions for Covered Species.

The performance standards for Years 10 and beyond are:

The cover, above 12 inches in height, of Scot's broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 5%.

Grassland habitat dominated by a mix of forbs and grasses, with at least 10% forb cover, is present on at least 80% of the site.

Evidence gathered from belt transects or other field observations indicate that gophers occupy at least 30% of the site area. Survey area will represent a total of 5 percent of the site by using a plot method that is appropriate to the size and configuration of each of the on-site habitat set-aside areas.

Management

Management includes actions needed to maintain the conservation value of the site, while meeting the performance standards. See Appendix 1 for a table of management actions, frequency, schedule, cost (in terms of labor hours), duration, etc. Management actions include:

- Vegetation and habitat management (e.g., mowing, herbicide, burning)
- Site management (e.g., controlling illegal dumping, trespassing, unauthorized ATV use)
- Biological monitoring (e.g., vegetation and habitat surveys)
- Reporting and Planning

Vegetation and Habitat Management

The assumption made in this site management plan and in the Funding Assurances section of the HCP is that mowing, or an effort similar in cost to mowing may be required to both manage invasive plants and restore habitat conditions required by the Covered Species. Mowing may not be recommended every year, and other treatments during a given year may be more effective in restoring the site to these conditions.

Continued mowing in late summer is the default conservation measure and does not require special approval from USFWS.

Other conservation actions may be employed in addition to, or instead of mowing to manage vegetation on portions of, or across the entire site. These other actions may include prescribed fire, targeted application of herbicides, or other methods approved by USFWS. A detailed description of any alternative proposed methods must be presented to USFWS at least three months in advance for their approval.

Mowing

Annual mowing in late summer is the default treatment for controlling invasive plants and keeping the site dominated by a variety of grasses and forbs. Each year the effectiveness of this

treatment method will be reviewed and alternative methods will be recommended following spring monitoring. It is likely that mowing will not be required every year.

If monitoring in spring indicates that habitat conditions on the site would benefit from mowing in late summer, this will be done so that the site continues to be dominated by grasses and herbs, in an early successional stage. In this way, habitat conditions preferred by Olympia pocket gophers, and the open grassland conditions required for Taylor's checkerspot butterflies and streaked horned larks will be maintained. Because it promotes the growth of preferred forage plants (herbs and grasses), regular mowing is likely to encourage the spread of pocket gophers on this site. Pocket gophers are known to aerate soils and increase plant diversity (Hartway and Steinberg. 1997; Mielke, 1977). Therefore, even if habitat management is limited to mowing in late summer, soil conditions should improve, prairie plants may spread, and habitat for the Covered Species will continue to be enhanced and conserved.

Targeted Herbicide Use

Targeted use of herbicides to control invasive plant species may be recommended for managing Scot's broom, or for reducing the cover of dense, rhizomatous grasses, including reed canarygrass, if mowing alone is not enough to achieve performance standards for habitat restoration. Prairie restoration practitioners in this region have successfully employed the use of grass-specific herbicides that kill non-native grasses with minimal impacts to native forbs and grasses to open areas up for colonization of native species (Stanley et al. 2011). If native vegetation is not already present in the general area, grass-specific herbicide treatment may need to be followed with native seeding. Or this treatment may be used to create areas of bare ground for colonization by mosses and lichens, provided there is low risk of colonization by another invasive species.

To minimize potential impacts to Covered Species, lower toxicity herbicides shall be used whenever possible. Selective herbicide application will occur rather than broadcast application treatments.

Prescribed Fire

Prescribed fire has been recommended by regional prairie restoration practitioners to prevent invasion of woody vegetation (Dunwiddie and Bakker 2011). Fire is also known to stimulate the germination and growth of native prairie species, and would likely improve habitat conditions for the Covered Species. However, prescribed fire would also stimulate the germination of Scot's broom (Dennehy et al. 2011), possibly creating the need for more intensive management of this species by targeted herbicide or additional mowing. Care must also be taken that areas made bare by fire are not colonized by Scot's broom or other invasive species. Follow-up seeding or planting of native plants may be required following fire if no native seed source is present in the general area or likely to be present in the seed bank.

If prescribed fire is used in any given year, no more than 1/3 of the site area may be burned that year since this activity can temporarily remove or disturb habitat for the Covered Species.

Native Seeding and Planting

Native seeding and/or planting is most likely to be recommended if a grass-specific herbicide or fire is used to clear areas of dense grasses or invasive species and there are few native plants in

the area to become re-established in the cleared area. Native seeding or planting may also be recommended if it is deemed necessary to meet the performance standard for providing oviposition sites, larval food, or nectar sources for Taylor's checkerspot butterfly.

High Intensity Short Duration Grazing

High intensity grazing early in the growing season is being used on some prairies in South Puget Sound to control the growth of non-native rhizomatous grasses and increase coverage by native prairie plants. If this method proves to be an effective mechanism for prairie restoration and if it is clear that dense rhizomatous grasses are limiting prairie vegetation on any of the sites (Tumwater Commerce in particular), then this type of grazing may be considered as another tool that is used in future years to enhance habitat conditions for the Covered Species. This management tool is also likely to be beneficial to gophers because it should act to decrease overall grass cover and promote the growth of forbs, their preferred forage plants (as long as soils do not become compacted).

Site Management

The land manager assigned by the Owner's Association will manage property access and human use of the habitat set-asides.

Site Inspection

The site is inspected annually or when the owner is notified of any problems. Signs of human activities are recorded, and corrective measures for any problems that are found are implemented. For example, property signs that go missing are replaced, trash is removed, and barriers to ATV use are put into place to prevent further access.

Fences, Gates, Roads

Site boundaries are marked with conservation site signs on Tumwater Commerce and with signs and fencing on Deschutes and Tilley Road. There are no roads on or gates accessing the habitat set-asides.

Public Access

There is no official public access, and no signs of public use are apparent on any of the set-asides. A walking trail used to be present along the corridor at Deschutes, but this use has changed now that fencing has been installed.

Biological Monitoring

Biological monitoring will be conducted to determine if conservation goals and performance standards are being met, and to recommend conservation actions for the current and future years. The entire site will be explored to note any problems with invasive species, or other ecological changes. Photo documentation and updates to plant lists will be completed. The survey protocol described in Appendix 2 will be followed in order to evaluate whether or not performance standards are met each year.

A general description of dominant plant species will be recorded, and habitat conditions will be evaluated during monitoring, but no specific performance standards are required for the composition of the plant community since gophers will forage on a wide variety of forbs and grasses. If streaked horned larks or Taylor's checkerspot butterfly occupy the site in the future,

then conservation activities may need to be modified to accommodate their habits. This will be addressed in the monitoring report prepared for USFWS. USFWS must approve conservation actions proposed for promoting these species before they are implemented.

Reporting and Planning

Monitoring reports will be prepared and submitted to USFWS annually for 20 years until this HCP expires.

Monitoring reports will include the following:

13. Activity and date of conservation actions since last monitoring report.
14. Current on-site conditions that are or may be adversely affecting Covered Species and their habitat, as well as any actions being undertaken or contemplated to address such conditions.
15. An evaluation of how of conservation goals and performance standards are being met; what activities need to be taken to meet them in future year; or recommendations for revisions to goals and performance standards if changed circumstances have occurred.
16. Conservation actions anticipated prior to the next monitoring report submission.

Monitoring reports for other conservation sites (Leitner Prairie and Deschutes Corridor) and the development sites (until construction) required in the HCP may be combined into one annual report for presentation to USFWS.

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Figures

Figure 1. Vicinity Map

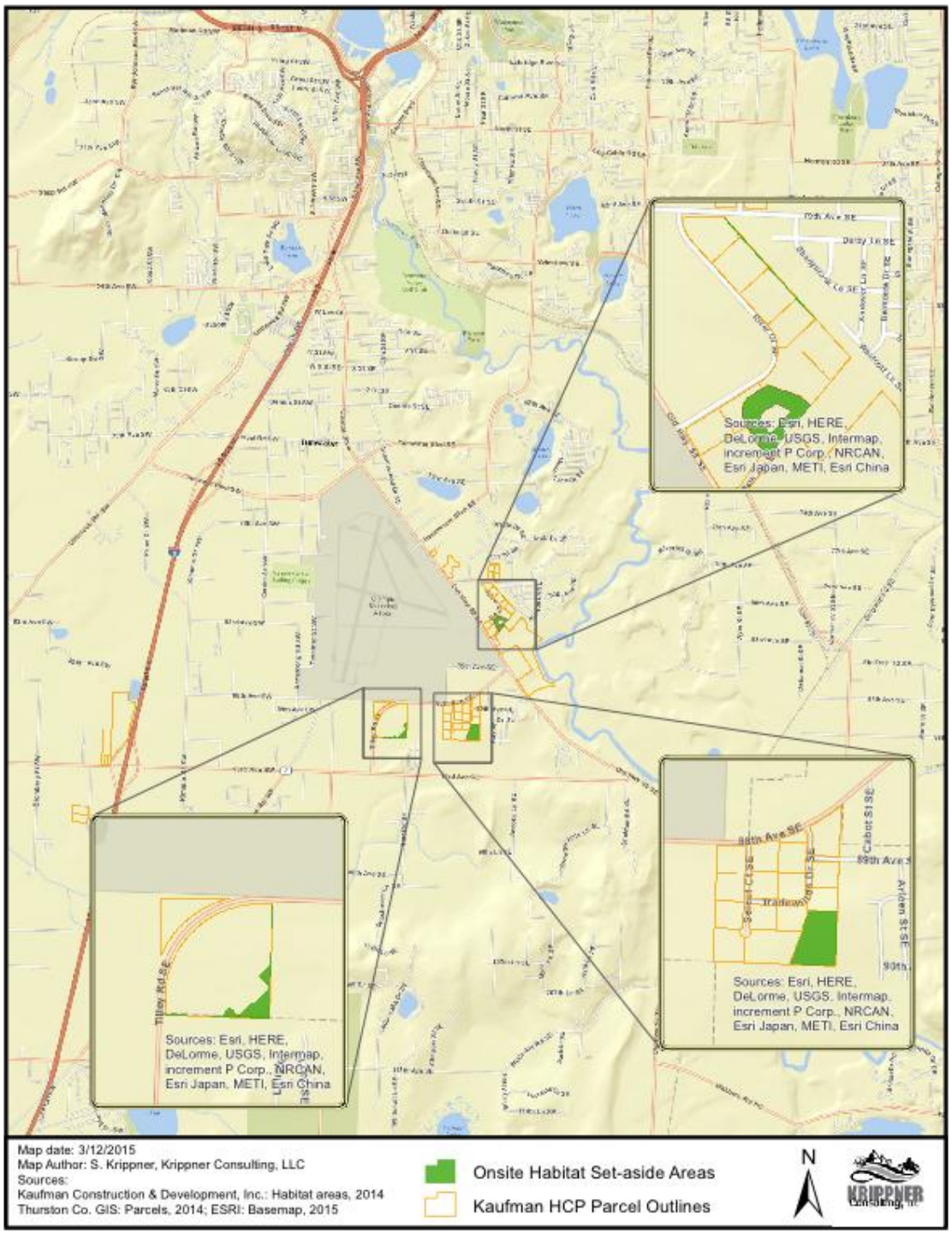

Figure 2. Deschutes Industrial Park Habitat Set-Aside

Figure 3. Tumwater Commerce Place Habitat Set-Aside

Figure 4. Tilley Road Industrial Park Habitat Set-Aside

Appendix 1: Management and Monitoring Actions by Phase.

Management Summary				
Initial Phase (Years 1-3)				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 hours per year	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	16 hours per year	1 time per year	1 time per year following monitoring
Conduct biological performance monitoring	Belt transect data collection and photo monitoring	20 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	16 hours per year	1 time each year	Due November 1
Update management plan	Update management plan as needed.	10 hours per year	As needed	Year end

Intermediate Phase (Years 4-9)				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 total hours	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by mowing, brush cutting, and/or spot spraying; seeding or other prairie restoration techniques may also be used	16 hours per year	1 time per year	1 time per year following monitoring
Conduct biological performance monitoring	Belt transect data collection and photo monitoring	16 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	12 hours per year	1 time each year	Due November 1
Update management plan	Update management plan as needed.	5 hours per year on average	As needed	Year end

Final Phase (Years 10–20)				
Access control/garbage removal	Keep property in orderly condition	8 total hours	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by mowing, brush cutting, and/or spot spraying; seeding or other prairie restoration techniques may also be used	12 hours per year	1 time per year	1 time per year following monitoring
Conduct biological performance monitoring	Belt transect data collection every other year; photo monitoring and general site observations every year	12 hours per year on average	1 time per year	Spring to early Summer
Prepare annual monitoring report and work plan for next year	Presentation of field data, results, and conclusions. Plan outlining management, monitoring, restoration, and administration for upcoming year.	10 hours per year on average	1 time per year	Due November 1
Update management plan	Update management plan as needed.	5 hours per year on average	As needed	Year end

Management Summary for Development Sites				
Initial Phase (Year 1) – hours/costs are assumed to decrease by an average of 5% per year for the duration of the 20-year permit term				
Actions	**Description**	**Metric**	**Frequency**	**Schedule**
Access control/garbage removal	Keep property in orderly condition	8 hours per year	1 time per year	1 time per year following monitoring
Maintain open habitat and control noxious weeds	Maintain open prairie by brush cutting and spot spraying	80 hours during the initial Year 1 for initial clearing of Scot's broom then 16 hours in Year 2 for maintenance	1 time per year	1 time per year following monitoring
Conduct biological performance monitoring	Habitat mapping and photo monitoring	20 hours per year	1 time each year	Spring to early Summer
Prepare annual monitoring report and work plan for next year	Presentation of field data, results, and conclusions. Plan describing management recommendations for upcoming year.	12 hours per year	1 time each year	Due November 1

Appendix 2: Survey Protocol

Introduction

This survey protocol is intended to provide a standardized approach for assessing whether the conservation program outlined in the HCP is being successful implemented. Indicators of successful implementation are measured by the percent cover of the vegetation type, presence and distribution of pocket gopher mounds, and other habitat features that characterize habitat suitability for the species covered in the HCP. The data collected in accordance with this survey protocol indicates whether suitable habitat exists for the streaked horned lark, Taylor's checkerspot butterfly, and Mazama pocket gopher.

Survey Timing and Frequency

Surveys for percent cover of vegetation types and pocket gopher mounds will be conducted every year from June 1 through October 31 for the first 10 years, then every 2 years from years 10 through 20. In alternating years from years 10 through 20, the sites will still be monitored for any signs of problems in terms of human access, habitat modifications, or noxious weeds.

Survey Coverage

Survey area coverage should be approximately 5 percent of the habitat set-aside.

For example, the Tumwater Commerce habitat set-aside is 5.45 acres. To survey 5 percent (0.27 acres) of the 5.45 acres survey plots should be 10 by 10 meters (100 m^2 or 0.0247 acre) in size and there should be a total of 11 plots because the total of 0.27 acres divided by 0.056 acre (100 m^2) equals 11 plots. Now draw the transect lines spacing the parallel belt transect lines 50 meters apart, determine the length of the line using GIS, and divide it by 11 to determine how far between plots to place them. See Figure A for an example of how the transect line is drawn on a site. In cases where the plot width is wider than the site area itself, the plot width and length can be adjusted accordingly to total 100 square meters.

Field Materials

Field notebook

Meter tape

PVC pipes for temporary staking of 10 by 10 meter plots during survey

GPS

Camera

Field data sheets

Aerial imagery map (described below)

Procedures for Collecting Field Data

Prepare an aerial photo of the survey site and randomly select a different cardinal direction/orientation for the continuous transect line every year, unless surveying in a narrow corridor, then just center the transect in the corridor.

Belt transect lines are spaced parallel to each other and 50 meters apart.

Transect lines are continuous throughout the site.

Import the belt transect route onto a GPS unit for consistency in the field or use another method that ensures transects are spaced and placed appropriately.

Survey plots are 10 meters by 10 meters, placed on alternating sides of the belt transect evenly spaced along the entire length of the belt transect (See example in Figure A).

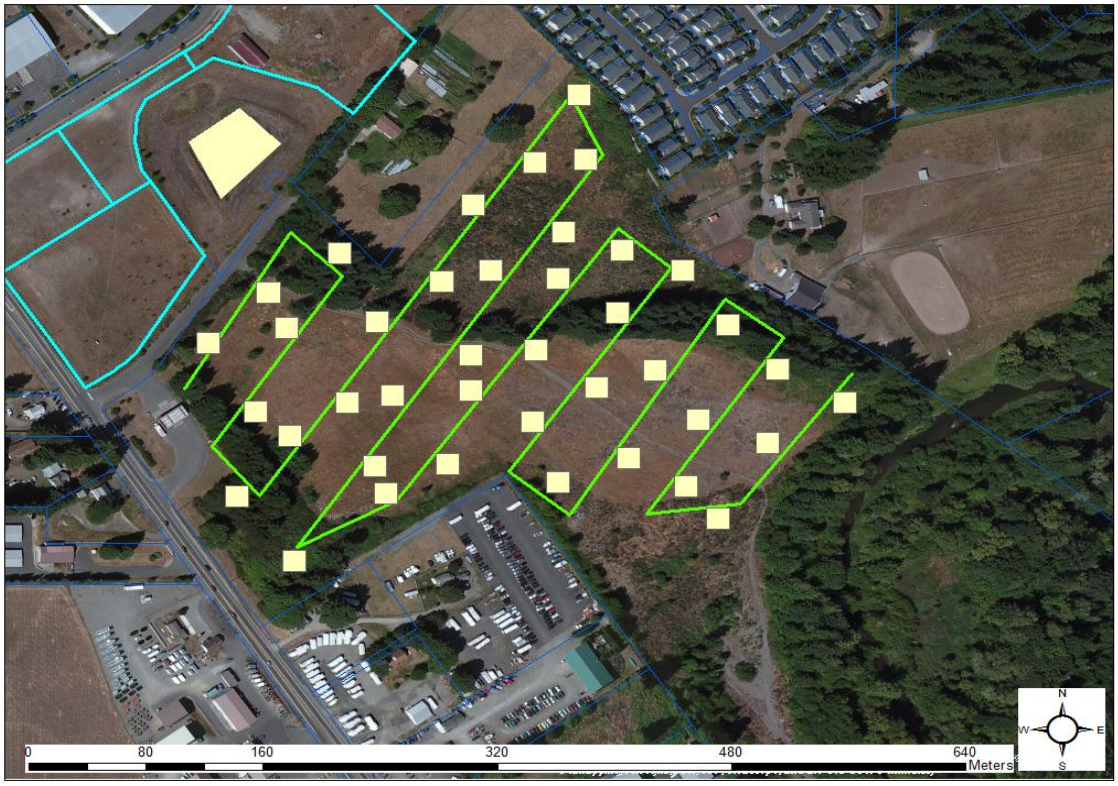

Figure A. Example of continuous transect line and plots evenly spaced along the line at Deschutes Corridor.

Aerial photo of the survey site should include north arrow, scale bar, survey area boundary, and parcel boundaries (if relevant), overlaid on recent, high-resolution aerial imagery.

Print copies of aerial photo and field survey form for use in the field, and/or collect field data electronically in accordance with the field form.

At each plot record percent cover or presence/absence data as specified on the field data form for: Scot's broom and/or all other woody vegetation greater than 12 inches in height; grassland with >10% forbs; and gopher mounds.

Record gopher mounds observed in other areas outside of plots.

Record GPS point location at the center of each plot (approximate center).

Survey Protocol for Development Sites

The development sites will be monitored each year to advise on habitat management and noxious weed control. Habitat maps that have been created for each development site for the HCP will be updated to show habitat changes (e.g., shrub habitat that has been converted to grassland via brush cutting, etc.) and to identify areas for management. Management activities, past and projected, and current habitat conditions at each site (in map format) will be reported each year and included as part of the annual report that is submitted to USFWS for approval.

Field Data Form for Habitat Set-Aside

Date:
Site:
Surveyor:
General Notes:

Notes about gopher mounds observed on site between plot locations:

Data to Record in Each 10 x 10 m Plot	**Plot 1**	**Plot 2**	**Plot 3**
% Scot's broom / woody cover > 12" tall (0-4; 5-9; 10-19; 20-49; 50-100)			
% Grassland with forbs at >10% cover (0-4; 10-19; 20-39; 40-79; 80-100)			
Gopher mounds present (yes or no)			

Appendix F. Estimated Management Funding Requirements

KAUFMAN HCP

Annual Maintenance Cost Summary

Acreage	0	185.13	7.72	192.85	
EXPENSES:	Conservation Properties	Undeveloped Properties	On Site Mitigation Area	Total Annual	Annual Year 21
Administrative/Management Cost:	$1,350.00	$0.00	$0.00	$1,350.00	$2,212.13
Insurance	$800.00	$0.00	$0.00	$800.00	$1,310.89
Licenses & Fees	$50.00	$0.00	$0.00	$50.00	$81.93
Maintenance - KCD	$3,900.00	$10,861.23	$452.92	$15,214.15	$3,000.00
Monitoring	$6,000.00	$3,000.00	$3,000.00	$12,000.00	$0.00
Professional Services - Accounting	$800.00	$0.00	$0.00	$800.00	$1,310.89
Taxes: Property	$814.00	$0.00	$0.00	$814.00	$1,333.83
Translocation Fee	$2,500.00	$0.00	$0.00	$2,500.00	$0.00
Contingency Fee - 10%	$1,621.40	$1,386.12	$345.29	$3,352.81	$924.97
Total Annual Cost	$17,835.40	$15,247.35	$3,798.21	$36,880.96	$10,174.65
Cost/Acre	$96.34	$82.36		$199.21	$54.96
		KH	KRE	Liberty Leasing	
Annual Allocation/Company		$18,393.25	$16,993.62	$1,494.09	

Payment Schedule

Payment due date	Amount Due	Years Covered	Notes
9/1/2015	$304,007.14	1-10	Balance due based on estimated schedule
8/31/2020 (Year 5)	$249,297.60	11-20	Balance due subject to change based on actual expenses from years 1-5 and the remaining cash balance at payment due date.
8/31/2030 (Year 15)	$286,121.86	21-100	Balance due subject to change based on actual expenses from years 6-15 and the remaining cash balance at payment due date.
Total	$839,426.60	1-100	

20 Year Schedule of Annual Cost Inflation @2.5% & Variable Mitigation Properties Ammortized						5%
	Total	KH	KRE	Liberty Leasing	Present Value	Period
Year 1	$36,880.96	$18,393.25	$16,993.62	$1,494.09	$36,880.96	0
Year 2	$37,021.56	$18,463.37	$17,058.41	$1,499.79	$35,258.63	1
Year 3	$37,165.67	$18,535.24	$17,124.81	$1,505.62	$33,710.36	2
Year 4	$37,313.38	$18,608.90	$17,192.87	$1,511.61	$32,232.70	3
Year 5	$37,464.79	$18,684.42	$17,262.64	$1,517.74	$30,822.38	4
Year 6	$37,619.99	$18,761.81	$17,334.14	$1,524.03	$29,476.24	5
Year 7	$37,779.06	$18,841.15	$17,407.44	$1,530.47	$28,191.32	6
Year 8	$37,942.11	$18,922.46	$17,482.57	$1,537.08	$26,964.75	7
Year 9	$38,109.23	$19,005.81	$17,559.58	$1,543.85	$25,793.83	8
Year 10	$38,280.54	$19,091.24	$17,638.51	$1,550.79	$24,675.98	9
10 Year Total	$375,577.29	$187,307.64	$173,054.58	$15,215.07		
Present Value above payments @ 5% Int.	$304,007.14	$151,720.69	$140,175.60	$12,324.33	$304,007.14	
Year 11	$38,456.13	$19,178.81	$17,719.41	$1,557.90	$30,131.38	5
Year 12	$38,636.10	$19,268.57	$17,802.34	$1,565.19	$28,830.85	6
Year 13	$38,820.58	$19,360.57	$17,887.34	$1,572.67	$27,589.06	7
Year 14	$39,009.67	$19,454.87	$17,974.47	$1,580.33	$26,403.28	8
Year 15	$39,203.48	$19,551.53	$18,063.77	$1,588.18	$25,270.91	9
Year 16	$39,402.14	$19,650.61	$18,155.31	$1,596.23	$24,189.50	10
Year 17	$39,605.77	$19,752.16	$18,249.13	$1,604.48	$23,156.67	11
Year 18	$39,814.48	$19,856.25	$18,345.30	$1,612.93	$22,170.19	12
Year 19	$40,028.42	$19,962.95	$18,443.88	$1,621.60	$21,227.93	13
Year 20	$40,247.70	$20,072.31	$18,544.92	$1,630.48	$20,327.83	14
11-20 Year Total	$393,224.47	$196,108.63	$181,185.86	$15,929.98	$249,297.60	
Present Value above payments @ 5% Int. due at the end of year 5	$249,297.60	$124,329.52	$114,868.74	$10,099.33		

80 Year Schedule of Annual Cost Inflation @2.5% & Variable Mitigation Properties Ammortized						5%
	Total	0	0	0	Present Value	Period
Year 21	$10,174.65	$5,074.29	$4,688.17	$412.19	$7,972.11	5
Year 22	$10,429.02	$5,201.15	$4,805.37	$422.49	$7,782.29	6
Year 23	$10,689.74	$5,331.18	$4,925.51	$433.05	$7,597.00	7
Year 24	$10,956.99	$5,464.46	$5,048.65	$443.88	$7,416.12	8
Year 25	$11,230.91	$5,601.07	$5,174.86	$454.98	$7,239.55	9
Year 26	$11,511.68	$5,741.10	$5,304.23	$466.35	$7,067.18	10
Year 27	$11,799.48	$5,884.63	$5,436.84	$478.01	$6,898.91	11
Year 28	$12,094.46	$6,031.74	$5,572.76	$489.96	$6,734.65	12
Year 29	$12,396.82	$6,182.54	$5,712.08	$502.21	$6,574.30	13
Year 30	$12,706.75	$6,337.10	$5,854.88	$514.76	$6,417.77	14
Year 31	$13,024.41	$6,495.53	$6,001.25	$527.63	$6,264.97	15
Year 32	$13,350.02	$6,657.91	$6,151.28	$540.82	$6,115.80	16
Year 33	$13,683.77	$6,824.36	$6,305.07	$554.35	$5,970.19	17
Year 34	$14,025.87	$6,994.97	$6,462.69	$568.20	$5,828.04	18
Year 35	$14,376.52	$7,169.85	$6,624.26	$582.41	$5,689.28	19
Year 36	$14,735.93	$7,349.09	$6,789.87	$596.97	$5,553.82	20
Year 37	$15,104.33	$7,532.82	$6,959.61	$611.89	$5,421.58	21
Year 38	$15,481.94	$7,721.14	$7,133.60	$627.19	$5,292.50	22
Year 39	$15,868.98	$7,914.17	$7,311.94	$642.87	$5,166.49	23
Year 40	$16,265.71	$8,112.02	$7,494.74	$658.94	$5,043.47	24
Year 41	$16,672.35	$8,314.82	$7,682.11	$675.42	$4,923.39	25
Year 42	$17,089.16	$8,522.69	$7,874.16	$692.30	$4,806.17	26
Year 43	$17,516.39	$8,735.76	$8,071.02	$709.61	$4,691.74	27
Year 44	$17,954.30	$8,954.16	$8,272.79	$727.35	$4,580.03	28
Year 45	$18,403.16	$9,178.01	$8,479.61	$745.53	$4,470.98	29
Year 46	$18,863.23	$9,407.46	$8,691.60	$764.17	$4,364.53	30
Year 47	$19,334.82	$9,642.65	$8,908.89	$783.28	$4,260.61	31
Year 48	$19,818.19	$9,883.71	$9,131.62	$802.86	$4,159.17	32
Year 49	$20,313.64	$10,130.80	$9,359.91	$822.93	$4,060.14	33
Year 50	$20,821.48	$10,384.07	$9,593.90	$843.50	$3,963.47	34
Year 51	$21,342.02	$10,643.68	$9,833.75	$864.59	$3,869.10	35
Year 52	$21,875.57	$10,909.77	$10,079.60	$886.20	$3,776.98	36
Year 53	$22,422.46	$11,182.51	$10,331.59	$908.36	$3,687.05	37
Year 54	$22,983.02	$11,462.08	$10,589.88	$931.07	$3,599.26	38
Year 55	$23,557.60	$11,748.63	$10,854.62	$954.35	$3,513.57	39
Year 56	$24,146.54	$12,042.34	$11,125.99	$978.20	$3,429.91	40
Year 57	$24,750.20	$12,343.40	$11,404.14	$1,002.66	$3,348.25	41
Year 58	$25,368.95	$12,651.99	$11,689.24	$1,027.73	$3,268.53	42
Year 59	$26,003.18	$12,968.29	$11,981.47	$1,053.42	$3,190.70	43
Year 60	$26,653.26	$13,292.49	$12,281.01	$1,079.75	$3,114.74	44
Year 61	$27,319.59	$13,624.81	$12,588.03	$1,106.75	$3,040.57	45
Year 62	$28,002.58	$13,965.43	$12,902.74	$1,134.42	$2,968.18	46
Year 63	$28,702.64	$14,314.56	$13,225.30	$1,162.78	$2,897.51	47
Year 64	$29,420.21	$14,672.43	$13,555.94	$1,191.85	$2,828.52	48
Year 65	$30,155.71	$15,039.24	$13,894.83	$1,221.64	$2,761.18	49
Year 66	$30,909.61	$15,415.22	$14,242.21	$1,252.18	$2,695.43	50
Year 67	$31,682.35	$15,800.60	$14,598.26	$1,283.49	$2,631.26	51
Year 68	$32,474.41	$16,195.61	$14,963.22	$1,315.58	$2,568.61	52
Year 69	$33,286.27	$16,600.50	$15,337.30	$1,348.46	$2,507.45	53
Year 70	$34,118.42	$17,015.52	$15,720.73	$1,382.18	$2,447.75	54
Year 71	$34,971.38	$17,440.90	$16,113.75	$1,416.73	$2,389.47	55
Year 72	$35,845.67	$17,876.93	$16,516.59	$1,452.15	$2,332.58	56
Year 73	$36,741.81	$18,323.85	$16,929.51	$1,488.45	$2,277.04	57
Year 74	$37,660.35	$18,781.95	$17,352.74	$1,525.66	$2,222.82	58
Year 75	$38,601.86	$19,251.49	$17,786.56	$1,563.81	$2,169.90	59
Year 76	$39,566.91	$19,732.78	$18,231.23	$1,602.90	$2,118.24	60
Year 77	$40,556.08	$20,226.10	$18,687.01	$1,642.97	$2,067.80	61
Year 78	$41,569.98	$20,731.75	$19,154.18	$1,684.05	$2,018.57	62
Year 79	$42,609.23	$21,250.05	$19,633.04	$1,726.15	$1,970.51	63
Year 80	$43,674.47	$21,781.30	$20,123.86	$1,769.30	$1,923.59	64
Year 81	$44,766.33	$22,325.83	$20,626.96	$1,813.54	$1,877.79	65
Year 82	$45,885.49	$22,883.98	$21,142.63	$1,858.87	$1,833.08	66
Year 83	$47,032.62	$23,456.08	$21,671.20	$1,905.35	$1,789.44	67
Year 84	$48,208.44	$24,042.48	$22,212.98	$1,952.98	$1,746.83	68
Year 85	$49,413.65	$24,643.54	$22,768.30	$2,001.80	$1,705.24	69
Year 86	$50,648.99	$25,259.63	$23,337.51	$2,051.85	$1,664.64	70
Year 87	$51,915.21	$25,891.12	$23,920.95	$2,103.15	$1,625.00	71
Year 88	$53,213.10	$26,538.40	$24,518.97	$2,155.72	$1,586.31	72
Year 89	$54,543.42	$27,201.86	$25,131.95	$2,209.62	$1,548.54	73
Year 90	$55,907.01	$27,881.90	$25,760.25	$2,264.86	$1,511.67	74
Year 91	$57,304.68	$28,578.95	$26,404.25	$2,321.48	$1,475.68	75
Year 92	$58,737.30	$29,293.42	$27,064.36	$2,379.52	$1,440.55	76
Year 93	$60,205.73	$30,025.76	$27,740.97	$2,439.00	$1,406.25	77
Year 94	$61,710.88	$30,776.40	$28,434.49	$2,499.98	$1,372.77	78
Year 95	$63,253.65	$31,545.81	$29,145.36	$2,562.48	$1,340.08	79
Year 96	$64,834.99	$32,334.46	$29,873.99	$2,626.54	$1,308.17	80
Year 97	$66,455.86	$33,142.82	$30,620.84	$2,692.20	$1,277.03	81
Year 98	$68,117.26	$33,971.39	$31,386.36	$2,759.51	$1,246.62	82
Year 99	$69,820.19	$34,820.68	$32,171.02	$2,828.50	$1,216.94	83
Year 100	$71,565.70	$35,691.19	$32,975.29	$2,899.21	$1,187.97	84
11-20 Year Total	$2,527,207.52	$1,260,367.15	$1,164,460.28	$102,380.09	$286,121.86	
Present Value above payments @ 5% Int. due at the end of year 15	$286,121.86	$799,051.25	$738,247.94	$64,907.23		

Breakdown of Kaufman Maintenance

	Asset Life	Cost	Annual Cost
Tractor	12	$ 25,000.00	$ 2,083.33
Trailer	12	$ 3,000.00	$ 250.00
Truck	5	$ 7,000.00	$ 1,400.00
Brush hog	5	$ 2,500.00	$ 500.00
Total Fixed cost	34	$ 37,500.00	$ 4,233.33
Annual Fuel			$ 500.00
Annual maintenance			$ 500.00
Total cost before labor			$ 5,233.33
Estimated labor			
Hours	120		
Labor rate	$ 50.00		
Total Labor cost			$ 6,000.00
Total cost			$ 11,233.33
Overhead & PROFIT	25%		$ 2,808.33
Tax	8%		$ 1,172.48
			$ 15,214.15

Appendix G. Previously Approved Habitat Management Plans for Tumwater Commerce, Tilley Road, and Deschutes Industrial Park

PHILLIPS WESCH BURGESS
PLLC

724 Columbia St. NW, Suite 140
Olympia, WA 98501

360-742-3500
facsimile: 360-742-3519
www.pwblawgroup.com

September 19, 2012

11/13/2012
public hearing
5:30

TRANSMITTED VIA HAND-DELIVERY

Robert Smith
Senior Planner
Thurston County Resource Stewardship Department
2000 Lakeridge Drive SW
Olympia, Washington 98502

Re: Revised Final Habitat Management Plan, Deschutes Industrial Park

Dear Robert:

Enclosed please find the final revised Habitat Management Plan ("HMP") for the Kaufman Deschutes Industrial Park plat amendment and development agreement application.

This final revised version of the HMP for the project reflects all changes agreed to between Kaufman and USFWS. I understand that Joanne Stellini of USFWS will be communicating with the County directly regarding USFWS's recommendation.

In light of the substantial delay that USFWS's review has added to Thurston County's review of this project, I ask that the amendment and development agreement be promptly scheduled for BOCC hearing. With respect to scheduling, the applicant is unavailable during the week of October 22, 2012. In addition, advance notice and coordinated scheduling would be appreciated so the applicant can also arrange for WDFW and Linda Krippner to attend.

Please let me know if you require further information to set the application for public hearing.

Very truly yours,

Heather L. Burgess

HLB/dlg
Enclosure
cc: Jeff Fancher w/o enclosures (via email:*fanchej@co.thurston.wa.us*)
Mike Kain w/o enclosure (via email: *kainm@co.thurston.wa.us*)
Linda Krippner w/o enclosure (via email: *linda@krippnerconsulting.com*)
John Kaufman w/o enclosure (via email: *john@kaufmanbrothers.com*)
Theresa Kaufman-Wall w/o enclosure (via email: *theresa@kaufmanbrothers.com*)

Habitat Management Plan: Mazama Pocket Gopher For Deschutes Industrial Park & Kaufman Gopher Sanctuary

Applicant
Kaufman Real Estate, LLC
7711 Martin Way East
Olympia, WA 98518
360-491-5230

Subject Property
Deschutes Industrial Park
44160001000 8010 River Dr SE – Lot 10
44160001100 8024 River Dr SE – Lot 11
44160001200 8036 River Dr SE – Lot 12
44160001300 8108 River Dr SE – Lot 13
44160001500 8208 River Dr SE – Lot 15
44160001200 8220 River Dr SE – Lot 16
44160100000 8112 River Dr SE - Tract "A"
44160001700 8221 River Dr SE – Lot 17
31100000101 – Liberty Leasing
18.45 acres
Thurston County, Washington

Prepared for:
Kaufman Real Estate, LLC

Prepared by:
Krippner Consulting, LLC
PO Box 17621
Seattle, WA 98127

Date:
August 29, 2011 (Revised September 18, 2012)

KRIPPNER
Consulting, LLC

Table of Contents

Introduction

This Habitat Management Plan (HMP) for Deschutes Industrial Park and Kaufman Gopher Sanctuary has been prepared for Kaufman Real Estate, LLC (Kaufman) by Krippner Consulting, LLC to meet the requirements of Thurston County Code 17.15.735 for protecting habitat for the Mazama pocket gopher, a species listed by Washington State as threatened. This HMP is based on Washington State Fish and Wildlife (WDFW) management recommendations for Mazama pocket gopher (updated in 2011) and field surveys conducted by Krippner Consulting, LLC in June 2011. This HMP has been revised in response to agency review comments from Thurston County, WDFW and US Fish and Wildlife Service (USFWS) from June through September 2012. The final tally of on-site impacts, mitigation credits used by Deschutes Industrial Park and remaining mitigation credits available for other Kaufman projects is summarized in **Appendix A**. A copy of WDFW's November 21, 2011 comment letter is attached at **Appendix B**.

The purpose of this HMP is to describe habitat impacts and habitat protection areas at the Deschutes Industrial Park site, and habitat mitigation off-site at the Kaufman Gopher Sanctuary.

Deschutes Industrial Park site is a total of 38 acres in size and was platted in approximately 1992. About half of this site was developed before the listing of Mazama pocket gopher as a state threatened species.

The current portion of this site under review for a plat amendment is 18.45 acres in size and includes nine individual lots, including a storm drainage tract. Protecting habitat in advance at this larger scale of development rather than at the lot or parcel level should result in less fragmented habitat, both on-site and off-site.

The project team has known that Mazama pocket gophers are very abundant on this site since late January 2011. The search for a good off-site mitigation site started in February 2011 and has been conducted in coordination with WDFW and Capitol Land Trust. More than five sites were investigated, and meetings were held with WDFW and Capitol Land Trust, before Kaufman purchased the property proposed for off-site mitigation.

Kaufman Gopher Sanctuary is designed to create new Mazama pocket gopher habitat and will provide the off-site mitigation required for full build-out of this project. Mitigation credit from the Sanctuary will also be available for other Kaufman projects. The establishment of the Sanctuary site and its operating procedures are described in full in this HMP.

Existing On-site Conditions

The proposed Deschutes development site is 18.45 acres in size and is located east of the Olympia Airport between Old Highway 99 and 79th Avenue SE on River Drive SE (Figure 1). Commercial buildings border the other side of River Drive SE north and west of the site and

the Bridlewood residential subdivision borders the east site boundary. The site is zoned as Light Industrial and is located in the Tumwater Urban Growth Area (UGA).

Vegetation

Site vegetation has been disturbed for many years. Before purchase by Kaufman in 1992, the site was used as a tree nursery and soils were tilled each year as part of nursery operations (Figure 2). Kaufman cleared the site for development and they were tilling it every year to manage vegetation until 2006. Grasses, mainly sweet vernal grass, red fescue, brome, orchard grass and velvet grass dominate the site. Scotch broom is patchily distributed (Photo 1). Dominant herbs throughout the site include hairy cat's ears, long-leaf plantain, vetch and lupine. Douglas fir seedlings were growing in the south portion of the site, likely as a result of the past nursery operations given their regular spacing in the field (Photo 2). A native fescue bunchgrass has become established in a small portion of the storm drainage facility (Photo 3). A variety of mosses and bracken fern are also growing in the storm drainage facility (Photo 4).

On-Site Photos

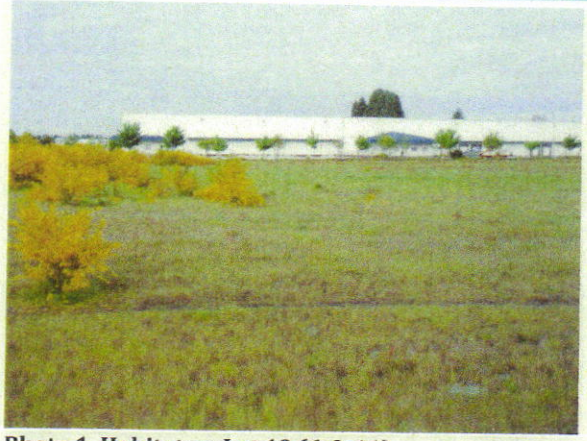

Photo 1. Habitat on Lot 13 (6-3-11).

Photo 2. Douglas fir seedlings (6-1-11).

Photo 3. Bunchgrasses in storm facility (6-2-11).

Photo 4. Fern and moss in storm facility (6-2-11).

Soils

The mapped soil type on the site is Nisqually loamy fine sand (USDA NRCS, 2010). Nisqually loamy fine sand is a soil type where gophers are commonly found in Thurston County (WDFW, 2011). Soils are pervious and sandy from the surface to 10 feet deep or more (Geotechnical Testing Laboratory, 1997). The site is relatively flat with 0 to 3% slopes, except in Tract A, where storm drainage facilities have been developed.

Gopher Population

Mazama pocket gophers are abundant in the areas surrounding this site. A large population of Mazama pocket gophers occupies the Olympia Airport site directly across Old Highway 99, and a site survey of the Comcast lot in 2010, located within the Deschutes Industrial Park but not subject to this HMP, identified occupied gopher habitat covering approximately 45% of the lot. An established gopher habitat protection area (associated with Plat of Bridlewood Division 1) borders the north portion of the site.

The Deschutes Industrial Development site was surveyed on June 1, 2, and 3 by Linda Krippner, Krippner Consulting, LLC. Occupied gopher habitat extends across approximately 60% of the site, or 11.2 acres of the total 18.45-acre site (Figure 3). Gopher densities were high in most areas. The only exceptions were in some areas where soil had been compacted by vehicle traffic, in developed areas on Lot 15 and in some portions of the storm drainage facility. These results are not surprising because gophers are known to have unusually high densities on sites where soils are disturbed (Smallwood and Morrison, 1999) and the Deschutes site is adjacent to another highly modified site, the Olympia airport, that also hosts a large, dense population of gophers.

Existing Lot Development

In 1992 the site was subdivided into 18 lots. Lots 1 through 9 were developed prior to implementation of current WDFW Management Recommendations for the Mazama Pocket Gopher and, as a result, do not have designated on-site habitat protection areas. One of the lots, Tract "A" was also developed as storm drainage for the entire site (Figure 4). Lot 14 was sold but not developed until 2011, when Comcast, the lot owner, completed a Thurston County Reasonable Use Exception approval process due to the presence of Mazama pocket gopher habitat. As approved, the Comcast project will develop Lot 14 with a small building, driveway, and on-site stormwater facility. The Comcast development includes an on-site habitat protection area for the gopher established contiguous with the habitat protection area for the Plat of Bridlewood Division 1 (Figure 5). This HMP is intended to include the remaining undeveloped lots in the Deschutes Industrial Park (Lots 10, 11, 12, 13, 15, 16 and 17) as well as the adjacent Liberty Leasing lot also under Kaufman ownership (Figures 4 and 5).

Proposed Activity

The proposed project is to develop Lots 10, 11, 12, 13, 15, 16 and 17 and the Liberty Leasing lot for commercial and industrial uses (Figure 5). These lots will be developed once Kaufman sells or leases them to various industrial users. Some of the lots may not be

developed for another 2 to 10 years, depending upon demand. The stormwater tract has already been developed for full commercial capacity of the Deschutes Industrial Site. Lot 14 was developed under separate ownership, Comcast, and is subject to a separate HMP for the gopher habitat on its site. The remaining lots (1-9) were developed under earlier critical area regulations and are not included in this HMP.

Habitat Management Plan Conditions

A combination of on-site and off-site mitigation will be used to compensate for impacts to existing gopher habitat on the site. The maximum amount of impact to occupied habitat that would occur on each lot is shown in Figure 4. This estimate of 9.9 acres of impacted habitat is based on the June 2011 mound survey data and methods for calculating occupied habitat in accordance with 2011 WDFW management recommendations. This estimate does not take into account any habitat impacts avoided in the strip of land to be protected adjacent to Bridlewood habitat area in accordance with USFWS comments in 2012.

On-Site Mitigation

On-site mitigation will include permanent protection of Tract A and a strip of land 10 feet wide on the back sides of Lots 10, 11, 12, and 13, adjacent to the Bridlewood habitat area. Perimeter fencing and signage will be used to mark the boundary of this on-site habitat protection area, and prevent access by vehicles and foot traffic. The area of Tract A is 3.3 acres and the area of the 10-foot wide strip of land adjacent to Bridlewood is 9,938 square feet (0.23 acre)(Figure 5). Tract A includes approximately 1.3 acres of occupied habitat, 1.5 acres of additional habitat and 0.5 acre of gravelly storm basin (Figure 4).

Tract A contains stormwater drainage facilities, yet also provides habitat for numerous gophers as was recorded during the survey. Gopher mounds were observed even along the bottom edges of the drainage facilities (Photo 5), indicating that likely all of Tract A may potentially be used by gophers in the future, at least for foraging, even if their burrowing is limited by seasonal saturation at the lowest elevation. Gophers are known to forage on a wide variety of grasses and forbs (Burton and Black, 1978; Witmer et al., 1996). The dense growth of vegetation in Tract A is likely to provide abundant forage. The infiltration rates are high here, with surface water only collecting briefly at the bottom of the facility during precipitation events (Photo 6). No surface water was observed in the facility on January 27, 2011. A few minor upgrades to the stormwater drainage facilities were completed in August 2011 in order to bring the facility into compliance with Thurston County's recently updated stormwater standards.

Photos in the Storm Drainage Facility

Photo 5. Gopher mound at bottom edge (6-2-11).

Photo 6. Water flowing in following rainfall (6-2-11).

As each lot is developed, extruded curbing will be used to prevent vehicles from entering habitat protection areas. No pesticides or herbicides will be used in gopher habitat protection areas without approval from the Thurston County. No domestic pets are expected to roam free on this site from the new developments as the lots are designated for industrial use only. The adjacent Bridlewood residential development, including the Bridlewood habitat protection area, is fully fenced.

The following performance standards and management will apply to the on-site habitat protection areas:

1. Scotch broom shall be removed using above ground hand techniques. Vegetation in Tract A and in habitat protection areas designated on other lots will be cut or mowed to an approximate height of 12 inches twice per year during the growing season to prevent brush, such as Scotch broom, from shading grasses and herbs and Douglas fir seedlings from becoming established as trees. Thurston County Resource Stewardship Department may reduce this mowing requirement pursuant to revised state or federal management recommendations for the species with written notice to Kaufman or its successors by October 1 of each year.
2. Existing trees within the on-site habitat protection area along the boundary with Bridlewood subdivision will be removed.
3. The cover of Scotch broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10% during any given year.

Kaufman or its successors will submit a monitoring report by no later than October 1 of each year to the Thurston County Resource Stewardship Department to ensure that performance standards have been met. The monitoring report will include the following:

1. A description by activity and date of what management actions have been taken in the habitat protection areas.

2. A description of current on-site conditions that are or may be adversely affecting pocket gophers or their habitat, as well as any actions being undertaken or contemplated to address such conditions.

Access by WDFW and USFWS to conduct survey or restoration activities will be allowed in the on-site habitat protection areas with permission from Kaufman or its successors as long as any activities in Tract A do not conflict with current stormwater facility requirements.

Kaufman Gopher Sanctuary

Existing Conditions

Kaufman Gopher Sanctuary is located in Thurston County in the Rochester area east of Interstate 5, near the Scatter Creek Wildlife Area owned by WDFW (Figure 6). The site includes two parcels. Parcel #09200011008 at 16721 Leitner Road SW is west of Leitner Road and Parcel #12630110600 at 16722 Leitner Road SW is east of Leitner Road. The west parcel is 15.6 acres in size and the east parcel is 20.5 acres in size. The parcels are currently zoned Rural/Residential Resource 1/5 and were previously platted for rural residential development consistent with this zoning. Kaufman purchased the Kaufman Gopher Sanctuary site in 2011. A Thurston County stormwater easement extends onto the west parcel at the southeast corner of this parcel, adjacent to Leitner Road. The area of this easement extending onto the parcel is approximately 0.43 acre (Figure 7).

WDFW has identified this area east of Interstate 5 and near Scatter Creek Wildlife Area as having good potential for off-site mitigation for gopher habitat (Stinson, email communications, 2011). This site is surrounded by land zoned for rural uses and pocket gophers are known to exist nearby, less than one mile south of the site along Leitner Road SW and on the other side of I-5 in the Scatter Creek Wildlife Area.

Krippner Consulting conducted a field reconnaissance on June 3, 2011 to assess current site conditions. Dense grasses and Scotch broom cover most of this site (Photo 7). A row of Douglas fir trees is located along the south site boundary. The soils are rocky and are mapped as Spanaway gravelly sandy loam and Spanaway-Nisqually complex (USDA NRCS, 2010). Soils, at least in some areas, are compacted. Three gopher mounds were observed during this brief field visit (Photo 8) and it is likely that more exist on this site, though the population density is probably low given the dense cover by Scotch broom. A variety of native prairie flowers were in bloom during the site visit, including native species of camas, violet, buttercup, potentilla and blue-eyed grass. The dominant grass species observed was red fescue.

Pre-Restoration Photos at Kaufman Gopher Sanctuary

Photo 7. View towards I-5 of off-site parcel (6-3-11).

Photo 8. Gopher mound at off-site location (6-3-11).

Habitat Management

Kaufman will enter into a conservation easement agreement with Capitol Land Trust encumbering the entirety of both parcels. The conservation easement agreement will be binding on all future owners and be in substantially the form attached as **Appendix C** to this HMP.

A baseline survey of Mazama pocket gophers mounds and general site conditions will be conducted before site management, such as clearing Scotch broom and mowing, commences.

Sanctuary boundaries will be located by a qualified surveyor and marked in the field for site monitoring and management purposes. Large, established stands of Scotch broom are currently located on the sanctuary site. These will need to be removed in order to improve habitat conditions for pocket gophers and for prairie species including native wildflowers and butterflies. In accordance with the Thurston County (2009) fact sheet on Scotch broom, "*mechanical methods can be used on larger infestations with the use of brush cutters, tractor-mounted mowers, or backhoes. Cutting stems in the spring and early summer will result in new shoot production and poor control. However, up to 80% mortality can be achieved by cutting down plants when they are drought stressed (July through September).*"

Kaufman will perform the initial removal of Scotch broom using mechanized means as described in the Thurston County fact sheet on Scotch broom control. The ideal time to do this initial cut is just after blooming, but before seed has set in July. Ground disturbance will be kept to a minimum. The brush debris resulting from mechanical cutting is anticipated to mulch relatively quickly on-site.

The large Douglas fir trees that border the south side of the site will be removed as requested by USFWS in 2012.

Performance standards and management for Kaufman Sanctuary shall include:

1. The area shall be mowed to a height of approximately 12 inches once in the late summer or early fall, after most flowers have bloomed and ground-dwelling birds have nested.
2. The cover of Scotch broom and other woody vegetation combined with any other plant species on the state or county noxious weed list cannot exceed 10% during any given year.

Kaufman or its successors will submit a monitoring report by no later than October 1 of each year to the Thurston County Resource Stewardship Department to ensure that performance standards have been met. The monitoring report will include the following:

1. A description by activity and date of what management actions have been taken in the habitat protection areas.
2. A description of current on-site conditions that are or may be adversely affecting pocket gophers or their habitat, as well as any actions being undertaken or contemplated to address such conditions.

Regular mowing is likely to encourage the spread of pocket gophers on this site. Pocket gophers are known to aerate soils and increase plant diversity (Hartway and Steinberg. 1997; Mielke, 1977). Therefore, even with limited habitat management on this site, the currently compacted soils should be improved and prairie vegetation may be enhanced. Restoration of prairie habitat for species other than the gopher shall be permitted and encouraged, but is not required as a condition of this HMP.

Kaufman will conduct the initial restoration activities and continue them for at least three years or until Kaufman contracts ongoing management responsibilities to another qualified conservation land management entity that will undertake permanent management and stewardship responsibilities for the Sanctuary. This contractual delegation of responsibility will include provisions for enforcement of management and stewardship requirements by an appropriate third party agency, such as Thurston County, WDFW, or USFWS, as determined by agreement of Kaufman, the designated land management entity, and the identified third party agency at the time such contract is entered. Capitol Land Trust will also continue to enforce the terms of its conservation easement encumbering the property on a permanent basis.

The restrictive covenant and conservation easement will both limit property owner use of the Sanctuary in perpetuity to non-motorized activities like hiking and equestrian use only, no grazing, tilling or other land disturbing activities, except those conducted by Kaufman or other delegated conservation land management entity for restoration and maintenance of gopher habitat consistent with the terms and conditions of this HMP.

Access by WDFW and USFWS to conduct survey or restoration activities will be allowed in perpetuity consistent with notice to Kaufman or its successors and to the extent proposed

restoration activities conform to the terms and conditions of the conservation easement burdening the property.

Mitigation calculations are provided in **Appendix A**. The required mitigation is calculated at a 3:1 ratio (3 acres of protected habitat required for 1 acre of impact to occupied habitat). The area of impact is estimated as the occupied habitat that is located on the lots to be developed at Deschutes Industrial Park. In summary, approximately 9.9 acres of occupied habitat will be impacted at Deschutes, and 3.5 acres of on-site habitat and 27.7 acres of off-site habitat will be protected at the Kaufman Sanctuary to compensate for this impact. Once the County stormwater facility area and the allocation for Deschutes Industrial Park is subtracted from the total Kaufman Sanctuary, there will be approximately 8 acres of habitat remaining for mitigation. This remaining mitigation credit may be used for two other Kaufman projects: the Grand Mound and I-5 Commerce projects, should those properties be found to include Mazama pocket gopher habitat. Off-site mitigation requirements for the Grand Mound and I-5 Commerce project, if any, will be determined at time of permitting and may be in excess of the remaining off-site mitigation area acreage.

Duration of Plan and Modifications

Kaufman will conduct the initial restoration activities and continue them as needed for at least the first three years. After the initial three-year period, Kaufman will contractually delegate ongoing management responsibilities to another qualified conservation land management entity that will undertake permanent management and stewardship responsibilities for the Sanctuary. This contractual delegation of responsibility will include provisions for enforcement of management and stewardship requirements by an appropriate third party agency, such as Thurston County, WDFW, or USFWS, as determined by the parties at the time such contract is entered. Capitol Land Trust will also continue to enforce the terms of its conservation easement encumbering the property on a permanent basis.

This HMP, including designating the on-site and off-site habitat protection areas and maintaining them, will be recorded in conjunction with the proposed amendment to the Deschutes Industrial Park final plat and referenced as a plat note. Any modifications to this HMP proposed by the owner upon development of a specific parcel will require additional review and approval from Thurston County.

This HMP has been prepared to cover the remaining build-out of the Deschutes Industrial Park. The specific development proposal for each lot will be determined by the leaseholder or purchaser of the lot consistent with the terms of this HMP.

Once approved and recorded in conjunction with amendment of the Deschutes Industrial Park final plat, this HMP shall be deemed adequate to provide all habitat mitigation which may be required for the Mazama pocket gopher pursuant to the Thurston County Critical Area Ordinance (TCC 17.15, or as may be later amended) and/or the State Environmental

Policy Act (Ch. 43.21C RCW) in conjunction with remaining development of the Deschutes Industrial Park for Lots 10, 11, 12, 13, 15, 16, 17 and Liberty Leasing.

Off-Site

Kaufman will have six (6) months from the date that Thurston County approves the proposed amendment of the final plat of the Deschutes Industrial Park adopting the terms and conditions of the HMP to enter into and record a conservation easement for the Kaufman Gopher Sanctuary property with Capitol Land Trust and complete any collateral agreements, including funding of an endowment, which may be necessary between the parties to effectuate the same. Kaufman will have a period of three years from the date of final approval of the plat amendment to contract with a qualified conservation land management entity for permanent management and stewardship of the Sanctuary property as described above.

Compliance

Failure to comply with this Plan is a violation of Thurston County Code and may subject the violator to civil and/or criminal penalties.

The Deschutes Industrial Park is located in the City of Tumwater's Urban Growth Area ("UGA"). Should the property be annexed in the future, all provisions referencing Thurston County permitting and enforcement authority in this HMP shall instead be deemed to refer to the City of Tumwater. This HMP is intended to be binding upon Kaufman and its successors unless expressly superseded per the terms and conditions above.

_____

_____

Landowner and (Date)
Agent Signature

_____

_____

Landowner or
Agent Names (Print)

_____

Address

_____

City, State, Zip

_____

_____

Capitol Land Trust (Date)

_____

_____

Capitol Land Trust (Print)

_____

Address

_____

City, State, Zip

_____

Thurston County Representative (Date)

References

Burton, D.H. and H.C. Black. 1978. *Feeding Habits of Mazama Pocket Gophers in South-Central Oregon.* Journal of Wildlife Management. 42(2): 383-390.

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Witmer, G. W., R. D. Sayler and M. J. Pipas. 1996. *Biology and Habitat Use of the Mazama Pocket Gopher (Thomomys mazama) in the Puget Sound Area, Washington.* Northwest Science, Vol. 70. No. 2: 93-98.

Figure 1 - Vicinity Map

Sources: Thurston County Geodata Center. Parcels 2011; Bing Maps Hybrid, Microsoft 2010, aerial photo.

Figure 2 – Aerial Photography from 1990

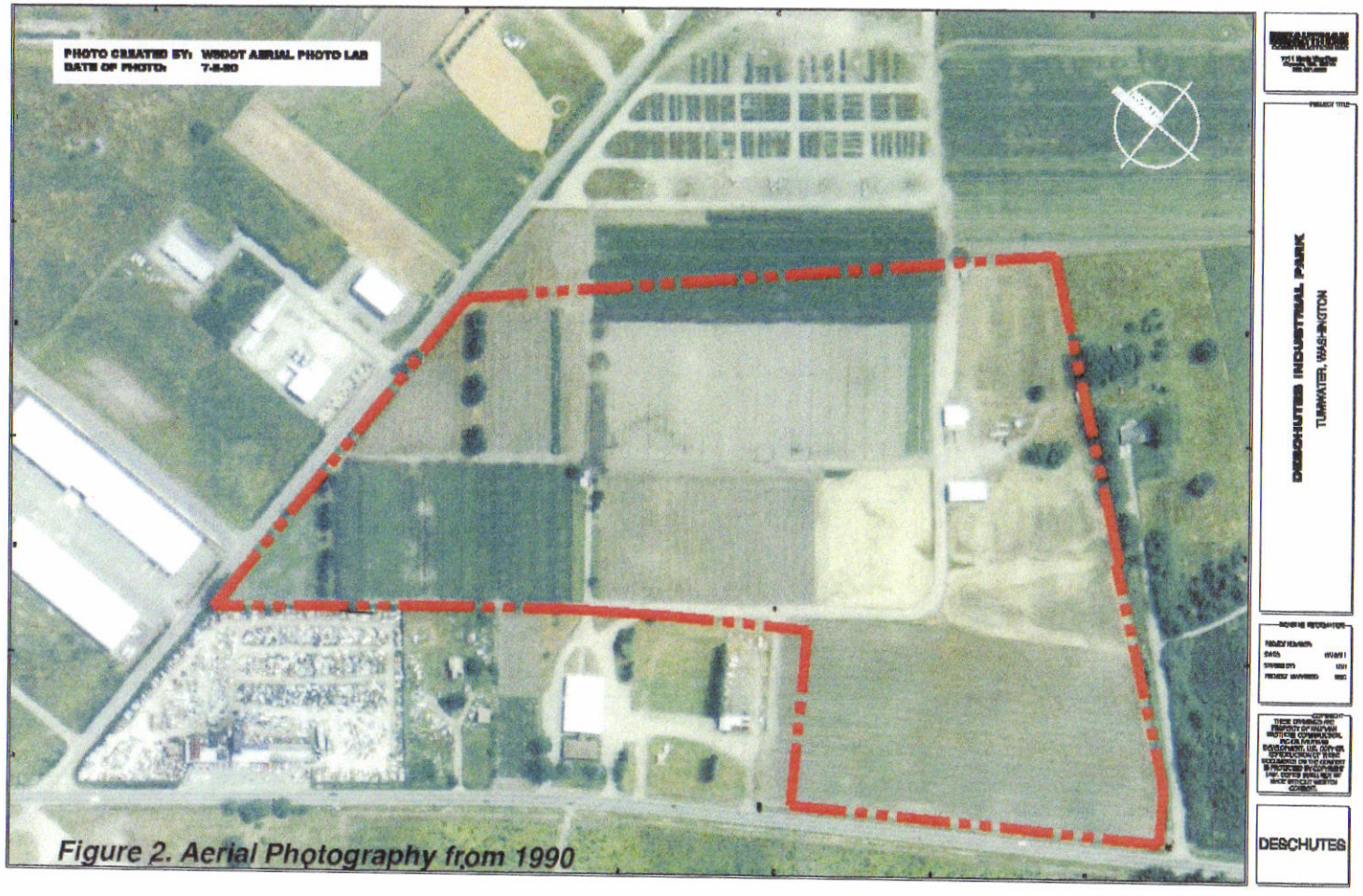
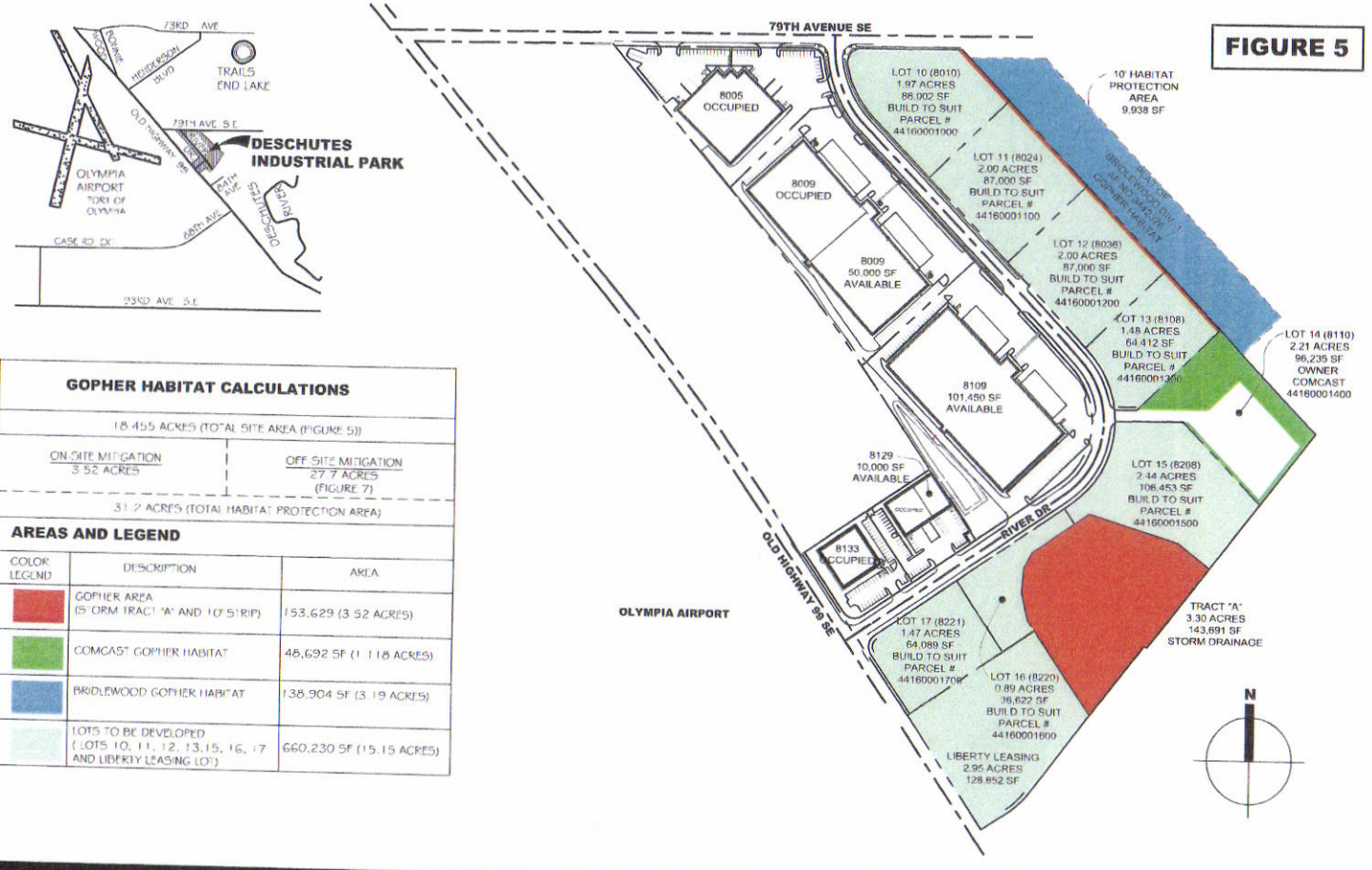


Figure 7 – Kaufman Gopher Sanctuary Boundaries

Figure 5 – Deschutes On-Site Habitat Protection Areas



GOPHER HABITAT CALCULATIONS	
18.455 ACRES (TOTAL SITE AREA (FIGURE 5))	
ON-SITE MITIGATION 3.52 ACRES	OFF-SITE MITIGATION 27.7 ACRES (FIGURE 7)
31.2 ACRES (TOTAL HABITAT PROTECTION AREA)	

AREAS AND LEGEND

COLOR LEGEND	DESCRIPTION	AREA
	GOPHER AREA (STORM TRACT "A" AND 10' STRIP)	153,629 (3.52 ACRES)
	COMCAST GOPHER HABITAT	48,692 SF (1.118 ACRES)
	BRIDLEWOOD GOPHER HABITAT	138,904 SF (3.19 ACRES)
	LOTS TO BE DEVELOPED (LOTS 10, 11, 12, 13,15, 16, 17 AND LIBERTY LEASING LOT)	660,230 SF (15.15 ACRES)

Figure 6 – Kaufman Gopher Sanctuary – Landscape View

Date prepared: August 22, 2012
By: L. Krippner

Sources: Thurston County Geodata Center, Parcels 2011;
Bing Maps Hybrid, Microsoft 2010, aerial photo.

Figure 3 – On-Site Mound Survey Results

Figure 4 – Potential On-Site Impacts and Mitigation

Data prepared: August 25, 2011
By: L. Krippner

Sources: Thurston County Geodata Center, Parcels 2011; Bing Maps Hybrid, Microsoft 2010, aerial photo; Mound survey data, Krippner Consulting, June 1-3, 2011.

Appendix A – Off-Site Mitigation Credit Calculations

REVISED MITIGATION CALCULATIONS
KAUFMAN DESCHUTES INDUSTRIAL PARK
INCLUDING ADDITIONAL ON SITE HABITAT PROTECTION AREA
9/11/2012

Total maximum potential on-site habitat impact area at full development (show on Figure 4):

9.9 acres

Total off-site mitigation acreage:

36.1 acres

Total off-site mitigation area allocated to Deschutes Industrial Park:

27.7 acres

Total remaining off-site mitigation area:

8.4 acres
(.43 acres – County stormwater facility)

7.97 acres

Total habitat protection area provided for the Deschutes Industrial Park:

27.7 acres (off-site)
3.5 acres (on-site)

31.2 acres

Appendix B – WDFW Comment Letter: November 21, 2011

State of Washington
Department of Fish and Wildlife
Mailing Address: 48 Devonshire Road, Montesano WA 98563-9618, (360) 249-4628

November 21, 2011

John Kaufman
Kaufman Real Estate, LLC
7711 Martin Way East
Olympia, WA 98515

Dear Mr. Kaufman:

I am writing in response to your submitted Habitat Management Plan (HMP) currently under review entitled Habitat Management Plan: Mazama Pocket Gopher For Deschutes Industrial Park & Kaufman Gopher Sanctuary, dated August 29, 2011. Overall, the proposed HMP conforms to Washington State Department of Fish and Wildlife's (WDFW) Priority Habitats and Species Management Recommendations. WDFW supports the proposed HMP and mitigation bank plan and procedures as long as the following conditions can be met.

A baseline survey of each parcel within the Kaufman Gopher Sanctuary-Mitigation Bank shall be conducted to document current site conditions and identify the current status of Mazama pocket gopher at this location. The report from this baseline survey shall be submitted to WDFW for evaluation.

If the habitat on the Kaufman Gopher Sanctuary is to be restored, resulting in a higher density of gophers occupying the site, and density is to be considered as a performance standard in potentially reducing the mitigation ratio from 3:1 down to 2:1 or 1:1, then surveys will need to be updated regularly. WDFW shall be allowed to review all updated surveys to evaluate whether the performance standards have been met.

Prior to any relocation activities, WDFW shall be consulted to determine whether or not relocation of gophers would be appropriate.

As the best available science on Mazama pocket gopher changes or WDFW's management recommendations change, so should the Habitat Management Plan: Mazama Pocket Gopher For Deschutes Industrial Park & Kaufman Gopher Sanctuary.

If you have any further questions or concerns regarding this matter please contact Amy Iverson at 360-249-1228 or at amy.iverson@dfw.wa.gov.

Sincerely,

Amy Iverson

Amy Iverson
WDFW
Area Habitat Biologist

Appendix C – Conservation Easement Agreement

DRAFT – FOR DISCUSSION PURPOSES ONLY

After Recording Return To:

BEAN, GENTRY, WHEELER & PETERNELL, PLLC
910 LakeridgeWay SW
Olympia, Washington 98502

DEED OF CONSERVATION EASEMENT - DRAFT

Grantor: Kaufman Real Estate, LLC, a Washington Limited Liability Company

Grantee: Capitol Land Trust, a Washington Nonprofit Corporation

Property Address: 16721 Leitner Road SW, Olympia, Washington

Assessor's Tax Parcel Number(s): 09200011008

Abbreviated Legal Description:

Exhibit A: Legal Description of Property Subject to Conservation Easement
Exhibit B: Map of Property Subject to Conservation Easement

_____, having an address at XXXXXX, Washington, XXXX ("Grantor"), and Capitol Land Trust, a Washington Nonprofit Corporation, having an address at 209 East 4th Avenue, Suite #205, Olympia, Washington, 98501 ("Grantee") (collectively "Parties") enter into this Deed of Conservation Easement ("Easement") on this _____ day of _____, 2012 and agree as follows:

I. BACKGROUND

A. Grantor is the owner in fee simple of real property in Thurston County, Washington, consisting of approximately 15.56 acres ("Property"), described in Exhibit A: Legal Description of Property Subject to Conservation Easement and shown on Exhibit B: Map of Property Subject to Conservation Easement, which are attached to this instrument and incorporated herein by this reference.

B. The Property possesses natural, scenic, open space, biological, and ecological values (collectively "Conservation Values") of great importance to Grantor, the people of Thurston County, and the people of the State of Washington.

C. The Property's soils consist of Spanaway gravelly sandy loam (0-3% slopes and 3-15% slopes) and Spanaway-Nisqually complex which are commonly associated with Mazama pocket gophers according to Washington Department of Fish and Wildlife's Priority Species and Habitat Management Recommendations for the Mazama Pocket Gopher (WDFW 2011) and are also considered western Washington prairie soils.

D. The legislatively declared policies of the State of Washington in the Washington State Open Space Tax Act, Chapter 84.34 RCW, provide "that it is in the best interest of the state to maintain, preserve, conserve, and otherwise continue in existence adequate open space lands for the production of food, fiber, and forest crop, and to assure the use and enjoyment of natural resources and scenic beauty for the economic and social well-being of the state and its citizens." Under the Open Space Act, lands eligible for preferential real property tax treatment include such lands as the Protected Property where the permanent preservation of its open space lands in their current use would conserve and enhance natural resources and promote conservation of marine shorelines, threatened wildlife habitat, scenic viewsheds, and agricultural and forest lands.

E. The Property provides habitat for the mazama pocket gopher, a Federal candidate species and State Threatened Species which is associated with the glacial outwash prairie ecosystems in western Washington. The pocket gopher is an important species in prairie ecosystems because its tunneling activity helps maintain plant species richness and diversity. The biggest threat to the mazama pocket gopher is loss and modification of habitat.

F. Mazama pocket gophers require habitat that includes open grassland and abundant forbs and have been associated with prairie soils including Spanaway gravelly sandy loam and Spanaway-Nisqually complex which are present on the Property.

G. The ongoing conversion of land and open space to residential and commercial use in Thurston County has contributed to the decline of pocket gopher populations. Permanent protection of viable habitat is a critical step in recovery for this species.

H. The Property would be extremely desirable for residential development because of its location and orientation. In the absence of this Conservation Easement, the Property could be developed in a manner that would destroy the open space and rural character of the Property, the habitats present and its ecological value.

I. Protection of the Property is consistent with Thurston County Comprehensive Plan Chapter 9, Goal 1, Objective B: Critical Areas in which the Thurston County

Board of County Commissioners has recognized "the county should continue to protect areas containing wildlife habitats which are important to the long-term viability of important species of Thurston County, habitats which are unique or rare, or which contain important species from these State Priority Species which are known to occur in Thurston County, as provided in the Critical Areas Ordinance."

J. Specific Conservation Values on the Property have been documented in a natural resource inventory dated _____, on file at offices of Grantee and incorporated herein by this reference ("Baseline Documentation"), which consists of reports, maps, photographs, flora and fauna surveys, and other documentation that collectively provide an accurate representation of the Property at the time of this grant and which is intended to serve as an objective information baseline for monitoring compliance with the terms of this Easement.

K. Grantor intend that the Conservation Values of the Property be preserved and maintained by the continuation of land uses on the Property that do not significantly impair or interfere with those Conservation Values. These current uses include the residential and recreational uses set forth in this Easement.

L. Grantor as owner in fee of the Property has the right to identify, protect, and preserve in perpetuity the Conservation Values of the Property, and desires to transfer such rights to Grantee. This Easement, however, shall not be interpreted to deprive Grantor's ability to also identify, protect, and preserve such Conservation Values.

M. Grantee is a publicly supported, tax-exempt nonprofit organization, qualified under Section 501(c)(3) and 170(h) of the Internal Revenue Code of 1986, as amended ("Code"), and the regulations promulgated thereunder, and also qualified as a nonprofit nature conservancy corporation under RCW 64.04.130 and 84.34.250, whose primary purpose is the conservation, appreciation, and stewardship of the diverse open space of the southern Puget Sound region.

N. Grantee agrees, by accepting this grant, to honor the intentions of Grantor stated herein and to preserve and protect in perpetuity the Conservation Values of the Property for the benefit of this generation and generations to come and require the same of any successors or assigns.

II. AGREEMENT

A. Consideration. For the reasons stated above, and in consideration of the above Recitals, the mutual covenants, terms, conditions, and restrictions contained in this Easement, and other good and valuable consideration, the receipt of which the Grantor acknowledges, Grantor grants, conveys and warrants to Grantee a Conservation Easement in perpetuity over the Protected Property, consisting of

certain rights in the Protected Property, as defined in this Easement, subject only to the restrictions contained in this Easement.

B. Conveyance of Real Property. This conveyance is a conveyance of an interest in real property under the provisions of RCW 64.04.130 and is made as an absolute, unconditional, unqualified, and completed grant, subject only to the mutual covenants, terms, conditions and restrictions set forth in the Easement and those encumbrances set forth in Exhibit C ("Title Exceptions").

C. Purpose. The purpose of this Easement is to assure the Property will be retained forever, predominantly in its natural and open space condition and to prevent any use of the Property that will significantly impair or interfere with the Conservation Values except as specifically allowed herein. Grantor intends that this Easement will confine the use of the Property to activities that are consistent with the purpose of this Easement.

D. Rights of Grantee. In order to accomplish the purpose of this Easement, Grantor conveys to the Grantee the following rights:

1. Identification and Protection. To identify, protect and preserve in perpetuity and to enhance by mutual agreement the Conservation Values of the Property.

2. Access.

   a. To enter upon the Property annually, at a mutually agreeable time and upon prior verbal or written notice to the Grantor not less than ten (10) days in advance, for the purpose of making a general inspection to assure compliance with this Easement;

   b. To allow persons or groups to enter upon the Property for educational, scientific, and biological purposes to observe and study on the Property; provided that any such persons or groups are first approved by the Grantor, make prior arrangements with the Grantor, agree to provide the Grantor with copies of any data or reports resulting from such research, and agree to abide by any restrictions on access and behavior set forth by the Grantor;

   c. To enter the Property to ensure compliance with the Habitat Management Plan, and conduct restoration and habitat management activities in compliance with the Habitat Management Plan. Grantee may delegate this right to Grantee's named agents.

   d. To enter the Property at such other times as necessary if Grantee has a reason to believe a violation of the Easement is occurring or

has occurred, for the purpose of mitigating or terminating the violation and otherwise enforcing the provisions of this Easement and to undertake or require the restoration of such areas or features of the Property that may be damaged by any inconsistent activity or use. Such entry shall be upon prior reasonable notice to Grantor if such notice will not in the sole opinion of Grantee result in further damage to the Conservation Values of the Property. If reasonable notice is not given prior to entering the Property, Grantee shall provide notice of having entered the Property to Grantor within five (5) business days along with their findings and / or actions. All notices as provided herein will be with sufficient detail for Grantor to know the basis and facts of Grantee's beliefs;

3. Markers. To place and replace, during the inspections authorized above, small markers to identify boundaries, corners, and other reference points on the Property, to facilitate route finding and boundary line identification, provided such signs are in a location and of a content, size and nature that are approved of in advance by Grantor.

4. Injunction and Restoration. To enjoin any use of, or activity on, the Property that is inconsistent with the purpose of this Easement, including violations of law by members of the public, and to require or undertake the restoration of such areas or features of the Property as may be damaged by uses or activities inconsistent with the provisions of this Easement.

5. Restoration. To restore and maintain the habitat and conservation values on the property in compliance with the Habitat Management Plan.

6. Enforcement. To enforce the terms of this Easement as specified in Section H.

7. Assignment. To assign, convey, or otherwise transfer Grantee's interest in the Property in accordance with the provisions set forth in this Easement.

8. Restoration. To engage in restoration or habitat enhancement projects on the Property with the Grantor's permission. To plant, prune and mark, cut, and/or remove trees and other vegetation for the purposes of restoring or maintaining the aesthetic, natural or scenic qualities of the Property, for prevention of insect infestation, for fish and wildlife habitat enhancement or manipulation projects, to ensure compliance with the Habitat Management Plan, and for public health and safety, with the Grantor's permission.

E. Conservation Easement Limitations and Permitted Activities. Any use of, or activity on the Property inconsistent with the Conservation Values or stated purpose of this Easement is prohibited, and Grantor acknowledges and agrees they will not conduct, engage in, or permit any such use or activity. Without limiting the generality of this Section, the following are some specific restrictions on use, prohibited uses and permitted uses of the Property:

1. Subdivision. The legal or "de facto" division, subdivision, or partitioning of the Property is prohibited.

2. Transfer of Development Rights. This easement also prohibits the transfer of any development right allocated, implied, reserved, or inherent in the Property ("Development Rights") to any other property outside the Property and the use of the Property or the Development Rights for the purpose of calculating the permissible lot yield of any other property. All development rights now or hereafter allocated to, implied, reserved, or inherent in the Property, except as specifically reserved in this Easement are terminated and extinguished.

3. Development and Construction. There are currently no structures on the property. The placement or construction of any buildings, permanent structures or other improvements of any kind (including, without limitation, pipelines, towers, poles, wells, septic systems, drain fields, fences, roads, and parking areas, enclosures, or other improvements of any kind), temporary or permanent (hereinafter collectively referred to as "Improvements"), are prohibited, except as follows:

   a. Future Residential Structures. To construct one (1) single-family residence and one (1) garage and driveway associated with the residence with associated utility connections, landscaping, pathways, and other appurtenances typical of such residential use (collectively, the "Residence") and thereafter to maintain, renovate, expand or replace the Residence in substantially the same location. Construction of the Residence is subject to the following limitations:

      i. The Residence must only be located within the one (1) acre Residential Use Zone.

      ii. The location of the Residence must be designated in advance of any construction or earth-moving activities, including test pits and wells. The designated location of the Residence must be approved in writing by Grantee. Upon Grantee's approval, Grantor will have the Residence location surveyed and the survey recorded in the records of Thurston County.

iii. The Residence may have no more than one (1) attached or detached outbuilding. If the outbuilding is attached, then the Grantor may not construct an additional detached outbuilding. The outbuilding must be located within the 1-acre Residential Use Zone.

iv. The construction of the Residence and outbuilding must comply with all applicable zoning and building regulations, subject to any variances, waivers or other relief that the Grantee may approve (such approval not to be unreasonably withheld) and shall be a legally allowed use of the Property.

v. Grantor must provide Grantee with written notice of Grantor's intent to construct the single-family residence and/or associated structure allowed in this Easement in accordance with the notice procedures contained in this Easement.

vi. Construction of the Residence as well as any associated garage, gardens, driveways, and impervious surfaces allowed in this Easement must be contained entirely within a surveyed one (1) acre "Residential Use Zone." Prior to exercising any rights under this Section, Grantor must obtain a legal survey identifying the location and boundaries of the proposed one (1) acre "Residential Use Zone." All costs associated with surveying and adequately marking the residential-use zone and additional lots shall be the responsibility of the Grantor. The survey must be submitted to and receive approval of Grantee in accordance with the procedures contained in this Easement. Surveyed boundaries of the "Residential Use Zone" must be marked on the ground and markers must be maintained by Grantor.

b. Roads, Trails and Fences. The construction of new roads, parking areas, trails or fences outside of the Residential Use Zone is prohibited. Grantor may create new roads, parking areas, and fences in the Residential Use Zone or to the extent it is necessary for Grantor to exercise the rights provided elsewhere in this Easement, specifically for access to the Residence and outbuilding, and to fence the boundaries of the property.

c. Utilities. The installation of utility systems, including without limitation, water, sewer, septic, power, fuel and communication lines and related facilities ("Utility Systems") is prohibited except to maintain, replace, or extend existing utility systems, or to install

new utility systems, including water, sewer, power, fuel, and communication lines and related facilities, to the extent necessary to serve the Residence and structures allowed in this Easement. Permanent (non-portable) sewer facilities will be limited to serving the residential dwellings allowed in this Easement.

d. Removal of Trees and other Vegetation. The pruning, cutting down, or other destruction or removal of live and dead trees, shrubs, ground cover, or other non-invasive vegetation, or the harvesting, digging, cutting or removal of forest products from the Property outside of the Residential Area is prohibited except as follows:

i. Grantor may cut or remove vegetation only as required by the Habitat Management Plan.

e. Agricultural. Maintaining any agricultural facility or activity including crop production, irrigation, waste disposal and raising of livestock on the Property is prohibited. Vegetable gardens within the Residential Use Zone are permitted.

f. Wildlife Disruption and Hunting. The disruption of wildlife resting, feeding, breeding, and nesting activities and hunting or trapping, except to the extent determined necessary by Grantee to preserve or protect the Conservation Values of the Property, is prohibited. Feral domestic mammals, individuals from the family Muridae of the order Rodentia (old world rats and mice), and individuals from the family Talpidae of the order Soricomorpha (moles) may be killed without approval of Grantee if done so in a manner so as not to adversely impact the native plants and animals.

g. Water Rights. The transfer of any water right appurtenant to the Property to any other property and the use of such water rights for the purpose of calculating the permissible lot yield of any other property is prohibited.

h. Wells. Drilling for or operating new water wells or the operation of surface water collection systems is prohibited, except Grantor may drill, implement and maintain additional wells and surface water collection systems to provide water for permitted uses on the Property. Grantor shall notify Grantee before drilling additional wells.

i. Wetlands. The draining, filling, dredging or diking of any wetland areas, except as necessary to restore fish and/or wildlife habitat, is prohibited.

j. Ponds and Water Courses. The alteration of any ponds and water courses, the creation of new water impoundments or water courses, except as necessary to restore ecosystem processes relative to wildlife habitat, to implement an approved enhancement plan, wetland conversion, or as necessary to provide pedestrian access to water courses.

k. Flooding. Grantor may undertake such measures as are necessary to prevent flood damage to structures allowed in this Easement provided such activities avoid or minimize impacts to the Conservation Values of the Property.

l. Soil and Water. Any use or activity that causes or is likely to cause soil degradation, soil erosion, or pollution of any surface or sub-surface waters is prohibited outside of the Residential Use Zone.

m. Alteration of Land. The alteration of the surface of the land, including without limitation, the excavation, grading, fill or removal of soil, sand, gravel, rock, peat, or sod is prohibited except as deemed necessary by Grantee to preserve or protect the conservation or wildlife habitat improvement values of the Property, with Grantee's prior approval as provided in Section F.

n. Mining. The exploration for, or development and extraction of, oils, gases, coal, ores, minerals including sand and gravel, or geothermal resources, on or below the surface of the Property, is prohibited.

o. Archaeological Excavation. The exploration for fossils, or for archaeological, historical, or cultural objects, on or below the surface of the Property is prohibited.

p. Waste Disposal. The dumping, disposal or storage of any waste, rubbish, garbage, debris, vehicles, abandoned equipment, parts thereof, or other unsightly, offensive, or hazardous waste or material as defined in any applicable federal, state or local laws, regulations or ordinances is prohibited, except to compost and store vegetative and other wastes generated by permitted uses and activities on the Property, provided that such other wastes are stored temporarily in appropriate containment for removal at reasonable intervals and in compliance with applicable federal, state, and local laws.

q. Use of Property. There shall be no industrial activities on the Property. Conducting a business or other commercial activity is permitted exclusively within the Residential Use Zone, provided

such commercial activities do not harm or threaten to harm the Conservation Values of the Property. Grantor may conduct and allow organized educational and academic study such as wildlife and bird surveys, vegetation surveys, water quality sampling, general environmental education, and classroom visits on the Property with Grantee's notice and approval as provided in Section X, provided such activities are conducted in a manner and intensity that do not adversely impact the Conservation Values or Purpose of this Easement.

r. Signs. The placement of any signs or billboards is prohibited except placement of signs on the Property to advertise for sale or rent, to advertise permitted agricultural or business activities, to state conditions of access or directions to improvements on the Property, prohibit trespass and dumping, and to identify the conservancy of the Property provided such signs do not materially and adversely interfere with the Conservation Values of the Property.

s. Communication Structures. Communication structures of any type, such as cell phone towers, are prohibited.

t. Motor Vehicles. The operation of motorcycles, all terrain vehicles, snowmobiles, or any other type of off-road motorized vehicles outside of the Residential Use Zone is prohibited.

u. Recreational Use. Recreational activities that adversely impact the Conservation Values of this Easement are prohibited.

v. Domestic Animals. Domestic animals including but not limited to dogs, cats, birds, and horses outside of the Residential Use Area are prohibited.

w. Compliance with Habitat Management Plan. Grantor's activities must be consistent with and in compliance with the Habitat Management Plan which is hereto attached as Exhibit C and incorporated herein by reference.

x. Emergencies. Grantor may undertake other activities necessary to protect public health or safety, or which are actively required by and subject to compulsion of any governmental agency with authority to require such activity ("Emergency Action"), provided that any such activity shall be conducted so that interference with the Conservation Values of the Property is avoided to the greatest extent practicable.

F. Notice and Approval.

1. Notice. Grantor shall notify Grantee prior to undertaking the activities requiring notices in this Easement. The purpose of requiring Grantor to notify Grantee prior to undertaking certain permitted uses and activities is to afford Grantee an opportunity to ensure that the use or activity in question is designed and carried out in a manner consistent with the purposes of this Easement. Whenever notice is required and other than for an Emergency Action, Grantor shall notify Grantee in writing not less than forty five (45) days prior to the date Grantor intends to undertake the use or activity in question. The notice shall describe the nature, scope, design, location, timetable, and any other material aspect of the proposed activity in sufficient detail to permit Grantee to make an informed judgment as to its consistency with the purpose of this Easement.

2. Approval. Where Grantee's approval is required and other than for an emergency action, Grantee shall grant or withhold its approval in writing within thirty (30) days of receipt of Grantor's written request for approval. Grantee's approval may be withheld only upon a reasonable determination by Grantee that the action as proposed would be inconsistent with the purposes of this Easement. Grantee's approval may include reasonable conditions that must be satisfied in undertaking the proposed use or activity. If Grantor must undertake an Emergency Action, Grantor may proceed with such action without Grantee's approval only if Grantor notifies Grantee prior to taking such action promptly after the emergency and Grantee cannot provide its approval, with or without conditions, within such time as is reasonable under the circumstances.

3. Grantee's Failure to Approve within the Required Time. When Grantee's approval is required, and when Grantee does not grant its approval or give notice of its disapproval within the time period and manner set forth herein, Grantor may conclusively assume Grantee's approval of the permitted use or activity in question.

4. Addresses for Notices. Any notice, demand, request, consent, approval, or communication that Grantor or Grantee desires or is required to give to the other Party shall be in writing either served personally or sent by first class mail, postage prepaid, addressed as follows:

To Grantor: (to be filled in with Grantor's name and address)

To Grantee: Capitol Land Trust
Washington Nonprofit Corporation

209 4th Avenue East, #205
Olympia, Washington 98501

or to such other address as Grantor or Grantee from time to time shall designate by written notices to the other Party.

G. Alternative Dispute Resolution. In the event a dispute arises between Grantee and the Grantor relating to this Easement, a meeting regarding the dispute shall be held by the Parties, to be attended by representatives with decision-making authority, to attempt in good faith to negotiate a mutually acceptable resolution of the dispute. If the dispute cannot be resolved within a reasonable time not to exceed sixty (60) days, which time may be extended by mutual consent of the Parties, then the Parties may bring an action at law or in equity to resolve the dispute and enforce the terms of this Easement.

H. Remedies.

1. Immediate Action Required. If Grantor or Grantee, each in its sole and absolute discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the Conservation Values of the Property, Grantor or Grantee may, without notice to the other Party and without utilizing the Alternative Dispute Resolution procedures contained in this Easement, file an action in Thurston County Superior Court to obtain a temporary restraining order and preliminary injunction. All such actions for injunctive relief shall be taken without Grantee or Grantor being required to post bond or provide other security. However, upon entry of a preliminary injunction restraining the conduct in question in a manner sufficient to prevent or mitigate significant damage to the Conservation Values of the Property, the court shall refer the matter to mediation in accordance with the Alternative Dispute Resolution provisions of this Easement.

2. Nature of Remedy. Grantee's or Grantor's rights under this Section apply equally in the event of either actual or threatened violations of the terms of this Easement. Grantor and Grantee agree that their remedies at law for any violation of the terms of this Easement are inadequate and that each Party shall be entitled to the injunctive relief described in this Section both prohibitive and mandatory, in addition to such other relief to which each Party may be entitled, including specific performance of the terms of this Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. The remedies described in this Section shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity. No provisions of this Easement shall be interpreted to preclude Grantee from obtaining injunctive relief.

3. Liquidated Damages. If the actual damages to the Conservation Values of the Property that could result from a breach of this Easement by Grantor would be impractical or extremely difficult to measure, the Parties agree that the money damages Grantee is entitled to recover shall be the following:

a. With respect to the construction of any improvement prohibited by this Easement, which is not subsequently removed and the Property restored to its previous condition within a reasonable amount of time specified by Grantee, then damages shall be an amount equal to the greater of (a) the actual cost of such improvement, or (b) the increase in the fair market value of the Property or of any other real property owned by Grantor attributable to such improvement;

b. With respect to any use or activity prohibited by this Easement, whether or not involving the construction or maintenance of an improvement, an amount equal to any economic gain realized by the Grantor and/or any other Party, commencing from the date of breach.

c. The Parties agree that a mutually agreed licensed real estate appraiser shall make any fair market value determinations required by this Section.

4. Costs of Enforcement. In the event Grantor or Grantee finds it necessary to take action against the other Party to enforce or interpret any of the terms, covenants, or conditions of this Easement, the prevailing Party in any such action or proceeding shall be paid all costs, reasonable attorneys' and consultants' fees by the other Party and all such costs and fees shall be included in any judgment, order or award secured by such prevailing Party.

5. Party's Discretion. Enforcement of the terms of this Easement shall be at the discretion of the Grantor or Grantee, and any forbearance by such Party to exercise its rights under this Easement in the event of any breach of any terms of this Easement shall not be deemed or construed to be a waiver of such term or of any of Grantee's or Grantor's rights under this Easement. No delay or omission by Grantor or Grantee in the exercise of any right or remedy under this Easement shall impair such right or remedy or be construed as a waiver.

6. Waiver of Certain Defenses. Grantor and Grantee acknowledge that they have carefully reviewed this Easement and have consulted with and been advised by counsel of its terms and requirements, and neither shall assert the rule of construction that ambiguities are to be construed against the

drafting Party. In full knowledge of the provisions of this Easement, Grantor hereby waives any claim or defense it may have against Grantee or its successors in interest under or pertaining to this Easement based upon adverse possession or prescription relating to the Property or this Easement.

7. Acts Beyond Grantor's Control. Nothing contained in this Easement shall be construed to entitle Grantee to bring any action against Grantor to abate, correct, or restore any condition on the Property or to recover damages for any injury to or change in the Property resulting from causes beyond Grantor's control, including, without limitation, fire, flood, storm and earth movement, from any prudent action taken by Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes, or from acts of anyone but Grantor or its agent(s). In the event the terms of this Easement are violated by acts of trespassers, Grantor agrees, at Grantee's option and expense, to join in any suit, to assign its right of action regarding damage to the Easement to Grantee, or to appoint Grantee as its attorney-in-fact, for the purpose of pursuing enforcement action for damage to the Easement against the responsible Parties. It shall be Grantor's burden to demonstrate that a violation was caused by a trespasser.

8. Compliance Certificates. Upon request by Grantor, Grantee shall within thirty (30) days execute and deliver to Grantor any document, including an estoppel certificate, which certifies, to the best of Grantee's knowledge, Grantor's compliance or lack thereof with any obligation of Grantor contained in this Easement and otherwise evidences the status of this Easement as requested by Grantor. Such certification shall be limited to the condition of the Property as of Grantee's most recent inspection. If Grantor requests more current documentation, Grantee shall conduct an inspection, at Grantor's expense, within thirty (30) days of receipt of Grantor's written request and payment therefore.

9. Governing Law. The laws of the State of Washington shall govern this Easement. The courts of Thurston County, State of Washington, shall be the venue for any legal proceedings either Party commences with regard to this Easement. The Parties agree to submit themselves to the jurisdiction of the courts of the State of Washington for any disputes arising out of this Easement.

I. Access by Public. No right of access by the general public to any portion of the Property is conveyed by this Easement.

J. Costs, Liabilities, Taxes and Environmental Compliance.

1. Liabilities and Insurance. Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep and maintenance of the Property, including the maintenance of adequate comprehensive general liability insurance coverage. Such insurance shall include Grantee's interest and name Grantee as an additional insured and provide for at least thirty (30) days notice to Grantee before cancellation and that the act or omission of one insured will not invalidate the policy as to the other insured Party. Grantor remains solely responsible for obtaining any applicable governmental permits and approvals for any construction or other activity or use permitted by this Easement, and all such construction or other activity or use shall be undertaken in accordance with all applicable federal, state, and local laws, regulations, and requirements. Grantor shall keep the Property free of any liens arising out of any work performed for, material furnished to, or obligations incurred by Grantor.

2. Taxes. Grantor shall pay, before delinquency, all taxes, assessments, fees, charges of whatever description levied on or assessed against the Property by competent authority (collectively "taxes"), including any taxes imposed upon, or incurred as a result of, this Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. Grantee is authorized, but in no event obligated, to make or advance any payment of taxes, upon three (3) days prior written notice to Grantor, in accordance with any bill, statement, or estimate procured from the appropriate authority, without inquiry into the validity of the taxes or the accuracy of the bill, statement, or estimate, and the obligation created by such payment shall bear interest until paid by the Grantor at the maximum rate allowed by law for judgments.

3. Grantor's Indemnification. Grantor shall hold harmless, indemnify, and defend Grantee and its members, directors, officers, employees, agents, and contractors and the heirs, personal representatives, successors, and assigns of each of them (collectively "Indemnified Parties") from and against all liabilities, penalties, costs, losses, damages, expenses, causes of action, claims, demands or judgments caused by Grantor or persons under Grantor's control or by Grantor's employees, agents and contractors, including, without limitation, reasonable attorneys' and consultants' fees, arising from or in any way connected with injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property that is not a consequence of any activity of any of the Indemnified Parties.

4. Grantee's Indemnification. Grantee shall hold harmless, indemnify, and defend Grantor and Grantor's heirs, personal representatives, successors,

and assigns (collectively "Indemnified Parties") from and against all liabilities, penalties, costs, losses, damages, expenses, causes of action, claims, demands, or judgments, including, without limitation, reasonable attorneys' and consultants' fees, arising from or in any way connected with injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Property that is a consequence of Grantee's actions or omissions or the actions or omissions of Grantee's members, directors, officers, employees, agents or contractors on or about the Property.

5. Environmental Representations and Warranties. Grantor represents and warrants that as of the effective date of this Easement and to the best of Grantor's knowledge:

a. There are no apparent or latent defects in or on the Property that materially affect the Conservation Values;

b. Grantor and the Property are in compliance with all federal, state, and local laws, regulations, and requirements applicable to the Property and its use, including without limitation all federal, state, and local environmental laws, regulations, and requirements;

c. There has been no release, generation, treatment, disposal, storage, dumping, burying or abandonment ("Release") on the Property of any substances, materials, or wastes that are hazardous, toxic, dangerous, harmful or are designated as, or contain components that are, or are designated as, hazardous, toxic, dangerous, or harmful and/or which are subject to regulation as hazardous, toxic, dangerous, or harmful or as a pollutant by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA") and the Model Toxics Control Act, as amended ("MTCA") or any federal, state, or local law, regulation, statute, or ordinance, including, but not limited to, petroleum or any petroleum product ("Hazardous Substances");

d. There are not now any underground storage tanks located on the Property, whether presently in service or closed, abandoned, or decommissioned, and no underground storage tanks have been removed from the Property in a manner not in compliance with applicable federal, state, and local laws, regulations, and requirements;

e. Neither Grantor nor Grantor's predecessors in interest have Released any Hazardous Substances off-site, nor have they

Released any substance at a site designated or proposed to be designated as a federal or state Superfund sites;

f. There is no pending or threatened litigation affecting, involving, or relating to the Property or any portion thereof; and

g. No civil or criminal proceedings or investigations have been instigated are now pending, and no notices, claims, demands, or orders have been received, arising out of any violation or alleged violation of, or failure to comply with any federal, state, or local law, regulation, or requirement applicable to the Property or its use, nor do there exist any facts or circumstances that Grantor might reasonably expect to form the basis for any such proceedings, investigations, notices, claims, demands, or orders.

6. Remediation. If, at any time, there occurs, or has occurred, a Release in, on, or about the Property of a Hazardous Substance, Grantor agrees to take all reasonable steps necessary to assure its containment and remediation, including any cleanup that may be required by regulatory officials, unless the release was caused by Grantee, in which case Grantee shall be responsible for remediation. This clause shall not be interpreted to preclude any action by Grantor or Grantee to recover any portion of the costs of any remediation of the Property.

7. Control. Nothing in this Easement shall be construed as giving rise, in the absence of a judicial decree, to any right or ability in Grantee to exercise physical or managerial control over the day-to-day operations of the Property, or any of Grantor's activities on the Property, or otherwise to become an operator with respect to the Property within the meaning of CERCLA or MTCA.

K. Subsequent Transfer or Extinguishment.

1. Extinguishment. If circumstances arise in the future that render the purpose of this Easement impossible to accomplish, this Easement can only be terminated or extinguished, whether in whole or in part, by judicial proceedings in a court of competent jurisdiction, and the amount of the proceeds to which Grantee shall be entitled, after the satisfaction of prior claims, from any sale, exchange, or involuntary conversion of all or any portion of the Property subsequent to such termination or extinguishment, shall be determined, unless otherwise provided by Washington law at the time, in accordance with this Easement. Grantee shall use all such proceeds in a manner consistent with the purpose of this Easement.

2. Valuation. This Easement constitutes a real property interest immediately vested in Grantee, which, for the purpose of this Easement, the Parties stipulate to have a fair market value determined by multiplying (1) the fair market value of the Property unencumbered by the Easement (minus any increase in the value after the date of this grant attributable to improvements) by (2) the ratio of the value of the Easement at the time of this grant to the value of the Property, without deduction for the value of the Easement, at the time of this grant. The values at the time of this grant shall be those values used to calculate the deduction for federal income tax purposes allowable by reasons of this grant, pursuant to Section 170(h) of the Code. The values used shall be determined pursuant to the valuation requirements of Section 170(h) of the Code and the Treasury Regulations thereunder. For the purposes of this Section, the ratio of the value of the Easement to the value of the Property (minus any increase in the value after the date of this grant attributable to improvements) unencumbered by the Easement shall remain constant.

3. Condemnation. If the Easement is taken, in whole or in part, by the exercise of the power of eminent domain and provided such taking is not subject to the Easement, Grantee shall be entitled to compensation for the value of the rights conveyed by this Easement and Grantor shall be entitled to compensation for the value of all other rights relating to the Property in accordance with applicable law.

4. Subsequent Transfers. Grantor agrees (1) to incorporate by express reference the terms of this Easement in any deed or other legal instrument by which it divests itself of any interest in all or a portion of the Property, including without limitation, a leasehold interest, and (2) to describe this Easement in and append it to any executory contract for the transfer of any interest in the Property. Grantor further agrees to give written notice to the Grantee of the transfer of any interest upon such transfer. Such notice to Grantee shall include the name, address, and telephone number of the prospective transferee or such transferee's representative. The failure of the Grantor to perform any act required by this Section shall not impair the validity of this Easement or limit its enforceability in any way.

L. Amendment. If circumstances arise under which an amendment to or modification of this Easement would be appropriate, Grantor and Grantee are free to jointly amend this Easement; provided that no amendment shall be allowed that shall affect the qualification of this Easement or the status of Grantee under any applicable laws, including RCW 64.04.130, Chapter 84.34 RCW, or Section 170(h) of the Code, and any amendment shall be consistent with the purpose of this Easement and the Habitat Management Plan, and shall not affect its perpetual

duration. Any such amendment shall be recorded in the official records of Thurston County, Washington, and any other jurisdiction in which such recording is required.

M. Assignment and Succession.

1. Assignment. This Easement is transferable, but Grantee may only assign its rights and obligations under this Easement to an organization that is a qualified organization at the time of transfer under Section 170(h) of the Code (or any successor provision then applicable), and the applicable regulations promulgated thereunder, and authorized to acquire and hold conservation easements under RCW 64.04.130 or RCW 84.34.250 (or any successor provision then applicable). As a condition of such transfer, Grantee shall require that the purpose of this Easement continues to be carried out by the transferee. Grantee shall notify Grantor in writing, at Grantor's last known address, in advance of such assignment. The failure of Grantee to give such notice shall not affect the validity of such assignment nor shall it impair the validity of this Easement or limit its enforceability in any way.

2. Succession. If at any time it becomes impossible for Grantee to ensure compliance with the covenants contained herein and Grantee has not named a successor organization, or the Grantee shall cease to exist, then its rights and duties hereunder shall vest in such organization as a court of competent jurisdiction shall direct, pursuant to the applicable Washington law and the Code (or corresponding provision of any future statute) and with due regard to the purposes of this Easement.

N. Recordation. Grantee shall record this instrument in a timely fashion in the official records of Thurston County, Washington, and in any other appropriate jurisdictions, and may re-record it at any time as may be required to preserve its rights in this Easement.

O. General Provisions.

1. Effective Date. The effective date of this Easement shall be the date on which the Grantor executed this Easement.

2. Controlling Law. The interpretation and performance of this Easement shall be governed by the laws of the State of Washington.

3. Liberal Construction. Any general rule of construction to the contrary notwithstanding, this Easement shall be liberally construed in favor of the grant to affect the purpose of this Easement and the policy and purpose of RCW 64.04.130 and Chapter 84.34 RCW. If any provision in this instrument is found to be ambiguous, an interpretation consistent

with the purpose of this Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

4. Severability. If any provision of this Easement, or the application thereof to any person or circumstance, is found to be invalid, the remainder of the provisions of this Easement, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid, as the case may be, shall not be affected thereby.

5. Entire Agreement. This instrument, including attached Exhibits A, B, and C sets forth the entire agreement of the Grantor and Grantee with respect to the Easement and supersedes all prior discussions, negotiations, understandings, or agreements relating to the Easement, all of which are merged herein. No alteration or variation of this instrument shall be valid or binding unless contained in an amendment that complies with this Easement.

6. No Forfeiture. Nothing contained herein will result in a forfeiture or reversion of Grantor's title in any respect.

7. Termination of Rights and Obligations. Grantor's rights and obligations under this Easement terminate upon transfer of Grantor's interest in the Property, except that liability for Grantor's acts or omissions occurring prior to transfer shall survive transfer for a period of three (3) years following such transfer. Grantee's rights and obligations under this Easement terminate upon transfer of Grantee's interest in the Easement, except that liability for Grantee's acts or omissions occurring prior to transfer shall survive transfer for a period of three (3) years following such transfer.

8. Captions. The captions in this instrument have been inserted solely for convenience and ease of reference and are not a part of this instrument and shall have no effect upon construction or interpretation.

9. Counterparts. Grantor and Grantee may execute this instrument in two or more counterparts, which shall, in the aggregate, be signed by all Parties; each counterpart shall be deemed an original instrument as against any Party who has signed it. In the event of any disparity between the counterparts produced, the recorded counterpart shall be controlling.

10. Authority. The individuals signing below, if signing on behalf of any entity, represent and warrant that they have the requisite authority to bind the entity on whose behalf they are signing.

11. Recitals. Each recital set forth above is fully incorporated into this Easement.

P. Schedule of Exhibits.

1. Exhibit A: Legal Description of Property Subject to Easement.

2. Exhibit B: Map of Property Subject to Conservation Easement.

To Have and to Hold unto Grantee and its successors and assigns forever.

In Witness Whereof, the undersigned Grantor has executed this instrument this ___ day of _____, 20__.

GRANTOR:

By: _____
Its: _____
Date: _____

GRANTEE:

CAPITOL LAND TRUST

_____
By: _____
Its: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF THURSTON)

On this day before me, the undersigned, a Notary Public for the State of Washington, duly commissioned and sworn, personally appeared _____, to me known to be the _____of Capitol Land Trust, a Washington Nonprofit Corporation, the corporation that executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that she is authorized to execute the said instrument.

Given under my hand and official seal this ____ day of _____2012.

_____

Notary Public in and for the State of Washington
Residing at _____
Print Name: _____
My commission expires: _____

STATE OF WASHINGTON)
) ss.
COUNTY OF THURSTON)

On this day before me, the undersigned, a Notary Public for the State of Washington, duly commissioned and sworn, personally appeared _____, the entity that executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said entity, for the uses and purposes therein mentioned, and on oath stated that she is authorized to execute the said instrument.

Given under my hand and official seal this _____ day of _____2012.

_____

Notary Public in and for the State of Washington
Residing at _____
Print Name: _____
My commission expires: _____

EXHIBIT "A"

Legal Description of Property Subject to Easement.

EXHIBIT "B"

Map of Property Subject to Easement.

Exhibit C

Habitat Management Plan

4/15/2009

TILLEY ROAD INDUSTRIAL PARK
CITY OF TUMWATER, WASHINGTON

MAZAMA POCKET GOPHER
HABITAT PROTECTION PLAN

Prepared For:

KAUFMAN DEVELOPMENT LP
OLYMPIA, WA

Prepared By:

CURTIS WAMBACH, M.S.
PRINCIPAL & SENIOR BIOLOGIST
PE CONSULTANTS LLC
LACEY, WA

15 April 2009

MAZAMA POCKET GOPHER

HABITAT PROTECTION PLAN

For

TILLEY ROAD INDUSTRIAL PARK

Prepared For:

KAUFMAN DEVELOPMENT LP
7711 MARTIN WAY E
OLYMPIA, WA, 98516

Prepared By:

Curtis Wambach
PE CONSULTANTS LLC
(360) 438-1985

15 April 2009

EXECUTIVE SUMMARY

Project Name: Tilley Road Industrial Park

Site Location: The subject property is located on Tilley Road, City of Tumwater, Thurston County, Washington in Section 14, Township 17 North, Range 2 West, Willamette Meridian. The 27.87-acre subject property consists of one parcel, 12714310400.

Project Staff: Curtis Wambach, M.S., Senior Biologist, Principal of PE Consultants LLC

Field Survey(s): A detailed field investigation was performed between January and June of 2008. And, again in October 2008.

Project Description: The project plan involves the development of 8 lots that will occupy a space currently unused.

Species and Habitat Information: The Mazama pocket gopher and marginal pocket gopher habitat occurs on the subject property.

Impacts and Mitigation:

See Figure 3							
12	40,579	0.93	12	40,579	0.93	81,157	1.86
• Avoid habitat impacts to the greatest amount practicable in the early phases of development • Minimize impacts by preserving a large contiguous area for gopher reserve and by increasing our gopher habitat circle from 10 meters in diameter to 20 meters in diameter.							
Proposed future gopher relocation: • Relocate gophers off-site with approval from the WDFW							

Approved for Duration of Project. This Habitat Management Plan (HMP) has been prepared to cover the entire duration of the project and all future development phases of the proposed project. The current proposal is for a commercial industrial park with associated road systems and open space. The first phase of the project involves subdividing the subject property into eight (8) lots that will occupy a space currently unused. Subsequent development on each of the eight (8) new lots will be determined by the future buyer or lease holder on the lot. With the approval of this plan, the Habitat Management Plan (HMP) shall cover the proposed project as described in this report, as well as the future development on the eight (8) subdivided lots.

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APPENDICES

1.0 INTRODUCTION

1.1 Purpose.

Purpose. The purpose of the project is to prepare a Habitat Protection Plan (HMP) for the protection and management of the Mazama (Western) Pocket Gopher (*Thomomys Mazama*) and its habitat located on the Tilley Road Industrial Park property. The City of Tumwater Municipal Code Chapter 16.32.090 requires the preparation and submittal of a Habitat Protection Plan by the permit applicant when a protected habitat is located on a site to be developed. The City of Tumwater defines habitats to be protected under Tumwater Municipal Code Chapter 16.32.050(B) as habitats of sensitive species identified by the Washington State Department of Fish and Wildlife's (WDFW) 'Priority Habitats and Species' (PHS) database. The Mazama pocket gopher is listed as a State Priority Species by the WDFW PHS database, as well as a Federal Candidate Species for listing under the Endangered Species Act (ESA).

The City of Tumwater Municipal Code Chapter 16.32.090 requires that the Habitat Protection Plan addresses impacts on and preservation of the protected habitat located on the subject property. This report will describe existing conditions on the subject property including the general location of the Mazama pocket gopher habitat and use areas, potential development impacts, proposed conservation and mitigation measures, and landscape linkages to promote a sustainable and genetically viable on-site population.

Mitigation. Two (2) alternative mitigation strategies are provided in this report. 1) on-site mitigation and 2) assisted colonization off site. The WDFW has been requiring on-site mitigation resulting in many fragmented mitigation areas isolated and far in between. This short-term strategy has resulted in an unfortunate situation where the reduction in gene flow between these fragmented populations may lead to an eventual population decline, contrary to conservation efforts. How to protect the Mazama pocket gopher is a difficult question that may require some innovative solutions and decisive decisions. It may be that the best way to protect the Mazama pocket gopher is to provide a mechanism that projects a plan far into the future, rather than just a quick fix for the moment. It may be that the best strategy is to relocate this species off-site to a protected prairie habitat.

Approved for Duration of Project. This Habitat Management Plan (HMP) has been prepared to cover the entire duration of the project and all future development phases of the proposed project. The current proposal is for a commercial industrial park with associated road systems and open space. The first phase of the project involves subdividing the subject property into eight (8) lots that will occupy a space currently unused. Subsequent development on each of the eight (8) new lots will be determined by the future buyer or lease holder on the lot. With the approval of this plan, the Habitat Management Plan (HMP) shall cover the proposed project as described in this report, as well as the future development on the eight (8) subdivided lots.

1.2 Limitations of the Study.

The limitations of the study include:

1) Length of the field study. The field study had occurred from January to June of 2008 and again on 20 October 2008. Although this study is extensive in comparison to a one day reconnaissance, the length of a study typically limits reliable projection of gopher distribution on the site in the long term.
2) Gophers Move Around. One apparent problem with the current agency methodology is that gophers move around. The lapse of time between the consultant study and the agency review allows for the gophers to move around. My years of gopher studies provide great insight into gopher distribution and movement on the landscape. Juvenile gophers search for new territory, old tunnel systems are abandoned, the wet season high groundwater table floods tunnels, predation by coyotes, hawks, weasels, dogs, cats, and other predators eliminate individuals or colonies, and displacement by moles, voles, mountain beavers and other burrowing species play a role in moving around gophers. I have seen entire gopher colonies disperse.
3) Snapshot in time. Because gophers move around, a gopher study is a snapshot in time. A longer and more extensive study provides a more reliable estimate of gopher distribution, habitat, and individual occurrence within a study area. Shorter studies are less reliable than our more detailed study. However, as time passes, the distribution of gophers may change. That is why it is important to establish a snapshot in time of gopher habitat circles for the bases of our mitigation area calculations.

Mound-producing activity occurs more frequently in moist soils. Rain moistens the soils making its texture malleable for tunnel building. However, excessive precipitation may discourage gopher presence in water filled depressions and in low spots. To overcome these limitations, our firm drew on our years of field research experience gained in the preparation of Mazama pocket gopher Habitat Protection Plans. The City of Tumwater and the Washington Department of Fish and Wildlife have approved a number of our gopher projects, acknowledging or firms dedication to rigorous scientific methodology. Our firm has performed extensive field research on this and other neighboring properties, expanding our knowledge and experience in identifying gopher use areas during any time of the year. We have learned that pocket gophers typically are found in areas of densely spaced mounds. The field research for the Tilley Road study focused on the identification of gopher mound formations to determine gopher presence.

1.3 Project Location.

The subject property is located on Tilley Road, City of Tumwater, Thurston County, Washington in Section 14, Township 17 North, Range 2 West, Willamette Meridian (**Figure 1**). The 27.87-acre subject property consists of one parcel, 12714310400.

1.4 WDFW Guidelines.

Our reconnaissance, gopher identification, and mitigation strategy are based on guidelines prepared by the Washington Department of Fish and Wildlife during the month of June 2007 and presented to us at a 22 June 2007 meeting with WDFW. We have revised our gopher protection strategy on addressing the presence of the Mazama pocket gopher on the

subject property. We have altered our methodology from delineating gopher colonies to providing a 20-meter in diameter habitat circle around groups of mounds, taking into account an individual gopher's territory and potential juvenile gopher dispersion. We also avoid the greatest number of gopher habitat circles practicable.

As a contingency, we would like to keep open an option for assisted colonization of this small population of Mazama pocket gophers off-site. This contingency if approved would involve relocating this small pocket gopher population to a protected prairie habitat where this breeding stock would proliferate a new viable population, aiding in the recovery of this species.

1.5 Meeting Local Regulatory Requirements.

Curtis Wambach of PE Consultants LLC has prepared this Habitat Protection Plan (HPP) in accordance with Tumwater Municipal Code Chapter 16.32 to evaluate the presence of the particular important habitat or species, and the likelihood that the particular important habitat or species will maintain or reproduce over the long-term. Because the Mazama pocket gopher and its habitat have been documented by the Washington Department of Fish and Wildlife to occur in the vicinity of a mapped point location of an important species, a Habitat Protection Plan is required to address possible impacts to this species and its habitat and to provide viable conservation and mitigation measures to protect this species into the future.

This Habitat Protection Plan will address potential impacts to important habitat or species as a result of the development on this site. Conservation measures will be addressed to provide viable long-term conservation management of the Mazama pocket gopher.

1.6 Gopher Habitat and Biology.

Gopher Biology. The Mazama Pocket Gopher is a small burrowing mammal that eats roots, tubers, bulbs and some surface vegetation (see Section 3 for more detailed information on gopher biology). Feeding occurs primarily underground. However, the pocket gopher also feeds above ground on forbs and grasses during the evening and nighttime or during dimly-lit overcast days. When feeding above ground, the pocket gopher bends down grasses to collect the seeds. An area of intensely foraged grasses and forbs near their mound structures is an indicator of pocket gopher high use.

Gopher Habitat. The Mazama pocket gopher prefers prairie habitat. Historically, the Native Americans maintained prairie habitat in western Washington through burning the shrubs and trees off the land. Native Americans harvested camas and other crops, which grew abundantly in western Washington prairies. Since burning the fields became a thing of the past, forests and farms replaced much of the prairie ecosystem. Currently, only scattered remnants of this once human-maintained ecosystem remain in western Washington. Many of these areas are zoned for high-density development by local cities and counties. One of the last high quality habitats for the Mazama pocket gopher is at the Olympia International Airport. The Airport is a source of gopher dispersion near the subject property. Juvenile gophers seeking their own territory may wander into less desirable habitat away from the airport, as they have migrated onto the subject property and the neighboring cattle pasture.

Gopher Mounds. The Mazama pocket gopher produces characteristically crescent-shaped mounds of soil above the ground. Typically, mounds have a plug of soil closing the burrow entrance at the center portion of the crescent-shaped mound. Mounds are commonly found in lines marking the underground route of the burrow system. In contrast, moles produce larger conical-shaped mounds that appear more randomly distributed in the landscape. The pocket gopher burrow system is located just below the surface. However, brooding chambers and food caches are located as deep as 6 feet below the surface.

Mound Identification. Because moles often create mounds interspersed with gopher mounds, species-specific mound identification is an essential component of the study. Moles and pocket gophers live their lives almost completely under ground. Their tunneling activity results in mounds of dirt being excavated and left on the surface. Fortunately, mole and pocket gopher mounds can be identified in the field by easily observable characteristics. Basically, moles create round or conical-shaped mounds in contrast to the Crescent or kidney shaped mound of the pocket gopher. Another key difference is that only moles create surface runs, pocket gophers don't. The entrance to the mole tunnel system is in the center of the conical-shaped mound, while the entrance for the pocket gopher tunnel is beneath a plug located on the inner side of the crescent-shaped mound.

Gopher Dispersion. Although, home ranges are very small, juvenile pocket gophers sometimes wander up to 1,000 feet or more in search of territory. After several generations of these short-lived rodents, dispersion could extend a mile or more from the original natal territory. While searching for territory, juvenile pocket gophers may create individual or scattered mounds in poor habitats while probing for new territory or foraging areas. Individual wandering pocket gophers may create 'explorer mounds' outside of the primary mound complexes through the dispersal of juveniles or less commonly, adults searching for new foraging opportunities. The separation distance for suitable habitat is a compromise between the sedentary habits of these mammals and the search for new territory as juveniles strike out on their own. Two occupied mound complexes separated by less than a few kilometers of suitable habitat could represent two independent territories. Because of these wandering individual juvenile gophers searching for territory, there may be explorer mounds between two mound complexes or in areas of unlikely gopher habitat, such as in wetlands, forests, or in cemented glacial till.

2.0 GENERAL PROPERTY DESCRIPTION AND LAND USE

Historical Land Use. Historically, the site was likely part of a prairie system. Prairie systems in the southern Puget Sound area were maintained historically by the Native Americans through burning large tracts of land as a part of maintaining the production food plants, such as camas. When burning discontinued in this landscape, forests of Douglas fir replaced the prairie habitat. The subject property was wooded until recently, when it was partially cleared. After the property was partially cleared, the Mazama pocket gopher moved on to the property from the neighboring airport.

Current Land Use and Habitat. The subject property is currently undeveloped and unused (**Appendix A**). The site does not contain typical prairie habitat. The site contains European pasture grasses that were seeded after the clearing of a Douglas fir forest. Scattered

Douglas fir trees punctuate the field of European pasture grasses and logging debris. The site does not contain ideal Mazama pocket gopher habitat.

3.0 METHODOLOGY OF STUDY

Our study methodology is entirely based on the WDFW guidelines established in June of 2007 (**Insert 1**).

3.1 Background Review

Prior to the site reconnaissance, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database was reviewed to assess background information on Mazama pocket gopher occurrence at and near the subject property (**Attachment B**).

Background information on possible critical areas was reviewed prior to field investigations and included the following:

- The Washington Department of Fish and Wildlife (WDFW). 2004. Priority Habitats and Species (PHS) report: In the Vicinity of T17R02W Section 8. August 23 (**Appendix B**).
- Anchor Environmental, LLC. 2003. Habitat Protection Plan for Streaked Horned Larks, Western (Mazama) Pocket Gophers, and Oregon Vesper Sparrows at the Olympia Regional Airport. Prepared for the Port of Olympia.
- Knutsen, C. J. 2003. The *Thomomys mazama* pocket Gopher in Washington Prairies: a Contemporary View for Management. A Thesis: Essay of distinction submitted in partial fulfillment of the requirements for a degree Master of Environmental Studies the Evergreen State College.
- Thurston County Area Soil Survey, Soil Conservation Service (U.S. Department of Agriculture, 1973) (**Appendix C**).
- Thurston County Geodata Center Available on the Internet http://www.geodata.org/online.html
- City of Tumwater Municipal Code Chapter 16.32.
- PE Consultants LLC Mazama Pocket Gopher Information. http://www.peconsultants.net/gopher.htm
- PE Consultants LLC. 20 December 2006. Mazama Pocket Gopher Habitat Protection Plan. Heritage Place.
- PE Consultants LLC. 20 December 2006. Mazama Pocket Gopher Habitat Protection Plan. Bradbury Estates. (Approved)
- PE Consultants LLC. 16 March 2005. Mazama Pocket Gopher Habitat Protection Plan. Tumwater Highlands. (Approved)
- PE Consultants LLC. 6 December 2005. Mazama Pocket Gopher Habitat Protection Plan. Tumwater Commerce. (Approved)
- City of Tumwater Municipal Code Chapter 16.32.

3.2 Field Investigation

A detailed field investigation was performed between January and June of 2008. The purpose of this detailed field investigation was to 1) map and identify concentrated gopher mound sites, 2) distinguish gopher mounds from mounds created by other small burrowing mammals, and 3) identify gopher habitat circles on the subject property.

General Gopher Mound Survey

A visual inspection of the mounds was performed between January and June of 2008 to identify characteristics that would distinguish a pocket gopher mound from that created by a mole or other small burrowing mammal. Initially, the site was evaluated to gain an overall visual perspective on mound distribution and concentration throughout the subject property.

The entire property had been surveyed for gopher mound activity. The gopher mound survey was performed using the knowledge and experience gained from years of research and of similar pocket gopher Habitat Protection Plans on neighboring properties.

3.3 Wildlife Reconnaissance Methodology

An inventory of wildlife occurrence on the subject property, including the Mazama pocket gopher was compiled through the field survey and through a review of background information obtained from USFWS, WDFW, and the Department of Natural Resources (DNR) Natural Heritage Program. Information concerning amphibian and reptile species was based on Brown *et al.* (1995), Kozloff (1978), Leonard *et al.* (1993), Nussbaum *et al.* (1983), and Olson *et al.* (1997). Bird species information was based on Acorn and Baron (1997), Hunn (1982), Johnsgard (1990), and Kozloff (1978). Information concerning birds' nests, nesting cavities, woodpecker feeding stations, animal tracks, scats, and other wildlife indicators was based on Harrison (1979) and Murie (1974). Background information about mammals was based on Forey and Fitzsimons (1987), King County (1987), and Whitaker (1996).

Insert 1 WDFW Gopher Methodology of 22 June 2007

Key Planning Considerations:

- The boundaries of the project property are considered the planning unit irrespective of use intentions or site development plans.
- All gopher mounds are surveyed within the planning unit. Any mound believed active in the foreseeable past is considered active and included in the count (e.g. error on the side of gophers). Survey can be completed by consultant and verified by WDWF or vice versa until agreed.
- Mounds that lye on the project property boundaries are included in count regardless of partiality. Mounds bordering existing roadways are included in count if confirmed active in the foreseeable past.
- Each mound is encompassed within a 20-meter in diameter *(65.6 ft* diameter or 314 m^2 circle) circle representing a resident gopher burrow system and accounting for juvenile dispersion justified thru the discussion below.
- 20-m circles must enclose all mounds; if a mound is found outside a 20-meter circle, it belongs to an additional burrow system.
- A 2:1 replacement ratio is required for each circle justified by the juvenile to adult replacement necessary to retain a stable population.
- The area of each 20-meter gopher circle is 314 m^2 (341r^2) or .077630325 acres.

Juvenile Research Justification:

- Pocket gopher research finds that adult male and female gophers are relatively sedentary, loyal to their territory, and have small home range sizes.
- Juvenile gophers move far distances ~100-300 m (330-1000 ft approximately); Vaughan (1963) and Anderson and MacMahon (1981)] and can account for a tripling of burrow systems in one spring (Steinberg 1996a). Thus movement areas for this cohort of the population surround and extend beyond the resident gopher 10-m circle.
- In reality, a 20-m (65.6 it) use area accounts for the minimum dispersal distances for juvenile gophers.
- The high mortality rate of gophers in general (to 75% in one study; Hansen 1960) accounts for low growth rates for pocket gopher populations.
- Juveniles that survive often recolonize the mounds of gophers that die (Engeman and Campbell 1999; Witmer *et al.* 1996).

4.0 Results: GOPHER AND HABITAT DISTRIBUTION

4.1 Analysis of Existing Information

PE Consultants LLC has identified the Mazama pocket gopher on nearby properties. No Mazama pocket gopher polygons or individual occurrence has been identified on the subject property by the WDFW PHS database (**Appendix B**). However, it is evident from our other studies in the area that the Mazama pocket gopher occurs in the vicinity of the subject property.

Based on the Thurston County Geodata Center, the site contains a variety of soil types that include:

- Indianola Loamy Sand 0 to 3 Percent Slopes
  - Located in the northern portion of the property

- Yelm Fine Sandy Loam 0 to 3 Percent Slopes
  - Located in the southwestern corner of the property

Study Results

Soil mounds characteristic of the Mazama Pocket Gopher were identified on the subject property (**Figure 2**). Pocket gopher mounds were distributed primarily in mound complexes at the edge of the sidewalk at Tilley road. Few mound clusters were found in the central portion of the property during the site initial site study. It appears that gophers may compete for territory with other earth-moving species that densely populate portions of the subject property.

Abundant mountain beaver, vole, rabbit, and mole on the subject property contribute to extensive ground disturbance, creating burrows, tunnels, and mounds throughout the property. Extensive mountain beaver burrowing activity has been identified on site (**Appendix A—Photo 6 & 7**). Considerable mountain beaver earth-moving activity is obvious upon visual observation throughout the property. A burrow system may have as many as 10-30 entrances. The burrow of the mountain beaver is distinctive in part because of its large size, 5-8 inches in diameter with no plug, as plugs are found in a pocket gopher tunnel entrance (**Appendix A—Photo 6 & 7**). Soil disturbance from that of mountain beaver is distinctly different in visual appearance from that of the Mazama pocket gopher. However, the two may be indistinguishable to the less trained observer.

Abundant vole activity on the site was evident upon visual appearance of small open tunnel entrances, tunnels through dense grass, and thin tunnel ridges on the surfaced of the soil, indicating vole tunneling activity just below the surface. Rabbits were also identified on the subject property, creating burrows in brushy areas. Abundant mole mounds are identified on the property. Coyote diggings were common throughout the subject property, apparently digging up and preying upon the small burrowing mammals, including the Mazama pocket gopher. None of the soil-disturbing activity created by these other species should be confused with pocket gopher mounds.

Mounds characteristic of the Mazama pocket gopher can be intermixed with mole mounds, as mole mounds are identified by their "conical" shape, compared to gopher mounds that are

"crescent shaped". Mole mounds were found in higher densities around trees. Gopher and mole mounds may occur in close proximity to each other in some areas. However, moles have been observed to take over and replace gophers in some intermixed areas. We have observed moles replacing gophers in our experience studying the interspecies dynamics of gopher-mole interactions. In addition, we have observed that intensive coyote activity is evident in areas containing gopher mounds. Coyotes dig up the mounds and prey upon the gophers. Extensive coyote activity has been identified throughout the site.

Gopher Habitat Area

Gopher habitat areas have been defined by clusters of mounds characteristic of the Mazama pocket gopher. Based on the WDFW methodology as of 22 June 2007, a 20-meter diameter circle has been placed around any gopher mound believed to have been active in the foreseeable past (**Figure 2; Table 1**). Each mound is encompassed within a 20-meter in diameter (65.6 ft diameter or 314 m^2 circle) circle representing a resident gopher burrow system and accounting for juvenile dispersion justified thru the discussion below. Mounds that lie on the project property boundaries are included in count regardless of partiality. Any mounds bordering existing roadways are included in count if confirmed active in the foreseeable past.

Table 1. Gopher Habitat Area.

Gopher Habitat Circles (20-meter Diameter)	Area Per Circle (sf)	Total area of Gopher Habitat Circles	
		sf	Acres
12	3,382 sf	40,578	0.93

4.2 Analysis of Gopher Habitat

Marginal Mazama pocket gopher habitat occurs on the subject property. Whether habitat conditions occur on the site that would promote the continued existence of the Mazama pocket gopher is unknown. Vegetation on the property consists of European pasture grasses with areas containing Douglas fir stands. Himalayan blackberry and Scot's broom are quickly invading the site. These invasive plant species provide little or no habitat value for the Mazama pocket gopher. Native prairie plants cannot compete with the non-native invasive weeds. The invasive weeds eventually form a monoculture, displacing other plant species that provide greater pocket gopher habitat value. Soils are conducive for soil burrowing animals, such as the Mazama pocket gopher. However, good soils unfortunately provide excellent habitat for other small burrowing mammals, which may out-compete the Mazama pocket gopher in marginal gopher habitat.

Fragmented Populations

The Mazama pocket gopher population identified on the subject property is part of a fragmented population within the rapidly urbanizing areas of Tumwater. Habitat fragmentation leads to diminished gene flow and subsequent local extinction because of the isolated condition associated with fragmented population segments. A large contiguous habitat area would conceivably sustain this small population into the foreseeable future. Pocket gophers establish permanent territory where they may be relatively stationary for the

duration of their individual lives subsequent to juvenile dispersion. Gene flow depends on juvenile dispersion from their natal burrows in search of new territory.

The isolation of fragmented pocket gopher populations reduces gene-flow and disrupts the gopher life-cycle. The margins of poor, fragmented habitat confines juvenile dispersion within already established and vigorously defended adult gopher territory, seriously reducing the success of dispersion, gene flow, and thus, propagation of future generations.

The WDFW based preservation methodology takes gene flow into consideration by providing additional areas for juvenile dispersion. Habitat restoration would provide some habitat favorable to the Mazama pocket gopher with the intent of tipping the mole-gopher balance toward the gophers. Habitat restoration would provide resources for greater population density and allow the species to flourish into the foreseeable future.

One solution for overcoming the problem of fragmented habitat is to relocate surviving gophers from marginal habitat in urbanizing areas to large tracts of pristine or restored prairie habitat, allowing new pocket gopher populations to become established and flourish for continuing generations. By relocating the Mazama pocket gopher from isolated fragmented marginal habitat to a larger contiguous enhanced and maintained prairie habitat, this species has the opportunity for renewed vigor, establishing a stable equilibrium. This relocation strategy provides a permanent solution to the "quick fix" fragmented mitigation habitat patchwork.

Vegetation. Dominant vegetation on the site consists of Douglas fir, bracken fern, sword fern, and European pasture grasses, such as orchard grass and tall fescue, rather than native prairie vegetation. In comparison, prairie vegetation located at the Mima Mounds Natural Area Preserve contains: Idaho fescue (*Festuca idahoensis*), bent grass (*Agrostis diegoensis*), Henderson's shooting stars (*Dodecatheon hendersonii*) common camas (*Camassia quamash*), yarrow (*Achillea millefolium*), and violets (*Viola adunca*) (Anchor Environmental, LLC, 2003). Other prairie plants native to southwestern Washington but not identified on the site include slender cinquefoil (*Potentilla gracilis*), wild strawberry (*Fragaria virginiana*), wooly sunflower (*Eriophyllum lanatum var. lanatum*), Pacific wood-rush (*Luzula comosa*), long-stolon sedge (*Carex inops, Carex pensylvanica*), dune goldenrod (*Solidago spathulata var. neomexicana*), native oatgrass (*Danthonia spp.*), lomatium (*Lomatium utriculatum*), western buttercup (*Ranunculus occidentalis*), and grassy deathcamas (*Zigadenus venenosus*).

Soils. Soils on most of the site generally consist of a loose sandy loam, malleable for gopher excavations. However, this malleable soil also sustains abundant populations of other small burrowing mammals that compete for territory with the Mazama pocket gopher. Although the soils are good for the Mazama pocket gopher, the soils are excellent for gopher competitors. Evidence of abundant rabbit, vole, mountain beaver, and mole activity has been identified throughout the subject property. These species are competitors for burrowing space and other resources. Loose sandy loam also makes it easy for predators, such as the coyote, to dig up and prey upon gophers.

5.0 REGULATORY CONSIDERATIONS

The Mazama pocket gopher is a Federal Candidate Species and a State Threatened species. Federal listing of the Mazama pocket gopher under the Endangered Species Act (ESA) could occur in the near future. However, as a candidate species for listing under the ESA, the Mazama pocket gopher does not maintain the Federal protections afforded under the ESA. State Priority Species are typically protected by local jurisdictions under the wildlife habitat chapters of their critical area ordinances, which are required by the State Growth Management Act. Standards for protection vary, and are usually guided by a site-specific Habitat Management Protection Plan (HPP) that may include areas of preservation, habitat protection, habitat management and/or buffers around sensitive wildlife habitats. The WDFW sometimes also takes action directly to protect the Priority Species by exercising its authority under existing state codes.

The WDFW recently upgraded the listing of the Mazama pocket gopher from State Candidate to State Threatened species. No recovery plan is in place by the WDFW to protect this species under the new listing.

The City of Tumwater regulates habitats and species under its Fish and Wildlife Protection Ordinance (Chapter 16.32 of City Code). The purpose of the ordinance is the preservation and conservation (active management) of protected habitats and species, which specifically includes habitats and species identified on the PHS database. The ordinance specifies that when a protected habitat is located on a site to be developed, a Habitat Protection Plan shall be submitted by the permit applicant that analyzes the effects of proposed land use changes on the protected habitats and species. The plan is required to explain how the applicant will mitigate any adverse effects. The Tumwater ordinance also indicates that residential densities for sites containing protected wildlife areas shall be based on the provisions for the underlying zoning district. The ordinance does not require that all individuals of protected species be protected, but states that land use planning be sensitive to the priority of saving and protecting animal-rich environments within their preferred habitats and accustomed geographic distribution.

The City of Tumwater defines habitats to be protected under Tumwater Municipal Code Chapter 16.32.050(B) as habitats of sensitive species identified by the Washington State Department of Fish and Wildlife's (WDFW) 'Priority Habitats and Species' (PHS) database. The Mazama pocket gopher is listed as a State Priority Species by the WDFW PHS database. The City of Tumwater Municipal Code Chapter 16.32.090 requires that the Habitat Protection Plan addresses impacts and protection of the protected habitat located on the subject property. This report will describe existing conditions on the subject property including the general location of the Mazama pocket gopher habitat and use areas, potential development impacts, and proposed conservation and mitigation measures.

Approved for Duration of Project. This Habitat Management Plan (HMP) has been prepared to cover the entire duration of the project and all future development phases of the proposed project. The current proposal is for a commercial industrial park with associated road systems and open space. The first phase of the project involves subdividing the subject property into eight (8) lots that will occupy a space currently unused. Subsequent development on each of the eight (8) new lots will be determined by the future buyer or lease holder on the lot. With the approval of this plan, the Habitat Management Plan (HMP) shall cover the proposed project as described in this report, as well as the future development on the eight (8) subdivided lots.

6.0 PROPOSED PROJECT

This section describes the proposed project and possible impacts to the environment and listed species. Short-term development impacts, direct construction impacts, long-term operational impacts, and species impacts will be addressed in this section.

6.1 Project Description

The proposed project consists of a commercial industrial park with associated road systems and open space (**Figure 3**). The proposed project has been named Tilley Road Industrial Park. The project plan involves the development of eight (8) lots that will occupy a space currently unused. Project impacts are discussed in more detail below.

Future phases of development would almost fully utilize the subject property. Buildings would have associated parking areas. Mitigation would be proposed based on Section 7 of this report in preparation of future development phases.

6.2 Development Impacts

Avoidance
Because this project will be proposed in phases, the habitat circles will be avoided for the maximum time practicable. The majority of the gopher mounds located on the subject property occur in the Tilley road right-of-way. These mounds are not included in the plan because they are located off-site. After construction, the majority of the Tilley Road right-of-way will be restored to its original condition, providing habitat for the gophers. Two gopher habitat circles (~6,760 sf) will be avoided. These two mound clusters are located in the tree preservation and replacement area. Although they are preserved, the area would be mitigated because trees are expected to fill in this area eventually.

Minimization
We have recommended that gopher habitat is preserved in one large contiguous area of gopher-preferred soils and grasses. Another recommended conservation measure to minimize impacts is to increase our gopher habitat circle from the original 10-meters in diameter originally proposed by the WDFW to a much larger 20-meter in diameter, taking into account juvenile dispersion.

Gopher Habitat Replacement and Enhancement

Replace lost 20-meter in diameter habitat circle area with an enhanced habitat at a 2:1 replacement ratio. Enhancement of existing poor quality habitat would provide additional resources, refuge, and niche space required for a sustainable and growing gopher population. This plan enhances 81,157 sf of potential habitat in a large contiguous tract, which also provides landscape linkages to off-site potential gopher habitat, allowing the opportunity for increased gopher density by improving gopher habitat. Development impacts and enhancements to gopher habitat are summarized in **Table 2**.

Table 2 Development Impacts

See Figure 3							
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	40,579	0.93	12	40,579	0.93	81,157	1.86
• Avoid habitat impacts to the greatest amount practicable in the early phases of development • Minimize impacts by preserving a large contiguous area for gopher reserve and by increasing our gopher habitat circle from 10 meters in diameter to 20 meters in diameter.							
Proposed future gopher relocation: • Relocate gophers off-site with approval from the WDFW							

6.3 Operational and Indirect Impacts

Some impacts would occur generated by routine human activities, such as lawn maintenance, landscaping, and trapping nuisance animals that create mound systems in lawn. Some noise and human activity would occur during routine daytime operations that could disturb the Mazama pocket gopher.

7.0 MITIGATION

7.1 Impact Avoidance and Minimization

See discussion above in Section 6.2

7.2 Preservation and Enhancement Strategy

Replace lost 20-meter in diameter habitat circle area with an enhanced habitat at a 2:1 replacement ratio. Enhancement of existing poor quality habitat would provide additional resources, refuge, and niche space required for a sustainable and growing gopher population. This plan enhances 81,157 sf of potential habitat in a large contiguous tract, which also provides landscape linkages to off-site potential gopher habitat, allowing the opportunity for increased gopher density by improving gopher habitat. Development impacts and enhancements to gopher habitat are summarized in **Table 2**.

Replace lost poor quality habitat area with an enhanced habitat at the 2:1 ratio required by WDFW to promote a stable and increasing population. This plan has been prepared to preserve and enhance gopher habitat on the subject property, while preserving the intent and goal of the proposed land use (**Figure 3**).

Site Plan

This plan preserves and enhances contiguous habitat strips where gophers often produce abundant mound formations (**Appendix A; Photos, 3, 4, 5, 18, 19, 20, & 21**). Within the road right-of-way between Tilly Road and the Sidewalk, gopher mounds are abundant (**Appendix A; Photo 5**). It appears that the Mazama pocket gopher flourishes at edges of sidewalks and road and at maintained strips of vegetation between roads and sidewalks (**Appendix A; Photos, 3, 4, 5, 18, 19, 20, & 21**. The plan would maintain this habitat type where gophers appear to flourish. The mitigation plan preserves and enhances this habitat type for the continued existence of the Mazama pocket gopher.

Table 3 summarizes both the Washington Department of Fish and Wildlife (WDFW) management recommendations (Larsen and Morgan, 1998) to protect the Mazama pocket gopher and the mitigation strategy of this project.

Table 3. Summary of DFW PHS Recommendations and Project Mitigation Strategy

#	WDFW PHS Recommendation	Mitigation Strategy
1)	Elimination of invading non-prairie shrubs and trees, especially conifers	Eliminate invading non-prairie shrubs and trees, especially conifers, through periodic mowing
2)	Preservation of open areas with uncompacted, dry soils	Restoration and preservation of open area with mostly uncompacted, dry soils
3)	Avoidance of frequent plowing (infrequent plowing enhances gopher habitat),	Avoidance of frequent plowing
4)	Restriction of herbicides	Restriction of herbicides in mitigation area
5)	Installation of native species of vegetation palatable to Mazama pocket gopher	Installation of native species of grasses palatable to Mazama pocket gopher

WDFW PHS management recommendations will be incorporated into this mitigation strategy. The goal of the mitigation strategy consists of 1) restoring Mazama pocket gopher habitat and 2) restoring and preserving areas of open space.

This will be achieved by 1) elimination of invading non-prairie shrubs and trees, especially Scot's broom, through periodic mowing, 2) restoration and preservation of open area with mostly uncompacted, dry soils 3) avoidance of frequent plowing, 4) restriction of the use of

herbicides in the mitigation area, and 5) seed species of native grasses palatable to the Mazama pocket gopher.

7.2.1 Restoring Prairie Landscape

The mitigation strategy is to: 1) seed this area with native prairie grasses to encourage the restoration of prairie habitat and 2) periodically mow to eliminate invading non-prairie shrubs and trees, especially Scot's broom. Mowing would occur in autumn after prairie plants have dropped their seeds. Mowing would aid in the elimination of invading shrubs and trees and stimulate new growth of prairie vegetation. Mowing up to 4 times per year will allow the installed native prairie grasses to flourish.

7.2.2 Plantings

The grass species used in the mitigation plan were chosen for a variety of qualities, including: nativity to western Washington prairies, adaptation to site-specific environmental characteristics, ability to compete with aggressive non-native pasture species, value to the Mazama pocket gopher, value as wildlife habitat, pattern of growth, and aesthetic qualities. It is anticipated that the prairie area restored on the site will require maintenance to eliminate invading shrubs and trees through periodic mowing.

Native grass species were chosen to increase both the structural and species diversity of the mitigation areas, thereby increasing the area's value to the Mazama pocket gopher and other wildlife for food and cover. Species of vegetation that are both beneficial to the Mazama pocket gopher and other wildlife and competitive to non-native pasture grasses is desired. Plant materials will consist of native grass seed mixes. If plant species for installation listed in **Table 4** are not readily available as nursery stock during the mitigation planting period, other available plant species that are similar in composition and characteristics will be installed in their place.

The natural recruitment of prairie plant species from surrounding habitats are may establish initial populations of prairie plant species and a seed bank.

Table 4. Mitigation Plant List

Common Name	Scientific Name	Plants
NATIVE PRAIRIE GRASSES		
Idaho fescue	*Festuca idahoensis*	Seed
Bent grass	*Agrostis diegoensis*	Seed
Pacific wood-rush	*Luzula comosa*	Seed
Long-stolon sedge	*Carex inops, Carex pensylvanica*	Seed
Native oatgrass	*Danthonia spp.*	Seed
If plant species listed for installation are not readily available as nursery stock during the mitigation planting period, other available plant species that are similar in composition and characteristics will be installed in their place.		

7.3 Monitoring and Maintenance

Monitoring Methodology

The monitoring program will be conducted for a period of three years in the mitigation area. A baseline assessment will be performed prior to enhancement. Monitoring events will be completed three times per year as follows:

- At the time of relocation, record baseline conditions.
- Several times the first year to count newly-formed mound formations in test plots or along transects.
- Once per month for the Second and third year count newly-formed mound formations in test plots or along transects.

Monitoring will evaluate pocket gopher establishment, condition of habitat quality, and habitat usage in the enhancement area. If gopher relocation objectives are met at an earlier date, the applicant may request to end the monitoring phase earlier.

Monitoring Gopher Mounds

Permanent pocket gopher mound sampling points or transects will be established at the enhancement site. The same monitoring point will be re-visited throughout the monitoring period. Numbers of newly-formed gopher mounds will be recorded. General plant health, percent survival, and plant species occurrence (including volunteer species) will also be recorded. Qualified personnel will conduct all monitoring.

Photo-points will be established from which photographs will be taken throughout the monitoring period. These photographs will document general appearance and progress of gopher establishment in the enhancement area. Review of the photos over time will provide a semi-quantitative representation of success of the enhancement plan.

Monitoring and photo-point locations will be recorded to keep a record of gopher establishment in the enhancement area.

7.4 Goals and Objectives

Goal 1: Restore prairie preferred by the Mazama pocket gopher.

Objectives:

- Eliminate Scot's broom from gopher habitat to promote prairie habitat.
- Eliminate invading non-prairie shrubs and trees, especially Scot's broom, through periodic mowing.
- Restrict the use of herbicides in the mitigation area.
- Seed grass species palatable to Mazama pocket gopher.

8.0 ALTERNATIVE GOPHER ASSISTED COLONIZATION STRATEGY

This alternative plan involves the assisted colonization of this small population from this poor quality habitat to a protected area containing its preferred prairie habitat.

Small and isolated fragments of Mazama pocket gopher populations risk local extinction. The WDFW has been approving on-site set-aside areas as a short-term gopher mitigation strategy. Although this strategy may provide some immediate on-site, in-kind habitat patch for short-term gopher survival on a small scale, the strategy has created a fragmented patchwork of isolated gopher sub-populations. This fragmented patchwork of habitat areas does not provide the natural gene flow necessary for an overall sustained and healthy species population at the landscape level. As commercial and high density zoning allows for the continued urbanization of potential and historical gopher habitat, new large and contiguous habitat areas have to be preserved and created for the continued existence of this species.

Off-site Gopher Assisted Colonization Strategy

The gopher assisted colonization strategy involves relocating on-site gophers to an off-site preferred prairie habitat or a property that would be restored to prairie habitat. This strategy has been devised to save the small population of on-site gophers from decreased gene flow. Off-site relocation would provide breeding stock for new populations to aid in the recovery of this State Threatened species from its depleted population size. The on-site population would be relocated as breeding stock to a site or sites approved by the Washington Department of Fish and Wildlife (WDFW). One such site where the Mazama pocket gopher has been relocated is Wolf Heaven. The WDFW has relocated a Mazama pocket gopher population to Wolf Heaven.

Other possible relocation sites may be available, such as

1) West Rocky Prairie,
2) The new WDFW acquisition along Beaver Creek, between Old 99 and Tilley road,
3) Glacial Heritage County Park property, on the west side of the Black River,
4) Mima Prairie area on the west side of the Black River.

Site Preparation

Site preparation is essential for relocation success. My experience with red-tailed hawk and burrowing owl relocation efforts suggests that site preparation is an essential component for relocation success.

Gopher Relocation Methodology

A detailed field investigation of the Mazama pocket gopher will occur in the relocation area to evaluate individual survival and reproduction. PE Consultants LLC has successfully live trapped the Mazama pocket gopher as part of research projects to determine gopher presence or absence on various properties.

Live traps will be field located and mapped through GPS points. Sherman Box Traps measuring 12 inches in length, 3 1/8 inches in width, and 3 5/8 inches in height will be

distributed throughout the site in locations of newly formed gopher mounds. Fresh mounds are determined by dark, recently dug up soil. These newly formed gopher mounds will be excavated to expose the main runway. A pair (2) of traps will be installed in lateral within the main runway under an individual newly created mound to catch the gopher coming from either direction. Traps will be then covered with black plastic to seal off air exposure and to block penetrating light before backfilling the excavated hole with topsoil. Traps will be checked within 4 hours of installation to minimize stress to the animal.

The transport of the Mazama pocket gopher will occur based on recommendations of the WDFW. PE Consultants LLC will work very closely with the WDFW to ensure a successful gopher rescue project, aiding in the recovery of the species.

9.0 CONCLUSION

The mitigation measures proposed in this Habitat Protection Plan meet the City of Tumwater Code (Chapter 16.32) mitigation standards designed to maintain the functional values of critical areas by offsetting potential unavoidable impacts. With Mazama pocket gopher enhancement plan, the Tilley Road Industrial Park project would not significantly impact the continued survival of this State Threatened species. Preservation and enhancement efforts will be implemented to protect this small isolated population from ultimate local extinction. Currently, the gopher population is not intensely utilizing the entire property as habitat because of the poor habitat conditions. We plan on working very closely with the WDFW in order to ensure the greatest success of this Mazama pocket gopher Habitat Protection Plan.

We have provided two (2) alternative mitigation strategies. The first strategy involves on-site and in-kind mitigation setback. We have also provided a more permanent mitigation strategy to protect the Mazama pocket gopher into the foreseeable future. This strategy involves the relocation of the species to a preferred prairie habitat or a property that can be restored to prairie habitat.

Approved for Duration of Project. This Habitat Management Plan (HMP) has been prepared to cover the entire duration of the project and all future development phases of the proposed project. The current proposal is for a commercial industrial park with associated road systems and open space. The first phase of the project involves subdividing the subject property into eight (8) lots that will occupy a space currently unused. Subsequent development on each of the eight (8) new lots will be determined by the future buyer or lease holder on the lot. With the approval of this plan, the Habitat Management Plan (HMP) shall cover the proposed project as described in this report, as well as the future development on the eight (8) subdivided lots.

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FIGURES

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Figure 1

Tilly Road Industrial Park Property

Vicinity Map

Scale: 1" = 1500'

0 1500'

24 November 2008

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▲ Mound Survey (20 Oct 08)
▣ Mound in Right-of-way (20 Oct 08)
△ Mound Survey (Jan-June 08)
▣ Mound in Right-of-way (Jan-June 08)
20m Gopher Habitat Circle

			2:1 Mitigation Ratio	
20-meter Habitat Circles	Total Area sf	Acres	sf	Acre
12	40,578.96	0.93156474	81,157.92	1.863129

Figure 2

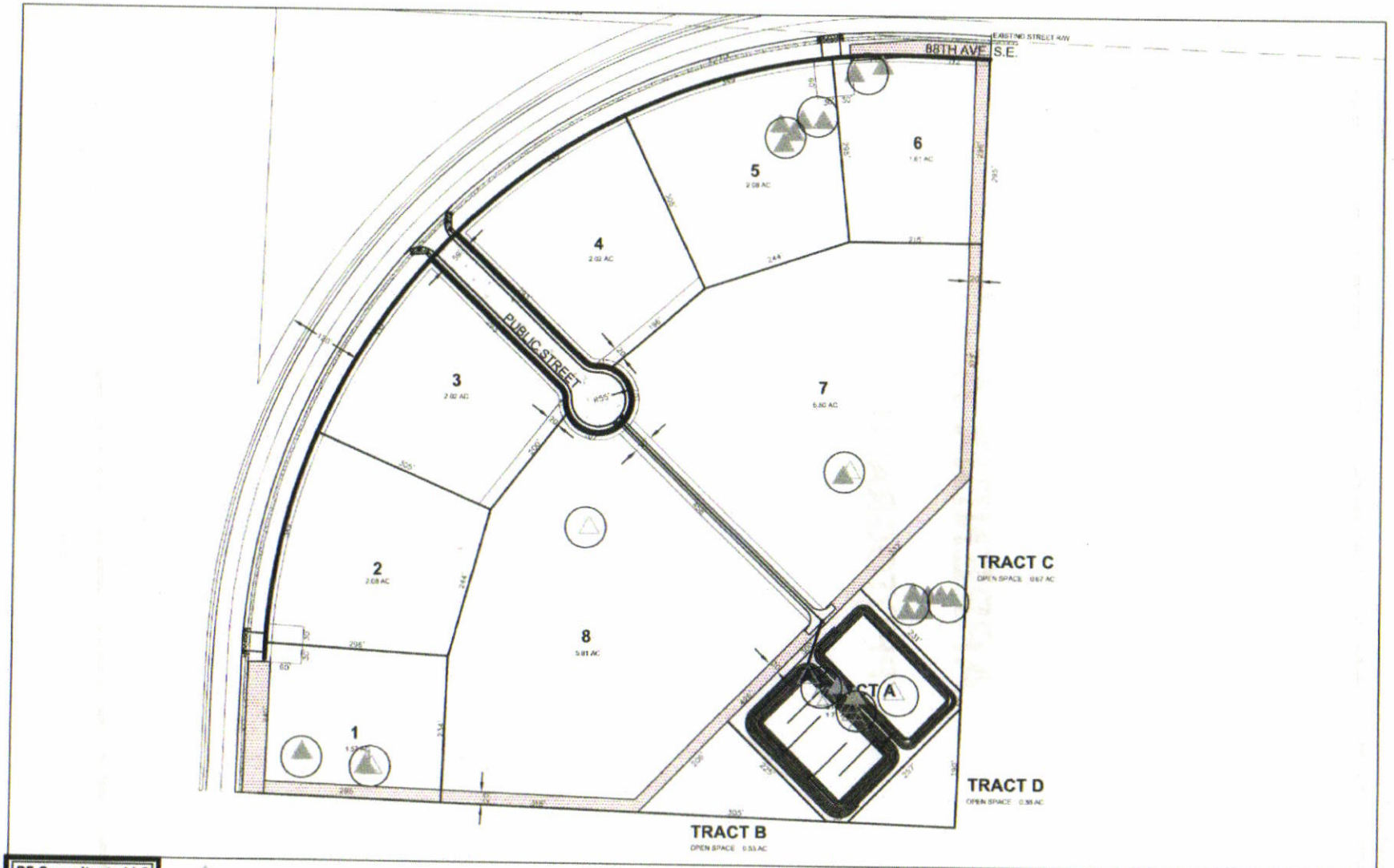
Tilly Road Industrial Park Property

Existing Conditions

Scale: 1" = 220'

0 220'

24 November 2008



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Gopher Mound Clusters (20 Oct 08)

Gopher Mound Clusters (Jan-June 08)

Gopher Mitigation Area (1.86 acres)

20m Gopher Habitat Circle

Mitigation Area
Impact 0.93 acre
2:1 Replacement Ratio
Enhance Preservation Area

20-meter Habitat Circles	Total Area sf	Acres	sf	Acre
12	40,578.96	0.93156474	81,157.92	1.863129

Figure 3

Tilly Road
Industrial Park
Gopher Mitigation Plan

Scale: 1" = 220'

0 220'

24 November 2008

APPENDIX A

PHOTOGRAPHS

Photo1 On-site dumping present

Photo 2 Dumping occurred in and around forested area

Photo 3 Trees saturate a large portion of the property

Photo 4 Small clearings consisting dominantly of Salal

Photo5 Gopher mound at sidewalk

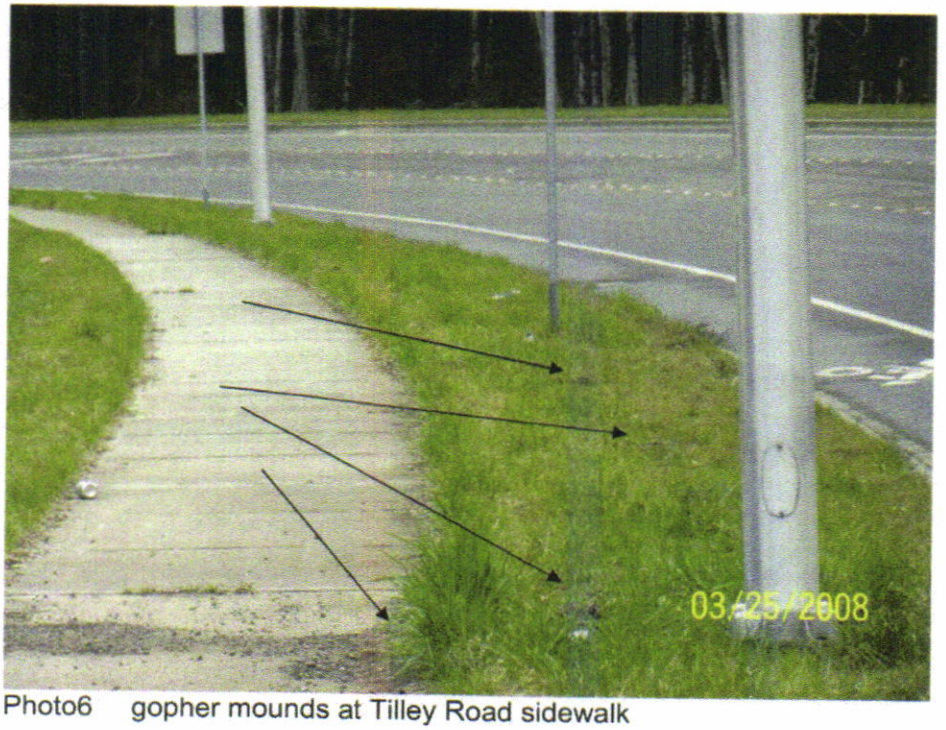


Photo6 gopher mounds at Tilley Road sidewalk

Photo7 gopher mounds at Tilley Road sidewalk

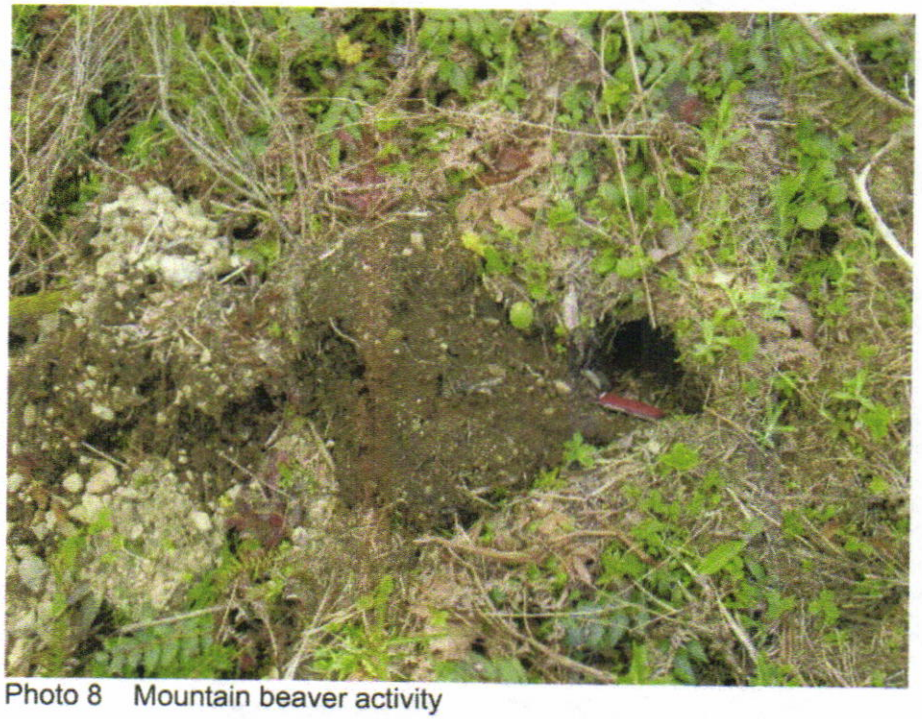


Photo 8 Mountain beaver activity

Photo 9 Mountain beaver activity

Photo 10 Ant Mound onsite

Photo11 Mountain beaver mound

Photo 12 Mountain beaver mound

Photo 13 Mountain beaver tunnel

Photo 14 Mountain beaver entrance

Photo 15 Mountain beaver mound & multiple entrances

Photo 16 Mountain beaver mound

Photo 17 Vole tunnel entrance

Photo 18 Mountain beaver entrance

Photo 19 Vole entrance

Photo 20 Mountain beaver mound

Photo 21 Mountain beaver mound

Photo 22 Gopher Mounds adjacent to sidewalk.

Photo 23 Gopher mound between sidewalk and street

Photo 24 Gopher mound between sidewalk and street

Photo 25 Gopher mound between sidewalk and street

APPENDIX B

GOPHER BIOLOGY

MAZAMA POCKET GOPHER BIOLOGY& MOUND IDENTIFICATION

This section describes the Mazama pocket gopher biology, including feeding habits, tunnels, dispersion, range, density, and population dynamics.

Mazama Pocket Gopher Biology

Species Description. Mazama pocket gophers are small (body ~5.5 in) fossorial (live in underground burrows) rodents with short-necked stocky bodies, narrow hips, and short legs (See photo of Mazama pocket gopher in **Appendix A**). They have cheek pouches that open on the sides of their mouth, which can be turned inside out like pants pockets, and are used for transporting food. They have small ears and small bead-like eyes. Their front feet are equipped with strong claws and their digits and palms are bordered with a fringe of stiff bristles (Verts and Carraway, 1998). Their tails are short (~2.5 in) and nearly naked. *T. mazama* is a relatively small pocket gopher, smaller than the species commonly found in eastern Washington. Male *T. mazama* average 10 – 20% heavier and 5% longer than the females.

Moles (family *Talpidae*), in contrast, are insectivores and lack the prominent gnawing teeth exhibited by pocket gophers and other rodents. Moles also have a pointed snout and front claws that differ substantially from pocket gophers. Since both moles and pocket gophers are seldom seen above-ground, most people only see the evidence of their digging.

Species Diet and Foraging. Pocket gophers eat a wide variety of both roots and above-ground plant parts. *T. mazama* is particularly fond of bulbs, such as wild onion and wild garlic, and also eat clover (*Trifolium* spp.), lupines (*Lupinus* spp.), false dandelions (presumably *Hypochaerus radicata*), and grasses. *T. mazama* forages in the evening on the surface close to their burrows (Stinson, 2005). Food caches consist of roots of cat's ear (*Hypochaeris radiata*), Gairdner's yampah (*Perideridia gairdneri*), bracken fern (*Pteridium aquilinum*), camas bulbs (Scheffer, 1995), and quackgrass (*Agropyron repens*).

Feeding preferences seemed to change with availability, but the most succulent plants available are the most preferred (Stinson, 2005). The annual diet of *T. mazama* consisted of aboveground parts of forbs and grasses (40% and 32%, respectively) and 24% roots (Stinson, 2005). The diet of *T. mazama* consists of 60% grasses in the winter and 16.6% grasses in the summer (Verts and Carraway, 2000). Forbs are the preferred forage when in season during the summer months. Woody plants make up 6% of the diet of *T. mazama* in the winter and 1.6 % in the summer. During July, when all forbs were most abundant, pocket gophers prefer forbs over grasses. In a fallow field and a Christmas tree farm in western Washington, food cache chambers usually contained a single type of root, often thistles (*Cirsium spp.)* or Scotch broom (Witmer *et al.*, 1996). Scotch broom is probably not a preferred food, since gophers are absent where Scotch broom is abundant (Steinberg, 1996a). Dandelions can consist of 94% of the pocket gophers' diet if available (Keith *et al.*, 1959; Laycock and Richardson, 1975).

Habitat requirements and Ecology. Mazama pocket gophers need open meadows, prairie, or grassland habitat with friable soils that are not too rocky. In general pocket gophers prefer light-textured, porous, well-drained soils, and do not occur in peat or heavy clay soils (Chase *et al.*, 1982). Gophers tend to favor areas with deeper soils (Baker *et al.*, 2003). The highest gopher densities occur in sites with dark-colored, light-textured soils vegetated with grasses and forbs, especially succulent forbs with underground storage structures. The availability of forbs may provide nutrients important for gopher growth and reproduction.

Mazama pocket gophers in Washington occur primarily on grasslands of the glacial outwash plain (Dalquest, 1948). Occupied sites in Washington include airport margins, fallow fields, Christmas tree farms, airport margins, fallow fields, Christmas tree farms, and occasionally in clearcuts. Provided a source population is available, Mazama pocket gophers may invade an area when the forest cover has been removed; as grass and forbs increase gophers can become abundant for a few years unless or until the area regenerates to forest (Stinson, 2005). This is what we found on the properties located west of the subject property. The Mazama pocket gopher invaded neighboring properties when land had been cleared of forest for pasture.

Pocket gophers require malleable soils to excavate tunnels. During the summer months when soils are dry, new tunnels tend to cave in, so tunnel and mound building activity is much reduced during the summer season. This is analogous to building a sand castle using dry sand. Rain moistens the soils, making the soil structure more amenable for tunneling. The best digging conditions occur when the soil moisture is at 10 to 20 percent (Stinson, 2005). During our 2 years of field studies, we have observed a greater frequency of mound building activities during or following rain events.

Pocket gopher populations are reported to undergo occasional extreme fluctuations (Case *et al.*, 1982) and are characterized by local extinction and re-colonization (Baker *et al.* 2003). Territoriality and extreme weather may influence pocket gopher populations more than any other factors. Pocket gophers are not long-lived and many live only to one year. Research has concluded that the maximum age reached by the Mazama pocket gopher is 4 to 5 years with an average of 2 years, although many in the studies did not survive longer than one year (Stinson, 2005).

Mound Identification

Gopher mounds can be distinguished from mole mounds by their shape and observable characteristics (**Table 1**; see photo of mounds in **Appendix A**). Pocket gopher mounds are generally crescent or kidney-shaped and made of finely sifted and cloddy soil (**Illustration 1 & 3**). Pocket gopher mounds are often built in a line, whereas moles leave more randomly placed mounds. Moles form conical or volcano-shaped mounds that are often made up of larger clods of soil in contract to the finely sifted pocket gopher mound (**Illustration 1 & 2**). The mole mounds are pushed up from the deep tunnels and may be 2 to 24 inches (5 to 60 cm) tall. The entrance to the pocket gopher tunnel extends generally 5 to 10 inches of the surface to the main tunnel that extends laterally in both directions.

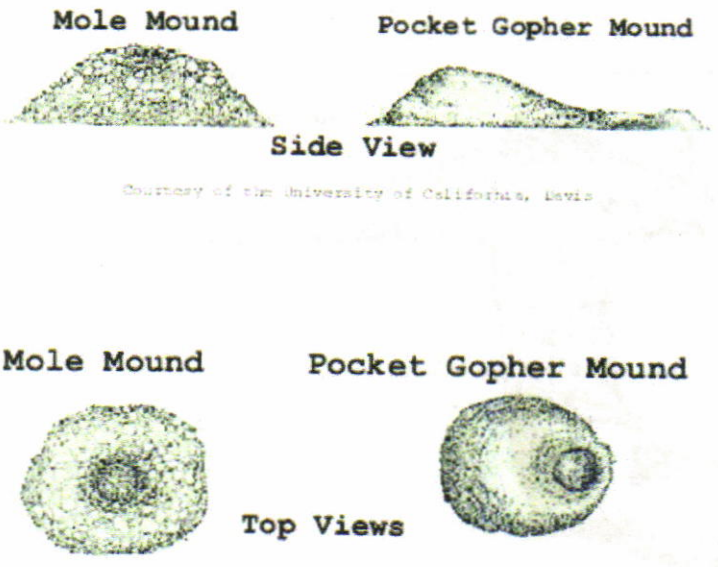


Illustration 1. Aerial and side view of pocket gopher verses mole mounds

Table 1. Pocket gopher verses mole mound.

Mound Feature	Mole	Pocket Gopher
Runways	Surface tunnels, 1 to 4 inches below the surface, connect with deeper runways located 3 to 12 inches below the surface, but may be as deep as 40 inches. Subterranean hunting paths are about 1.25 to 1.5 inches (3.2 to 3.8 cm) in diameter.	Tunnels are 3.8 to 4.4 cm in diameter, 10-15 cm below the ground, nest 90 cm in depth.
Dimension of Mounds	Excavated materials are piled in roughly circular mounds that are 6 to 24 inches in diameter and 2 to 8 inches high.	Mounds of soil are about 10-inch or greater diameter.
Shape of Mounds	circular or conical-shaped mounds	Crescent-or kidney-shaped
Aerial view	Mounds are round when viewed from above.	Mounds are crescent- or kidney-shaped when viewed from above.
Soil Plug	Soil plug is in the middle of mound and may not be distinct.	Soil plug is in the middle of the V shape or off to the side of the mound and may leave a visible depression. 1-3-inch soil plug.
Raised ridge	Tunnels are often just beneath the surface, leaving a raised ridge.	No tunnels are visible from above ground.
Distribution	Mounds are found in a line	Scattered

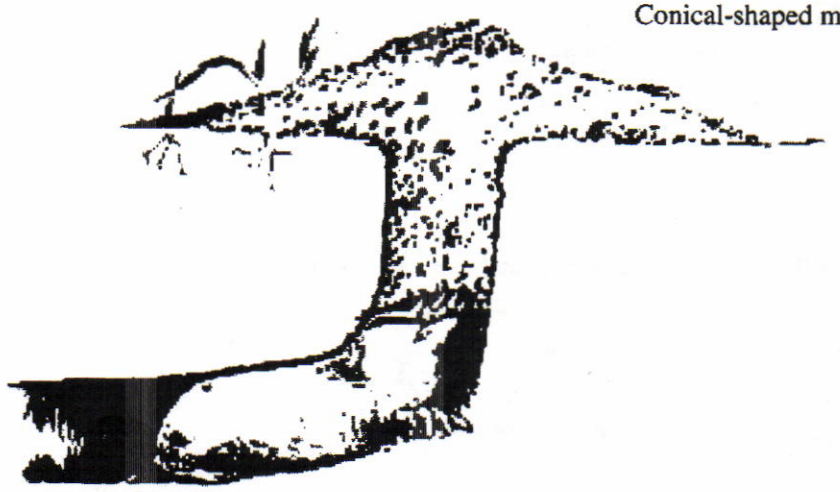


Illustration 2. Moles push dirt through vertical tunnels 2 to 24 inches to surface of ground.

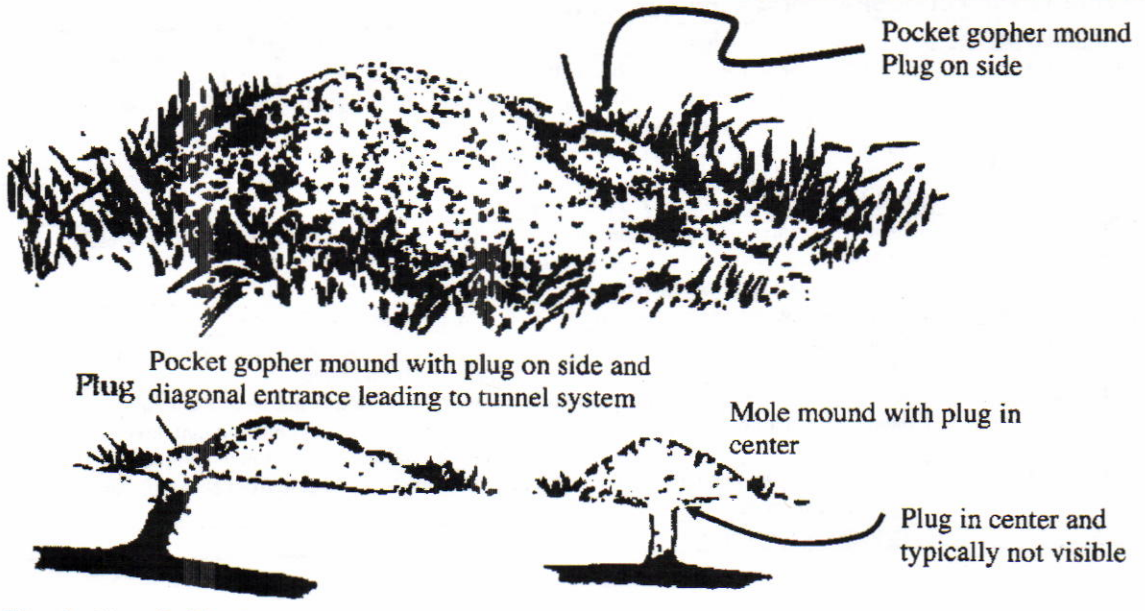


Illustration 3. Pocket gopher verses mole mounds.

Distribution and Dispersion

Distribution. Pocket gophers are found across most of the United States, with the exception of the northeastern states, and from central Alberta south to Panama (Chase *et al.*, 1982). Pocket gopher ranges generally do not overlap because one species will competitively exclude the other (Chase *et al.*, 1982; Verts and Carraway, 2000). They are usually not represented by more than one species at any one site. Mazama pocket gophers are restricted to western Washington, western Oregon, and a portion of northern California (Stinson, 2005).

Mazama pocket gophers are patchily distributed in open non-forested habitats in parts of western Washington (Stinson, 2005). Their center of abundance is on the south Puget Sound prairies of Pierce, Thurston, and Mason counties. The species is also found on subalpine meadows of the Olympic Mountains.

Home Range. Males and females both hold territory. The home range of males covers between 73 and 143 m^2 of area, while that of females covers 47 and 150 m^2 of area (Verts and Carraway, 2000) (**Illustration 4**). The area encompassing an individual's territory varies greatly, depending on the age of the gopher, resources available, suitable soil conditions, and other factors. Gophers are relatively solitary with exception during breeding season (October to June) when males and females can be found in the same tunnel system. *T. mazama* is polygynous in that males will mate with multiple females that enter the male's burrow system during breeding season. The larger size of males prevents them from entering the smaller burrow systems tunneled by females. Hence, females choose males by entering the male's burrow system (territory). An individual territory is sedentary once established. Territories are clustered in preferred areas favored for bountiful resources and suitable environmental factors. The close proximity of individual territories forming a colony allows for breeding success and for re-occupying abandoned tunnel systems. Field studies performed by PE Consultants LLC over the last several years has identified high use areas that resemble a colony of gophers, as well as some individual mounds formed in less desirable environmental conditions, presumably left by juveniles searching for individual territory.

Density. The Mazama pocket gopher averages 20 individual gophers per acre within a dense gopher colony (Stinson, 2005). Other studies estimated approximately 11 individual gophers per acre (Smallwood and Morrison, 1999). The larger the study area, density tends to decrease because the gophers tend to cluster in high density colonies. Smallwood and Morrison (1999) pointed out that the conventional study method is to estimate density for a dense cluster of gophers (colony); as the study plot size is increased, more gopher-free area is included and estimated density decreases.

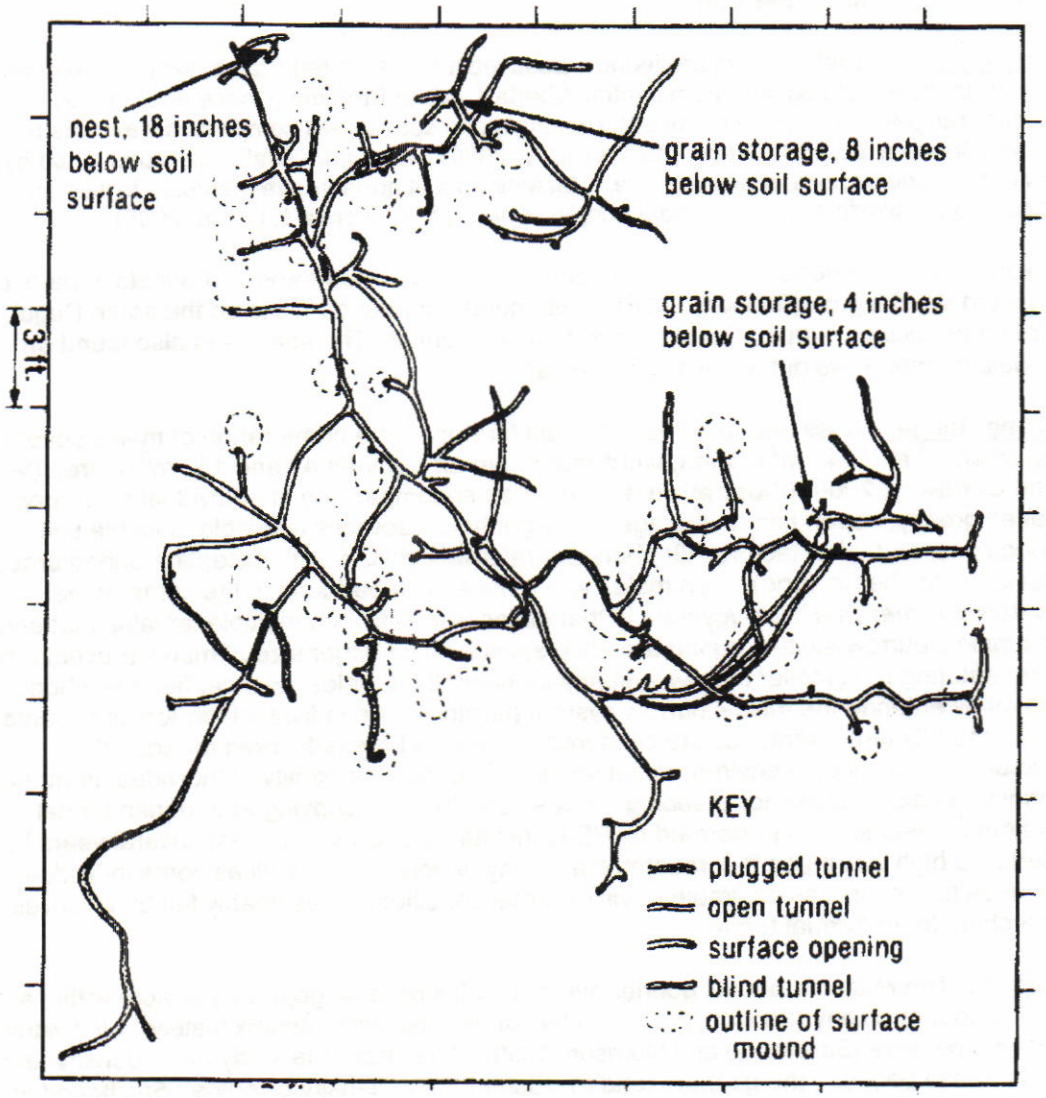


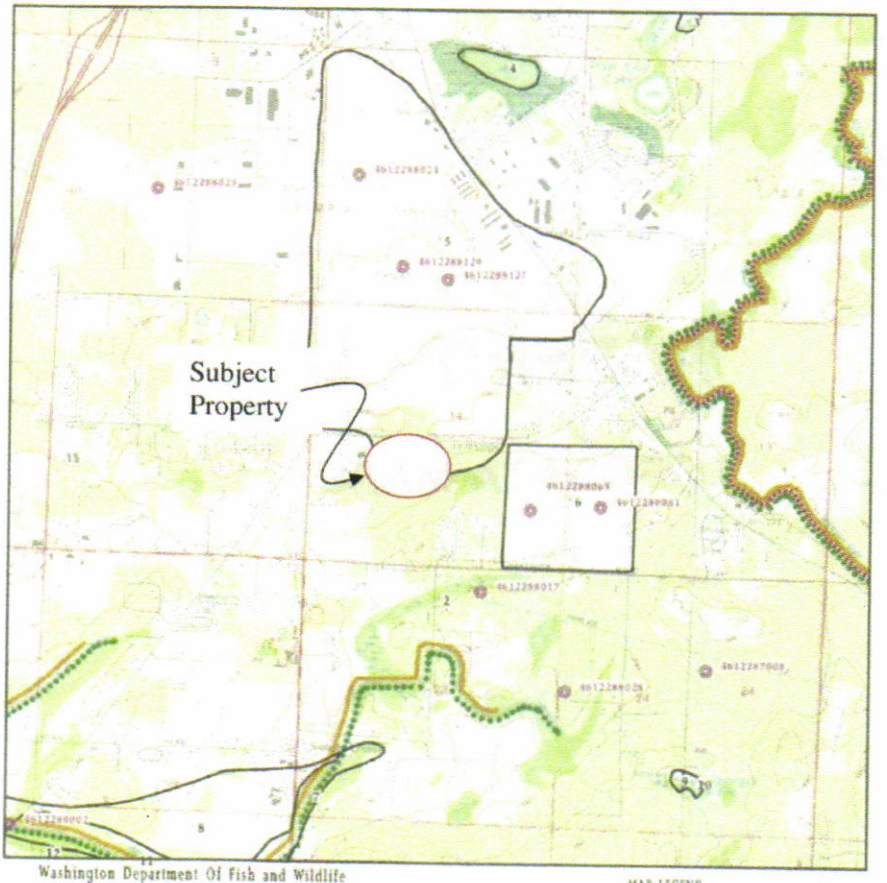
Illustration 4. Mazama pocket gopher mound and tunnel complex.

Juvenile Dispersion. Females produce an annual average litter size of 5 offspring during the October to June breeding season (University of Michigan Museum of Zoology, http://animaldiversity.ummz.umish.edu/site/accounts/informational/thomomys_mazama.htm) . Gestation takes 1 month and then shortly after, the juveniles leave their natal brooding chamber to seek their own territory. The gopher's relatively short lifespan creates an urgency to find territory and reproduce. Individuals with the best territory presumably have a better mating success, resulting in a clustering of territories that comprise the colony. Pocket gophers reach sexual maturity within one season and the average life span extends only 2 years (Maximum life span 5 yrs for males & 4 yrs for females).

Juvenile pocket gophers can wander from the natal burrow system almost 1000 feet in search of individual territory. Daly and Patton (1990) reported that vacant habitat within a few hundred meters is rapidly colonized. They further reported that 20% of juveniles wandered 120 to 300 feet of their natal territory. About half of that percentage moved up to 1000 feet or more of their natal territory. Juvenile pocket gophers disperse above ground from their natal burrows (Chase *et al.*, 1982). Most gophers that disperse far from their home range are males, as typical in small rodents (Stinson, 2005). After several generations of these short-lived rodents (within several years), dispersion could extend a mile or more from the original natal territory.

APPENDIX C

WDFW PHS DATABASE



Washington Department Of Fish and Wildlife

HABITATS AND SPECIES MAP

IN THE VICINITY OF T17R02W SECTION 14

MAP LEGEND

Priority Habitats/Species:

Other Habitats/Species:

Other Symbols:

AREA LOCATION

APPENDIX D

GEODATA MAPS


88TH AVE SE
UNNAMED PVT DRIVE
Cagey loamy sand
Nisqually loamy fine sand, 0 to 3 % slopes
Yelm fine sandy loam, 0 to 3% slopes
Everett very gravelly sandy loam, 0 to 3% slopes
0
612ft

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TUMWATER, WA 98501
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FAX 360/943-4375

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TUMWATER, WA 98512
360/754-4164
FAX 360/704-2093

POLICE DEPARTMENT
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OPERATIONS & MAINTENANCE
360/754-4151

MITIGATED DETERMINATION OF NON-SIGNIFICANCE (MDNS)
Tilley Road Industrial Plat - DSD-08-00027

Description of Proposal: The applicant is seeking preliminary plat approval to divide 26.58 acres zoned Light Industrial into 8 commercial/industrial lots, a storm water tract, a tree protection open space tract, and two open space tracts. The project will be served by City water and sewer utilities.

Proponent: Kaufman Development LLC, Attn: John Kaufman, 7711 Martin Way E., Olympia, WA 98516

Location of Proposal: The property is located at the southeast corner of 88th Avenue SE and Tilley Road SE, Tumwater. The site is in a portion of the NE ¼ of the SW ¼ of Section 14, Township 17 North, Range 2 West, Thurston County, Washington. Thurston County Tax Parcel 12714310400.

Lead agency: City of Tumwater, Community Development Department.
The lead agency for this proposal has determined that, as conditioned, it does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead-agency. This information is available to the public on request.

This MDNS assumes that the applicant will comply with all City ordinances and development standards governing the type of development proposed, including but not limited to, street standards, storm water standards, high groundwater hazard areas ordinance standards, water and sewer utility standards, critical areas ordinance standards, wetland protection standards, tree protection standards, zoning ordinance standards, land division ordinance standards, building and fire code standards, and level of service standards relating to traffic. These ordinances and standards provide mitigation of some of the adverse environmental impacts of the proposed development. If any such ordinances and standards are held not to apply to the proposed development, or if a variance or other exception to those regulations is sought by the applicant, the related environmental impacts should be re-evaluated to determine whether other mitigating measures are needed.

Conditions of Approval for mitigating environmental impacts:

1. Prior to final plat approval, the proponent shall either:
   a. Re-construct the Tumwater Boulevard interchange at I-5 to accommodate the traffic growth in accordance with the City of Tumwater 2007-2012 Capital Facilities Plan; or

b. Provide a voluntary traffic mitigation fee of $71,369 payable to the City of Tumwater. The mitigation amount for this improvement was calculated using the estimated project cost divided by the number of new trips through the interchange. This project is projected to distribute 23 trips through the interchange at $3,103 per trip.

2. Prior to final plat approval, the proponent shall either:
   a. Reconstruct the intersection of 93rd Avenue and Lathrop Industrial Drive in accordance with Thurston County's Capital Facilities Plan; or

   b. Provide a voluntary traffic mitigation fee of $2,356 to Thurston County. The mitigation amount for this improvement was calculated using the estimated project cost divided by the number of new trips through the intersection. This project is projected to distribute 6 trips through the intersection at $392.67 per trip.

3. Prior to final plat approval, the proponent shall either:
   a. Reconstruct the intersection of 93rd Avenue and Littlerock Road in accordance with Thurston County's Capital Facilities Plan; or

   b. Provide a voluntary traffic mitigation fee of $2,400 to Thurston County. The mitigation amount for this improvement was calculated using the estimated project cost divided by the number of new trips through the intersection. This project is projected to distribute 6 trips through the intersection at $400 per trip.

4. Prior to final plat approval, the proponent shall either:
   a. Construct widening, channelization and signal improvements to the 93rd Avenue interchange in accordance with the Washington State Department of Transportation (WSDOT) specifications; or

   b. Provide a voluntary traffic mitigation fee of $56,970 to WSDOT. The mitigation amount for this improvement was calculated using the estimated project cost divided by the number of new trips through the interchange. This project is projected to distribute 18 trips through the interchange at $3165 per trip.

This MDNS is issued under WAC 197-11-350; the lead-agency will not act on this proposal for 15 days from the date below. Comments must be submitted no later than April 13, 2011, by 5:00 p.m.

Date: March 29, 2011

Responsible Official: Michael Matlock, AICP, Community Development Director

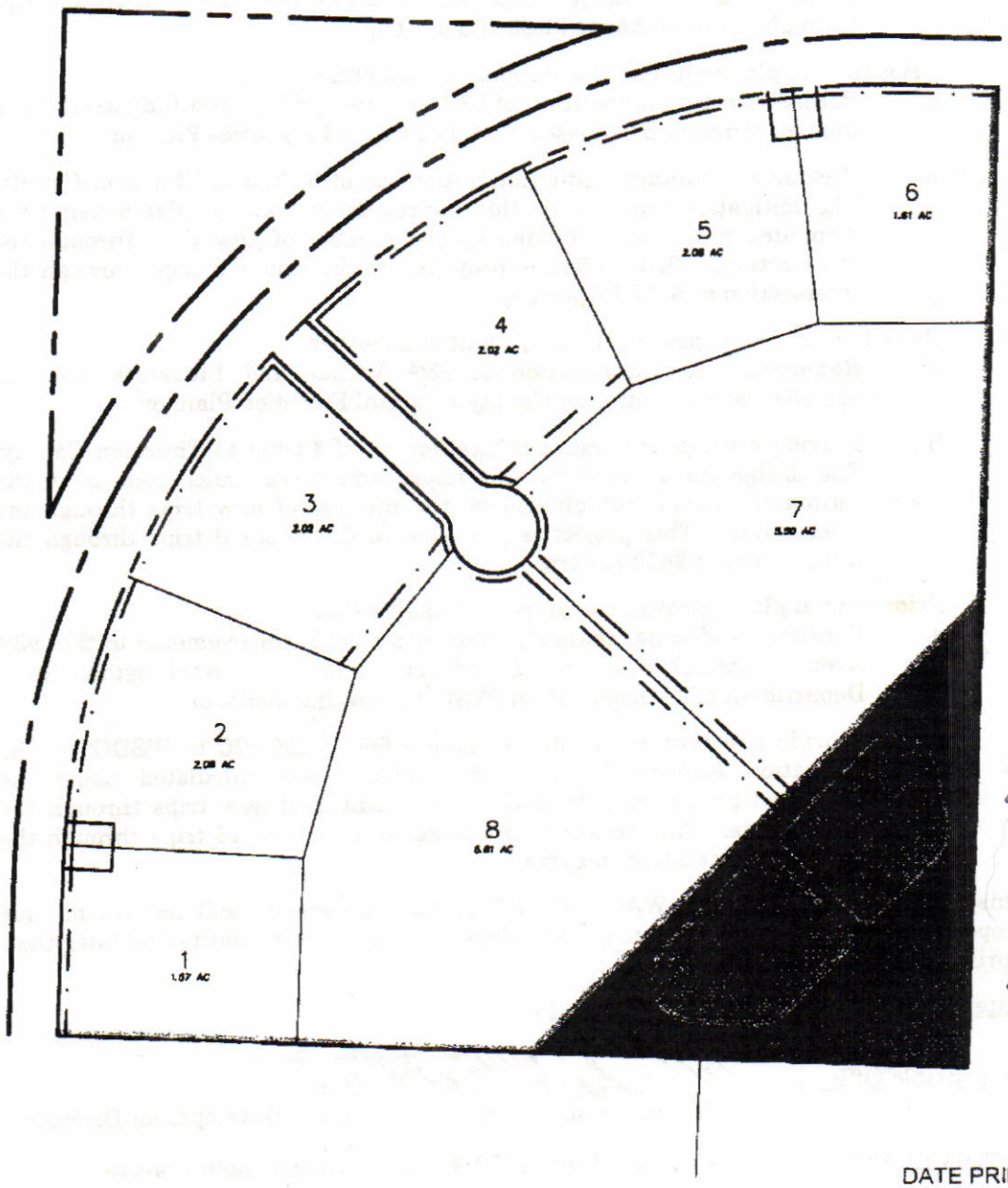
Contact Person: Chris Carlson, AICP, Permit Manager (360) 754-4180

Appeals of this MDNS must be made to the City of Tumwater Community Development Department, no later than April 19, 2011, by 5:00 p.m. All appeals shall be in writing, be signed by the appellant, be accompanied by a filing fee of $175, and set forth the specific basis for such appeal, error alleged and relief requested.

Tilley Rd 2.25ac set aside

KAUFMAN BROTHERS
CONSTRUCTION INC

7711 Martin Way East
Olympia, WA 98516
360.491.5230



← Stormwater pond 2.25ac

DATE PRINTED: 2/2/11

GOPHER HABITAT:

FIGURE #3

50 200'
0 100' 400'

TUMWATER COMMERCE INDUSTRIAL PARK
CITY OF TUMWATER, WASHINGTON

MAZAMA POCKET GOPHER
HABITAT PROTECTION PLAN

Prepared For:

KAUFMAN DEVELOPMENT LP
OLYMPIA, WA

Prepared By:

CURTIS WAMBACH, M.S., SENIOR BIOLOGIST
PACIFIC ENVIRONMENTAL CONSULTANTS L.L.C.
LACEY, WA

18 December 2005

HABITAT PROTECTION PLAN

MAZAMA POCKET GOPHER

For

TUMWATER COMMERCE INDUSTRIAL PARK

Prepared For:

KAUFMAN DEVELOPMENT LP
7711 MARTIN WAY E
OLYMPIA, WA, 98516

Prepared By:

Curtis Wambach
PACIFIC ENVIRONMENTAL CONSULTANTS L.L.C.
(360) 790-1559

18 December 2005

EXECUTIVE SUMMARY

Project Name: Tumwater Commerce Industrial Park

Site Location: The subject property is located at the southern end of Cabot Street SE, south of 88th Avenue SE, and north of 93rd Avenue SE, City of Tumwater, Thurston County, Washington in Section 13, Township 17 North, Range 02 West, Willamette Meridian

Project Staff: Curtis Wambach, M.S., Senior Biologist, President of Pacific Environmental Consultants LLC

Field Survey(s): The field investigation occurred between August and November 2004. A preliminary site investigation was conducted on August 21 and 22, 2004. An additional field reconnaissance was performed on 22 October 2005 to verify that field conditions have not changed.

Project Description: The proposed project consists of a 13-lot commercial subdivision with associated road systems and an open space tract.

Species and Habitat Information: The Mazama pocket gopher and marginal pocket gopher habitat occurs on the subject property.

Impacts and Mitigation:

Impacts	Size	Comments
Impacts	109,350 sf (2.51 acres)	Loss of active gopher habitat.
Mitigation	157,800 sf (3.62 acres)	Restore Prairie Habitat
Mitigation ratio 1.5:1		

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APPENDICES

1.0 INTRODUCTION

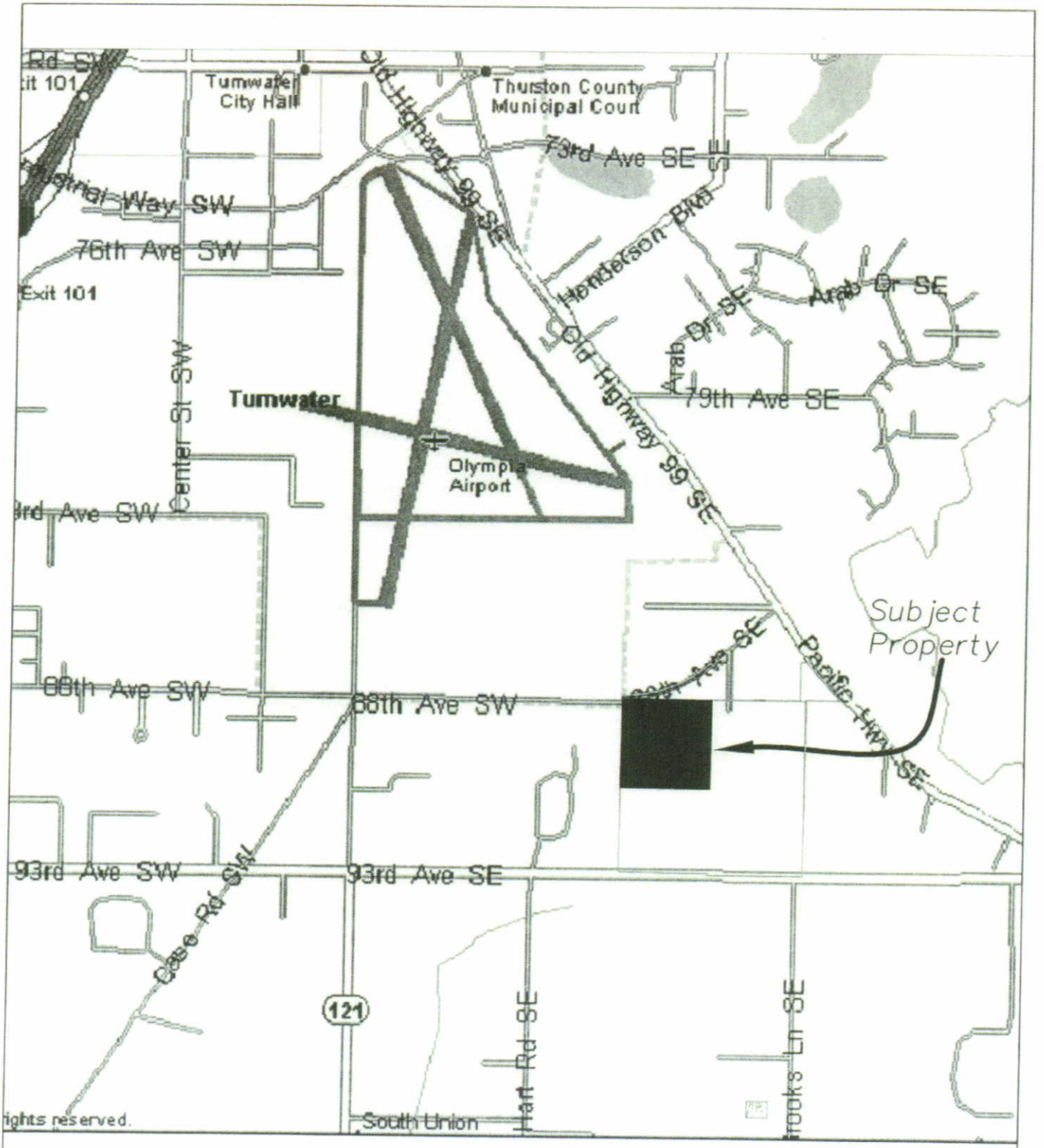
Purpose. The purpose of the project is to prepare a Habitat Protection Plan for the protection and management of the Mazama (Western) Pocket Gopher (*Thomomys Mazama*) and its habitat located on the Tumwater Commerce Industrial Park property. The City of Tumwater Municipal Code Chapter 16.32.090 requires the preparation and submittal of a Habitat Protection Plan by the permit applicant when a protected habitat is located on a site to be developed. The City of Tumwater defines habitats to be protected under Tumwater Municipal Code Chapter 16.32.050(B) as habitats of sensitive species identified by the Washington State Department of Fish and Wildlife's (WDFW) 'Priority Habitats and Species' (PHS) database. The Mazama pocket gopher is listed as a State Priority Species by the WDFW PHS database, as well as a Federal Candidate Species for listing under the Endangered Species Act (ESA). The City of Tumwater Municipal Code Chapter 16.32.090 requires that the Habitat Protection Plan addresses impacts on and preservation of the protected habitat located on the subject property. This report will describe existing conditions on the subject property including the general location of the Mazama pocket gopher habitat and use areas, potential development impacts, proposed conservation and mitigation measures, and landscape linkages to promote a sustainable and genetically viable on-site population.

Meeting City Requirements. Curtis Wambach of Pacific Environmental Consultants LLC has prepared this Habitat Protection Plan (HPP) in accordance with Tumwater Municipal Code Chapter 16.32 to evaluate the presence of the particular important habitat or species, and the likelihood that the particular important habitat or species will maintain or reproduce over the long-term. The uses and activities associated with development may be restricted on a property that lies within an important habitat or within six hundred feet of a mapped point location of an important species. Because the Mazama pocket gopher and its habitat have been documented by the Washington Department of Fish and Wildlife to occur on the subject property, a Habitat Protection Plan is required to address possible impacts to this species and its habitat and to provide viable conservation and mitigation measures to protect this species into the future.

This Habitat Protection Plan will address potential impacts to important habitat or species as a result of the development on a 39.55-acre site that will contain the Tumwater Commerce Industrial Park subdivision. Habitat preservation and mitigation will be addressed to provide viable long-term conservation management of the Mazama pocket gopher and its habitat.

Project Location. The subject property is located at the southern end of Cabot Street SE, south of 88th Avenue SE, and north of 93rd Avenue SE, City of Tumwater, Thurston County, Washington in Section 13, Township 17 North, Range 02 West, Willamette Meridian (**Figure 1**). The subject property consists of one parcel, 12714410000. The 39.55 -acre parcel is zoned light industrial.

The Port of Olympia International Airport is located diagonally to the northwest of the subject property. The immediate area in the vicinity of the project site contains primarily commercial and residential development. Land use located south of the subject property consists mainly of rural single-family development. North of the subject property mainly consists of commercial development.



Pacific Environmental L.L.C. CONSULTANTS

Figure 1
Vicinity Map

Mazama Pocket Gopher
Habitat Management Plan
Tumwater Commerce Industrial Park
20 November 2005

Scale: 1" = 400'
0 400'

Gopher Biology. The Mazama Pocket Gopher is a small burrowing mammal that eats roots, tubers, bulbs and some surface vegetation. The pocket gopher bends down vegetation to collect the seeds. This species primarily forages from underground burrows in open prairies. It may also forage on the surface of the ground at night or on overcast days.

Home ranges are very small, but dispersal distances are poorly known. Pocket gophers sometimes wander about 1,000 meters in search of better conditions (USFWS Nature Explorer Species Report, 1996 http://www.natureserve.org/explorer/servlet/NatureServe?searchName=Thomomys+mazama & Nowak, 1999). Pocket gophers may create individual or scattered mounds in poor habitats while probing for new foraging areas. There individual wandering pocket gophers may create 'explorer mounds' outside of the primary mound complexes. The separation distance for suitable habitat is a compromise between the sedentary habits of these mammals. It is unlikely that two occupied mound complexes separated by less than a few kilometers of suitable habitat would represent independent occurrences over the long term. Because of these wandering individual gophers, there may be explorer mounds between two mound complexes or in areas of unlikely gopher habitat, such as in wetlands or in cemented glacial till.

2.0 GENERAL PROPERTY DESCRIPTION AND LAND USE

Historical Land Use. Historically, the site was part of a prairie system. This prairie system was maintained by the Native Americans through burning large tracts of land as a part of maintaining the production food plants, such as camas. When burning discontinued in this landscape, forests of Douglas fir replaced the prairie habitat. The subject property was wooded until approximately 10 years prior, when it was logged, cleared and converted to agricultural land. After the property was cleared, the Mazama pocket gopher wandered on to the property and took up residence.

Current Land Use and Habitat. The subject property is currently undeveloped, fenced pastureland managed for cattle production (**Appendix A**). The 118-acre parcel located south and east of the subject property is currently attached to the subject property as a contiguous cattle pasture. The vegetation on the site occurs in concert with heavy grazing by many head of cattle and several horses. Intensive grazing nubs grass and other plants to their base, but also promotes a thick and dense blanket of sod near the soil's surface. This dense sod discourages the germination and the recruitment of native prairie plants. The formation of sod in this grazed pasture provides the pasture grasses with a competitive edge over the native prairie plant species that are not adapted to heavy grazing.

The site does not contain typical prairie habitat. The site contains European pasture grasses that were seeded after the clearing of a Douglas fir forest. This environment is typical of pastures containing cattle and other livestock throughout western Washington. Only small remnants of prairie remain in the vicinity of the subject property. The best example of existing prairie is located to the northwest of the site across 88th Avenue SE at the port of Olympia International Airport. The Airport contains a variety of native prairie forbs and grasses maintained through periodic mowing. The periodic mowing eliminates germinating trees and shrubs but allows the prairie plants to flourish. The Airport also contains a variety of non-native invasive weeds that are now a significant component in the

vegetative landscape. If grazing were eliminated, the pasture grasses may lose its competitive edge, allowing the opportunity for the germination and recruitment of prairie plants from the Airport and other surrounding prairie habitat. Periodic mowing would eliminate invading trees and shrubs, maintaining the prairie habitat.

3.0 METHODOLOGY OF STUDY

3.1 Background Review

Prior to the site reconnaissance, the Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) database was reviewed to assess background information on Mazama pocket gopher occurrence at and near the subject property (**Attachment B**).

Site Investigation. Background information on possible critical areas was reviewed prior to field investigations and included the following:

- The Washington Department of Fish and Wildlife (WDFW). 2004. Priority Habitats and Species (PHS) report: In the Vicinity of T17R02W Section 13. August 23.
- Anchor Environmental, LLC. 2003. Habitat Protection Plan for Streaked Horned Larks, Western (Mazama) Pocket Gophers, and Oregon Vesper Sparrows at the Olympia Regional Airport. Prepared for the Port of Olympia.
- Knutsen, C. J. 2003. The *Thomonys mazama* pocket Gopher in Washington Prairies: a Contemporary View for Management. A Thesis: Essay of distinction submitted in partial fulfillment of the requirements for a degree Master of Environmental Studies the Evergreen State College.
- Thurston County Area Soil Survey, Soil Conservation Service (U.S. Department of Agriculture, 1973)
- Thurston County Geodata Center Available on the Internet http://www.geodata.org/online.html
- City of Tumwater Municipal Code Chapter 16.32.

3.2 Field Investigation

The field investigation occurred between August and November 2004 and in November 2005. A preliminary site investigation was conducted on August 21 and 22, 2004. The purpose of this preliminary site investigation was to evaluate the site and the vicinity of the site for Mazama pocket gophers, characteristic burrow mound formations, and pocket gopher habitat. This preliminary site reconnaissance was performed to become familiar with the site characteristics and possible on-site pocket gopher habitat, and to gauge the general extent and intensity of pocket gopher activity on the subject property.

A detailed field investigation was performed between mid-October and mid-November 2004. The purpose of this detailed field investigation was to 1) map and identify concentrated gopher mound sites, 2) distinguish gopher mounds from mounds created by other small burrowing mammals, 3) trap gophers to determine core use areas, and 4) delineate gopher use polygons based on trapped gophers, recent gopher activity, and high gopher mound

concentrations. The 22 October 2005 site reconnaissance was to verify that field conditions has not changed.

General Gopher Mound Survey.
A preliminary field investigation was performed on August 21 and 22 to identify areas of mound concentrations. A visual inspection of the mounds was performed to identify characteristics that would distinguish a pocket gopher mound from that created by a mole or other small burrowing mammal. Initially, the site was surveyed by 4-wheel drive vehicle to gain an overall visual perspective on mound distribution and concentration throughout the subject property. The site was then traversed on foot from east to west along and between 8 transects measured 400 feet apart.

Known Mazama pocket gopher mounds were inspected within the maintained prairies of the Olympia Airport (where they are extremely abundant) in order to compare observations with potential signs of pocket gopher activity on the subject property.

Gopher Trapping Methodology.
A detailed field investigation involving live trapping of the Mazama pocket gopher occurred between mid-October and mid-November 2004. This trapping was supervised by Curtis Wambach and performed by Anna Schmidt, who obtained a valid scientific take permit from WDFW through her graduate thesis research at Evergreen State College. Ms. Schmidt's thesis research involved the trapping of the Mazama pocket gopher on the neighboring Airport property.

A grid of 20 "T" posts were installed and subsequently surveyed on the subject property and the adjacent 118-acre property to provide control points for field locating and mapping gopher trap locations. Gopher traps were field located and mapped through the compass and tape method measured from the nearest surveyed "T" post to the trap location. These posts were installed in roughly 400-foot intervals along a grid.

Eighteen Sherman Box Traps measuring 12 inches in length, 3 1/8 inches in width, and 3 5/8 inches in height were distributed throughout the site on average twice a week in locations of newly formed gopher mounds. Fresh mounds were determined by dark, recently dug up soil. These newly formed gopher mounds were excavated to expose the main runway. A pair (2) of traps was installed in lateral within the main runway under an individual newly created mound to catch the gopher coming from either direction. Traps were then covered with black plastic to seal off air exposure and to block penetrating light before backfilling the excavated hole with topsoil. Traps were checked within 4 hours of installation to minimize stress to the animal.

Fingernail polish has been placed on the right-hand claw of the gopher to indicate a recapture. This methodology is based on popular pocket gopher literature and on the successful use of this methodology in Anna Schmidt's thesis research.

3.3 Wildlife Reconnaissance Methodology

An inventory of wildlife occurrence on the subject property, including the Mazama pocket gopher was compiled through the field survey and through a review of background information obtained from USFWS, WDFW, and the Department of Natural Resources (DNR) Natural Heritage Program. Information concerning amphibian and reptile species was based on Brown *et al.* (1995), Kozloff (1978), Leonard *et al.* (1993), Nussbaum *et al.* (1983), and Olson *et al.* (1997). Bird species information was based on Acorn and Baron (1997), Hunn (1982), Johnsgard (1990), and Kozloff (1978). Information concerning birds' nests, nesting cavities, woodpecker feeding stations, animal tracks, scats, and other wildlife indicators was based on Harrison (1979) and Murie (1974). Background information about mammals was based on Forey and Fitzsimons (1987), King County (1987), and Whitaker (1996).

4.0 GOPHER AND HABITAT DISTRIBUTION

4.1 Analysis of Existing Information

The WDFW PHS database has defined a polygon of possible Mazama pocket gopher occurrence on the entire subject property. Locations of two positive identifications of Mazama pocket gopher occurrence on the adjacent 118-acre property are indicated on the WDFW PHS database. PHS records indicate that the Mazama pocket gopher occurs throughout the site.

The PHS database, Cynthia Knudsen M.Sc. thesis work (Evergreen State College 2003), and the Anchor Environmental Habitat Management Plan have all identified the Mazama pocket gopher on the Olympia Regional Airport property immediately northwest of the subject property. Both the airport and the subject property are meadow habitats, but the airport property contains many typical prairie grasses and forbs, whereas the subject property is dominated by pasture grasses, primarily orchard grass and tall fescue.

Four wetlands have been delineated on the subject property by Swan Resource Company during July 1998. These wetlands were labeled Wetlands A, B, D, & E. One additional wetland Wetlands C was identified on the neighboring 118-acre parcel to the south and east of the subject property. The Thurston County Geodata Center identifies 8 wetlands onsite and in the vicinity. Six of these wetlands were identified to occur on top of the central hill, whereas the Swan Resource Company identified three wetlands on top of the hill (Wetlands B, D, & E). One large wetland (Wetland C) is located southeast of the subject property. This wetland appears to drain to the southwest. A small wetland was identified on the northeastern corner of the property west of the access road (Wetland A). Although some gopher mounds were identified within the Swan Resource Company identified Wetland C, no gophers were trapped within the wetlands. The wetlands located on the central hill on the southern portion of the subject property are shallow depressions on cemented glacial till, which is not the preferred gopher soil type. The other on-site wetlands are located in shallow depressions lined with softer, malleable soils.

Based on the Thurston County Geodata Center, the site contains a variety of soil types that include:

- Alderwood Gravelly Sandy Loam 0 to 3 Percent Slopes
  - Located west of the central hill and on the northeastern portion of the subject property
- Everett Very Gravelly Sandy loam 30 to 50 Percent Slopes
  - Located on the central hill
- Indianola Loamy Sand 0 to 3 Percent Slopes
  - Located in the northern portion of the property

Soils identified on the adjacent 118-acre Property

- Everett Very Gravelly Sandy loam 0 to 3 Percent Slopes
  - Located on the southern portion of the property
- McKenna Gravelly silt loam 0 to 5 Percent Slopes
  - Located on the north-central and extending along the eastern edge of the subject property
- Yelm Fine Sandy Loam 0 to 3 Percent Slopes
  - Located in the southwestern corner of the property
- Alderwood Gravelly Sandy Loam 3 to 15 Percent Slopes
  - Located in the northeastern corner of the property
- Everson Clay Loam
  - Located at the eastern base of the central hill

No distinct correlation between mapped soil type and gopher mound concentration appears to be evident on the subject property. However, the Geodata map is only an indicator of actual soil types found in the field. Field analysis indicates that the greater gopher concentrations are found in softer, malleable soils.

Reconnaissance Results

Soil mounds characteristic of the Mazama Pocket Gopher were discovered in various concentrations throughout the subject property. Pocket gopher mounds were distributed primarily in mound complexes with individual explorer mounds typically distributed near the cluster (see **Attachment B**). Some areas contained few or no mounds characteristic of Mazama pocket gophers, and other areas contained a high concentration of characteristic mounds. These mounds were found in higher concentration in areas of soft malleable soils. Few or no characteristic mounds were identified in areas of hard rocky soils or in the wetland areas. Explorer mounds created by wandering individuals in search of new foraging habitat were located between mound complexes or in unlikely gopher habitat. For example, one mound was found in the cemented glacial till located on top of the hill located immediately west of the subject property. Although this area is unlikely gopher habitat, individual wandering gophers may create explorer mounds in this inhospitable environment while searching for new grazing opportunities.

In some areas on the subject property, mounds characteristic of Mazama pocket gophers appear to be intermixed with mole mounds, as mole mounds are identified by their "conical" shape, compared to gopher mounds that are "crescent shaped". The mole mounds were

found in higher densities around trees. Gopher and mole mounds occur in close proximity to each other on portions of the subject property.

Live trapping of the gophers was important to distinguish active mound complexes from explorer mounds and to differentiate gopher communities from that of moles. Live trapping provided the opportunity to define gopher high use areas from low use explorer areas. These gopher high use areas were defined by polygons in **Figure 2** based on active mound complexes and successful gopher trapping. None of the trapped gopher individuals with painted claws were recaptured. Thereby, all captured gophers were only captured once. The total number of gophers trapped during the field study totals 27 individuals, 24 on the subject property.

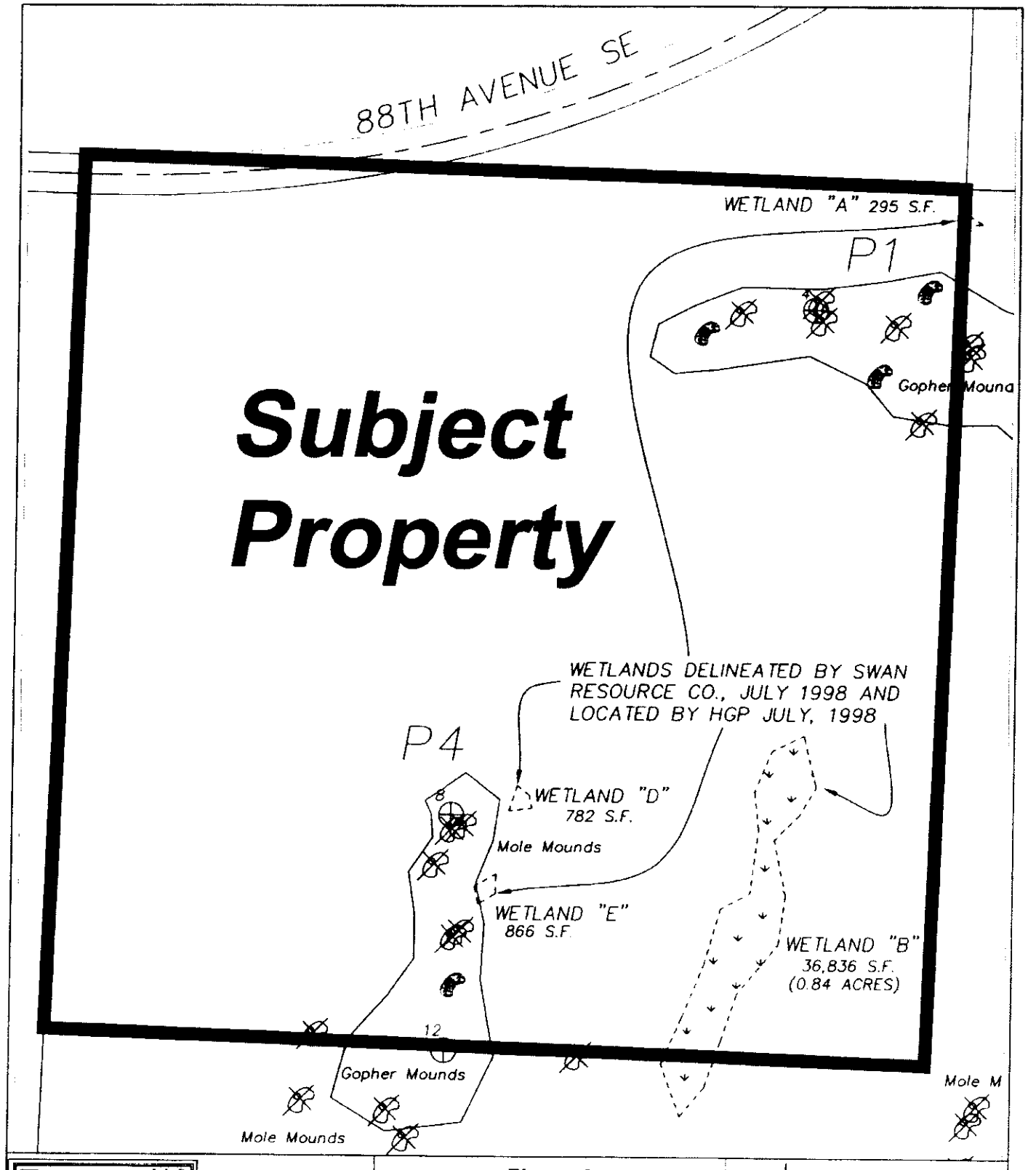
Gopher Polygons

Mazama pocket gophers were trapped in defined areas associated with high concentrations of newly formed gopher mounds. These defined areas were labeled P1 through P8, where P stands for 'polygon'. However, only P1 and P4 extend onto the subject property and thereby only these two polygons will be addressed in this report. High use polygons are located in areas of soft malleable soils and relatively high grass. Traps placed at the periphery of the mound complex or outlying areas surrounding the mound complex had a lower capture rate than within the mound complex, providing a good indicator of gopher distribution and use within a defined area. Outlying areas containing gopher mounds are likely used for exploration of new territories, for seasonal or occasional forage, or by young gophers at the periphery of the mound complex that have not yet established a high-quality territory. These explorer mounds do not define gopher mound complexes or associated high use areas, as gopher wandering may extend to 1000 yards from prime gopher habitat. As these individuals are searching for new forage, they leave mounds behind. Gopher high use polygons were defined only in areas containing new mounds and several trapped individuals.

- **P1:** Located on the northern edge of the central hill south of the access road. Nine (9) out of the 21 traps set within this aggregate of gopher mounds captured a Mazama pocket gopher. Six (6) of the captures individuals were located on the subject property. No recaptures occurred in this polygon.
- **P4:** Located on the western two of the central hill. One (1) of 11 traps captured a gopher indicating that this site does not contain a dense gopher population. Some of these traps were located off site and are not included on the drawings. The gopher captured within this polygon was trapped off site.

4.2 Analysis of Gopher Habitat

Marginal Mazama pocket gopher habitat occurs on the subject property. Habitat conditions for the continued on-site occurrence of the Mazama pocket gopher are precarious. The property is maintained as pasture and contains many head of cattle and some horses year round. Cattle trample burrow systems and compact the soils. Cattle have been observed stepping into and collapsing gopher burrows. European pasture plants conducive to cattle grazing are maintained on the property by continual grazing and human intervention. Native prairie plants cannot compete with the exotic pasture plants adapted to intensive cattle grazing. The subject property contains much different habitat conditions than the



P E Pacific Environmental L.L.C CONSULTANTS

Gopher Polygon

Wetlands

Gopher Trapped

Trap Failed

16 Control Points

Figure 2
Gopher Polygons

Mazama Pocket Gopher
Habitat Management Plan
Tumwater Commerce Industrial Park

Scale 1" = 200'

0 200'

Source of Survey:
HATTON GODAT PANTIER

prairie habitat found at the nearby airport, which is a degraded prairie in comparison with the Mima Mounds Natural Area Preserve prairie located approximately nine miles south of the subject property.

Vegetation. Vegetation on the site consists of European pasture grasses, such as orchard grass and tall fescue, rather than native prairie vegetation (**Table 1**). In comparison, prairie vegetation located at the Mima Mounds Natural Area Preserve contains: Idaho fescue (*Festuca idahoensis*), bent grass (*Agrostis diegoensis*), Henderson's shooting stars (*Dodecatheon hendersonii*) common camas (*Camassia quamash*), yarrow (*Achillea millefolium*), and violets (*Viola adunca*) (Anchor Environmental, LLC, 2003). Other prairie plants native to southwestern Washington but not identified on the site include slender cinquefoil (*Potentilla gracilis*), wild strawberry (*Fragaria virginiana*), wooly sunflower (*Eriophyllum lanatum var. lanatum*), Pacific wood-rush (*Luzula comosa*), long-stolon sedge (*Carex inops, Carex pensylvanica*), dune goldenrod (*Solidago spathulata var. neomexicana*), native oatgrass (*Danthonia spp.*), lomatium (*Lomatium utriculatum*), western buttercup (*Ranunculus occidentalis*), and grassy deathcamas (*Zigadenus venenosus*).

Soils. Soils on most of the site generally consist of a loose sandy loam, malleable for gopher excavations. However, the top of the hill located roughly in the southern portion of the subject property contains hard gravelly cemented till, which does not provide preferred gopher substrate. The large numbers of cattle on the property compact the soils beneath their feet, degrading soil conditions for gopher colonization.

Table 1. Plant Species Identified Onsite

COMMON NAME	SCIENTIFIC NAME	HABITAT	COMMENTS
	TREES		
Big-leaf maple	*Acer macrophylum*	Several lone trees	Off-site
Western red cedar	*Thuja plicata*	Several lone trees	Off-site
Red alder	*Alnus rubra*	Several lone trees	Young, on top of hill
	OTHER PLANTS		
Orchard grass	*Dactylis glomerata*	Pasture	Dominant
Tall fescue	*Festuca arundinacea*	Pasture	Dominant
Colonial bentgrass	*Agrostis tenuis*	Pasture	In some areas
Quack grass	*Agropyron repens*	Pasture	Common
Red fescue	*Festuca rubra*	Pasture	Dominant
Rye grass	*Elymus mollis*	Pasture	Scattered pockets
Kentucky bluegrass	*Poa pratensis*	Pasture	Dominant
Ripgut brome	*Bromus rubens*	Pasture	Traces
Fireweed	*Epilobium angustifolium*	Pasture	Scattered
Italian ryegrass	*Lolium multiolorum*	Pasture	common
English Plantain	*Plantago lanceolata*	Pasture	Dominant
	INVASIVE WEEDS		
Tansy ragwort	*Senecio jacobaea*	Open Disturbed	Common
Evergreen blackberry	*Rubus laciniatus*	Open Disturbed	Dist. along fenseline
Scotch broom	*Cytisus scoparius*	Open Disturbed	Common
Spotted cat's ear	*Hypochaeris radicata*	Open Disturbed	Common
Creeping buttercup	*Ranunculus repens*	Open Disturbed	Common
Red (sheep) sorrel	*Rumex acetosella*	Open Disturbed	Common
Himalayan blackberry	*Rubus discolor*	Various/Disturbed	Dist. along fenseline
Canadian thistle	*Cirsium arvense*	Open Disturbed	Central and southern

4.3 Drainages

Wetland B interflows through the soils off-site to the southwest of the subject property. No other drainages occur on the subject property. Wetlands A, D, and E appear to be isolated depression, containing no outlet. Wetland C, occurring off site to the south, drains to the southwest.

4.4 General Wildlife Observations

Wildlife observations and potential occurrence on the subject property is summarized in **Table 2**. No Federal or State listed species or their habitats were identified on the subject property. Wildlife species observed on the subject property, other than the Mazama pocket gopher, were common urban and suburban adapted species typical of human altered landscapes. It is possible that a greater number of species generally occur on the subject property than were observed during the site reconnaissance as the result of seasonal habitation, migratory stopovers, nocturnal habits, or a species allusive nature.

Table 2. Observed or Potential Wildlife Occurrence on the Project Site

Common Name	*Scientific Name*	Status	*Habitat*	*Observation*	*Comments*
BIRDS					
Black Capped Chickadee	*Poecile atricapilla*	None	Urban/ Suburban	Yes	Observed in trees
Northern Red-shafted Flicker	*Colaptes auratus*	None	Urban/ Suburban	Yes	Observed in trees on edge of property
American Robin	*Turdus migratorius*	None	Urban/ Suburban	Yes	Observed on site
Bewick's Wren	*Thryomanes bewickii*	None	Urban/ Suburban	Yes	Observed in brush at fence-line
American Crow	*Corvus brachyrhynchos*	None	Urban/ Suburban	Yes	Observed on site
Turkey vulture	*Cathartes aura*	None	Varied	Yes	Perching in tree at edge of property
Dark-Eyed Junco	*Junco hyemalis*	None	Suburban	Yes	Observed on site
Red-tailed hawk	*Buteo jamaicensis*	None	Suburban	Yes	Foraging on site
Vesper sparrow	*Pooecetes gramineus*	FCO SC	Oak Woodland Prairie	None	None observed
MAMMALS					
Western Gray Squirrel	*Sciurus griseus*	FSC ST	Oak woodland	None	No individuals or nests observed on site
Eastern Gray Squirrel	*Scinrus griscus*	None	Urban/ Suburban	Yes	Observed in northern and southern portion of property
Mole	*Scapanus sp.*	None	Grass	Yes	Observed mounds
Mazama pocket gopher	*Thomomys Mazama*	FC SC	Prairie	Yes	Observed mounds and trapped individuals
AMPHIBIANS					
None					
REPTILES					
Western Garter Snake	*Thamnophis ordinoides*	None	Variable	Yes	Observed on site
Northern Aligator Lizard	*Gerrhonotus coeruleus*	None	Open/open forested	None	May occur on site, none observed

EX: Extirpated
FE: Federal Endangered
FT: Federal Threatened
FSC: Federal Species of Concern
FC: Federal Candidate

SE: State Endangered
ST: State Threatened
SC: State Candidate
SS: State Sensitive
SM: State Monitor

None: No listing status
None*: This species has no state listing status, but it is classified as protected wildlife.
EX: Extirpated

5.0 REGULATORY CONSIDERATIONS

The Mazama pocket gopher is a Federal and State Candidate Species. Federal listing of the Mazama pocket gopher under the Endangered Species Act (ESA) could occur in the near future. However, as a candidate species for listing under the ESA, the Mazama pocket gopher does not maintain the Federal protections afforded under the ESA. State Priority Species are typically protected by local jurisdictions under the wildlife habitat chapters of their critical area ordinances, which are required by the State Growth Management Act. Standards for protection vary, and are usually guided by a site-specific Habitat Management (Protection) Plan that may include areas of preservation, habitat protection, habitat management and/or buffers around sensitive wildlife habitats. WDFW sometimes also takes action directly to protect the Priority Species by exercising its authority under existing state codes.

The subject property has recently been annexed by the City of Tumwater. At this time it falls under the jurisdiction of the City of Tumwater.

The City of Tumwater regulates habitats and species under its Fish and Wildlife Protection Ordinance (Chapter 16.32 of City Code). The purpose of the ordinance is the preservation and conservation (active management) of protected habitats and species, which specifically includes habitats and species identified on the PHS database. The ordinance specifies that when a protected habitat is located on a site to be developed, a Habitat Protection Plan shall be submitted by the permit applicant that analyzes the effects of proposed land use changes on the protected habitats and species. The plan is required to explain how the applicant will mitigate any adverse effects. The Tumwater ordinance also indicates that residential densities for sites containing protected wildlife areas shall be based on the provisions for the underlying zoning district. The ordinance does not require that all individuals of protected species be protected, but states that land use planning be sensitive to the priority of saving and protecting animal-rich environments within their preferred habitats and accustomed geographic distribution.

The City of Tumwater defines habitats to be protected under Tumwater Municipal Code Chapter 16.32.050(B) as habitats of sensitive species identified by the Washington State Department of Fish and Wildlife's (WDFW) 'Priority Habitats and Species' (PHS) database. The Mazama pocket gopher is listed as a State Priority Species by the WDFW PHS database. The City of Tumwater Municipal Code Chapter 16.32.090 requires that the Habitat Protection Plan addresses impacts and protection of the protected habitat located on the subject property. This report will describe existing conditions on the subject property including the general location of the Mazama pocket gopher habitat and use areas, potential development impacts, and proposed conservation and mitigation measures.

6.0 PROPOSED PROJECT

This section describes the proposed project and possible impacts to the environment and listed species. Short-term development impacts, direct construction impacts, long-term operational impacts, and species impacts will be addressed in this section.

6.1 Project Description

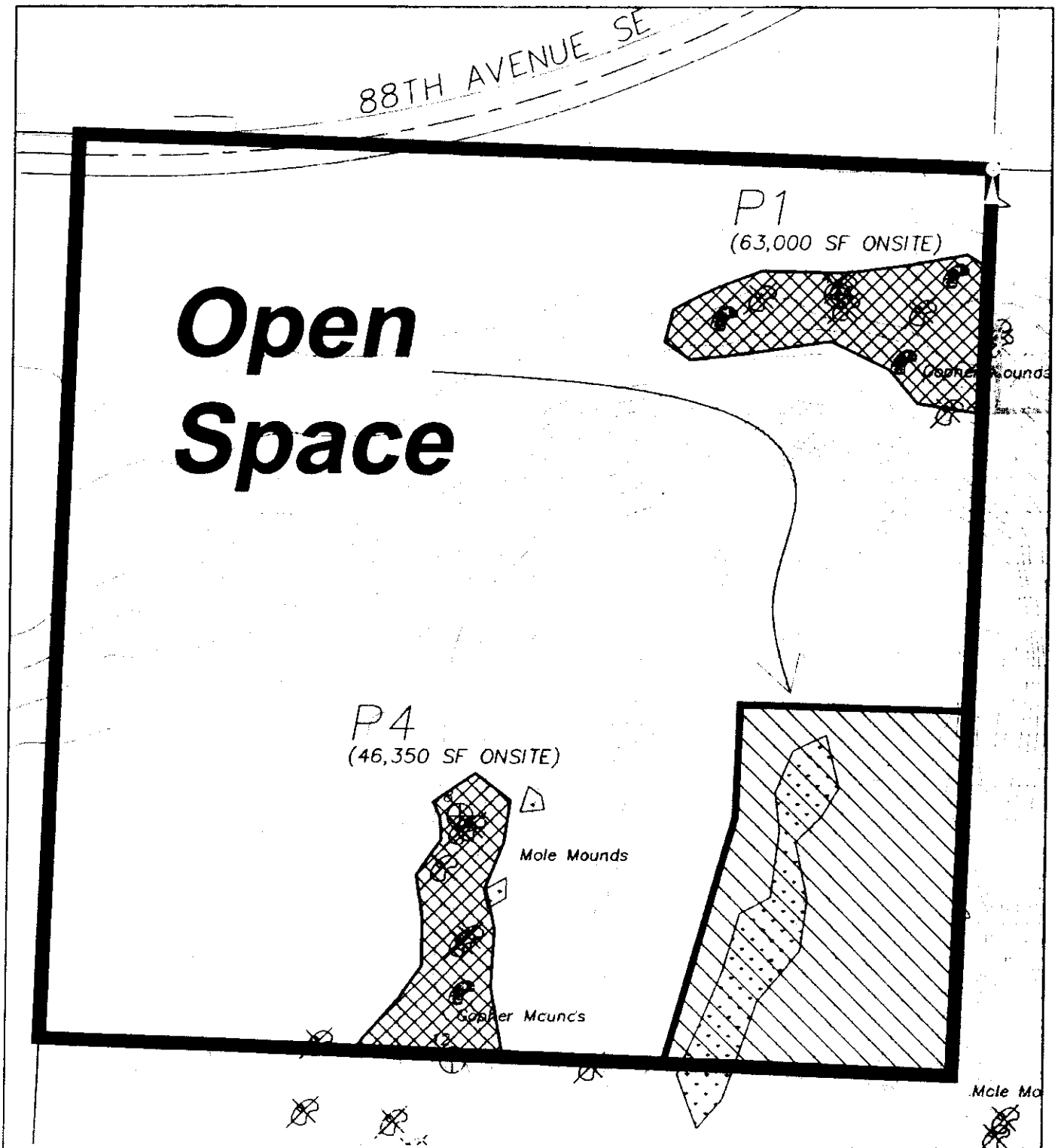
The proposed project consists of a commercial industrial park with associated road systems and open space (**Figure 3** and **Figure 4**). The proposed project has been named Tumwater Commerce Industrial Park. The project plan involves the development of 13 lots that will occupy a space currently unused. Project impacts are discussed in more detail below.

6.2 Development Impacts

Development impacts to gopher high use polygons are illustrated in **Figure 4** and summarized in **Table 3**. Polygons P1 and P4 will be impacted. The subject property will be converted from cattle pasture to a commercial development. Open space will total 9 percent of the subject property. On the adjacent property, 25 acres (or 21 percent) of the 118-acre subject property will be set aside from development as open space. Open space on both properties will be contiguous. The open space will contain wetlands and prairie habitat.

Table 3 Development Impacts

Gopher Polygons	Polygon Size	Impacts
P1	63,000 sf	63,000 sf
P4	46,350 sf	46,360 sf
Total sf	**109,350**	**109,350**
Acres	**2.51**	**2.51**



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Gopher Trapped

Trap Failed

Gopher Polygon

On-site Open Space

Off-site Open Space

Wetlands

Figure 3
Open Space

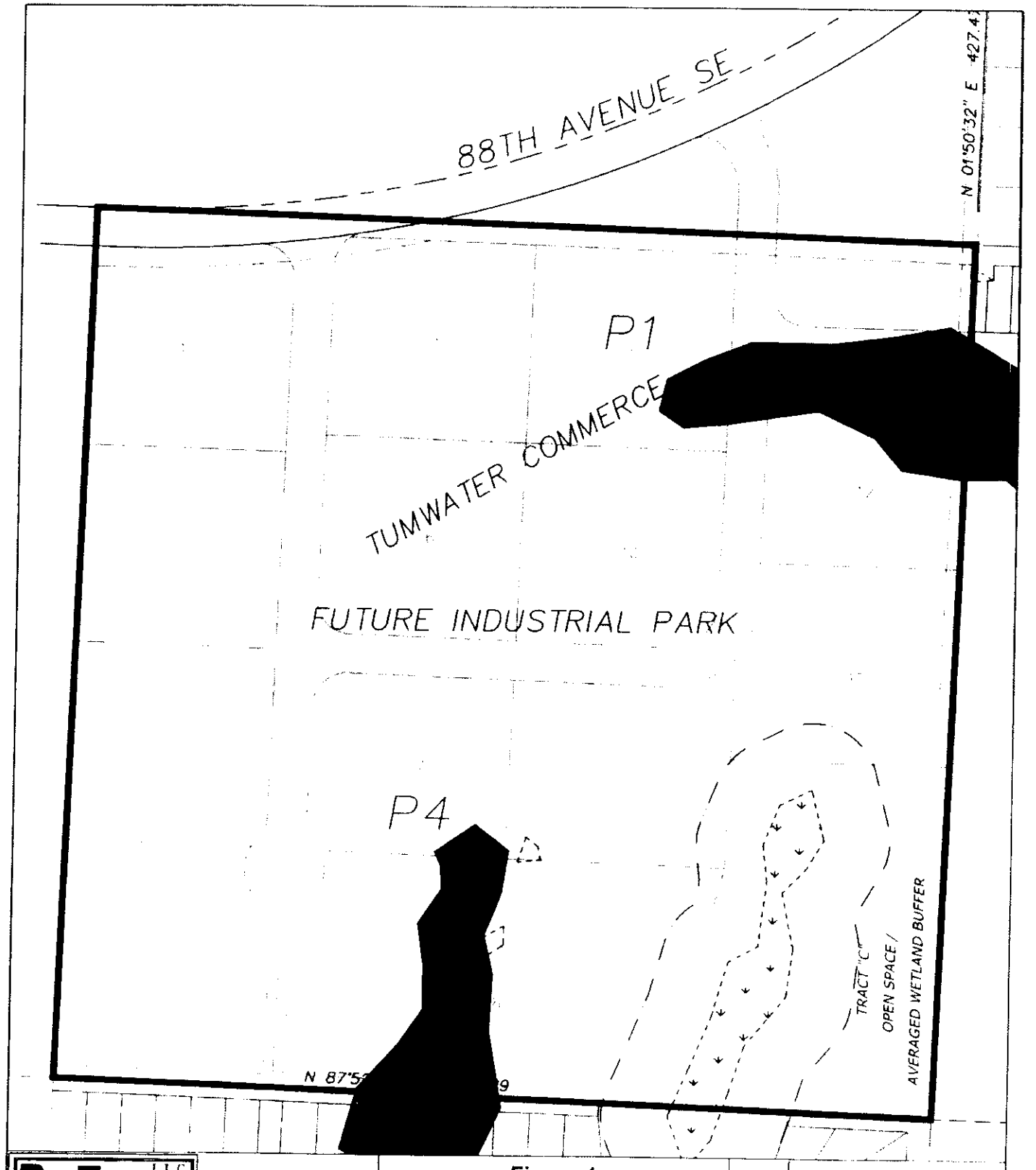
Mazama Pocket Gopher
Habitat Management Plan
Tumwater Commerce Industrial Park

25 November 2005

Scale: 1" = 200'

0 200'

Source of Survey:
HATTON GODAT PANTIER



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Impacted Polygon

Wetlands

Figure 4
Impact Analysis

Mazama Pocket Gopher
Habitat Management Plan
Tumwater Commerce Industrial Park

Scale: 1" = 400'

0 400'

Source of Survey:
HATTON GODAT PANTIER

6.3 Operational and Indirect Impacts

Some impacts would occur generated by routine human activities, such as lawn maintenance, landscaping, and trapping nuisance animals that create mound systems in lawn. Some noise and human activity would occur during routine daytime operations that could disturb the Mazama pocket gopher.

7.0 MITIGATION

7.1 Impact Avoidance and Minimization

Minimization of Mazama pocket gopher impacts consists of the preservation of an on-site 3.62-acre (9 percent of the site) open space area and the preservation of a large 25-acre off-site open space area dedicated to the conservation of the Mazama pocket gopher and other wildlife species that may occur on the project site.

7.2 Proposed Mitigation Strategy

Table 4 summarizes both the Washington Department of Fish and Wildlife (WDFW) management recommendations (Larsen and Morgan, 1998) to protect the Mazama pocket gopher and the mitigation strategy of this project. In general, the strategy is to 1) preserved 3.6 acres of potential habitat, 2) loosen the soils by disking, 3) planting a native grass seed mix to provide forage, and 4) periodic mowing to eliminate invading shrubs and trees.

Table 4. Summary of DFW PHS Recommendations and Project Mitigation Strategy

#	WDFW PHS Recommendation	Mitigation Strategy
1)	Elimination of invading non-prairie shrubs and trees, especially conifers	Eliminate invading non-prairie shrubs and trees, especially conifers, through periodic mowing
2)	Preservation of open areas with uncompacted, dry soils	Preservation of 3.6 acres of open area. Loosen the soils by disking to produce mostly uncompacted, dry soils
3)	Avoidance of frequent plowing (infrequent plowing enhances gopher habitat)	Avoidance of frequent plowing. Will plow once to loosen soils
4)	Restriction of herbicides	Restriction of herbicides in mitigation area
5)	Installation of native species of vegetation palatable to Mazama pocket gopher	Installation of native species of grasses palatable to Mazama pocket gopher

WDFW PHS management recommendations will be incorporated into this mitigation strategy. The goal of the mitigation strategy consists of 1) restoring Mazama pocket gopher habitat and of 2) preserving areas of open space (**Figure 5; Table 5**).

This will be achieved by 1) elimination of cattle from gopher habitat, 2) elimination of invading non-prairie shrubs and trees, especially conifers, through periodic mowing, 3) preservation of 3.6 acres of open area, 4) loosen compacted soils through disking, 4) avoidance of frequent plowing, 5) restriction of the use of herbicides in the mitigation area, and 6) seed species of native grasses palatable to the Mazama pocket gopher (**Table 5**).

Table 5. Mitigation Areas

Impacts	Size	Comments
Impacts	109,350 sf	Loss of active gopher habitat.
Mitigation	157,800 sf	Restore Prairie Habitat in open space (wetland buffer area)
Mitigation ratio 1.5:1	26,300 for each polygon	

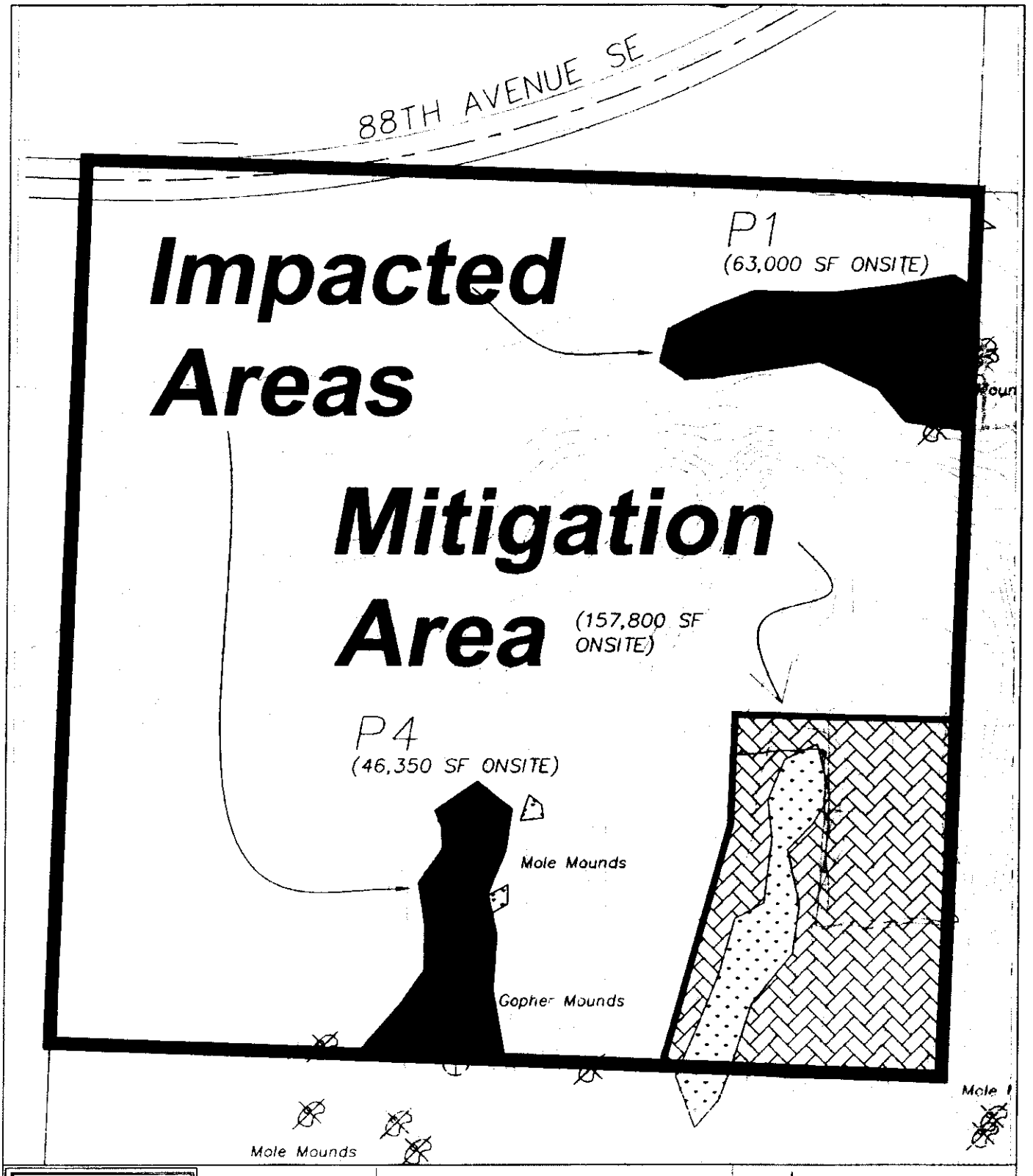
7.2.1 Preserving Habitat and Restoring Pasture to Prairie

The mitigation strategy is to 1) eliminate cattle grazing releasing the competitive advantage of the dominant pasture grasses, 2) disk compacted soils to loosen soils for gopher habitat, 3) seed this area with native prairie grasses to encourage the restoration of prairie habitat, and 4) periodically mow to eliminate invading non-prairie shrubs and trees, especially conifers. Mowing would occur once every other autumn after prairie plants have dropped their seeds. Mowing would aid in the elimination of invading shrubs and trees and stimulate new growth of prairie vegetation. Bi-yearly mowing and the elimination of cattle grazing will weaken the competitive advantage of European pasture grasses, allowing the installed native prairie grasses to flourish.

7.2.2 Mitigating for Landscape Linkages

The goal of our mitigation plan is to transform cattle pasture into a more natural prairie ecosystem following the 1991 WDFW Management Recommendations for the Mazama pocket gopher, as required by the City of Tumwater to satisfy permitting requirements. The development would: 1) not isolate the subject population, 2) maintain gene flow, and 3) maintain genetic viability of the on-site population. The Mazama pocket gopher wanders in search of new territory. We do not have to look any further than the subject property as an example. After the site was cleared of trees about 10 years ago, gophers blindly wandered over to the site in search of new territory. These gophers wandered over to the site from the Olympia Airport or other nearby properties. The on-site gophers had to blindly wander across busy streets and residential lots to colonize the recently cleared subject property. This wandering will maintain gene flow among individuals located on adjacent properties. The restoration of prairie habitat on adjacent properties will also contribute to the longevity of the on-site population. The mitigation plan will provide an enhanced prairie habitat where degraded cattle pasture now exists.

The Mazama pocket gopher occurs in lawns, on vacant lots, at the nearby Olympia Airport, and in utility easements throughout the area. Whenever an area is cleared of trees, the



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Impacted Polygon

Preserved Wetlands

Mitigation Area

Figure 5
Mitigation Area

Mazama Pocket Gopher
Habitat Management Plan
Tumwater Commerce Industrial Park

Scale: 1" = 400'

0 400'

Source of Survey:
HATTON GODAT PANTIER

Mazama pocket gopher tends to wonder in, searching for new territory, as exemplified on the subject property. The Mazama pocket gopher may cross streets and development in search of new territory, as occurred when the subject property was cleared of trees. In addition, enhancement of prairie habitat on adjacent properties also would contribute to a sustainable population of the Mazama pocket gopher on the subject property. The large Mazama pocket gopher restoration area located on the adjacent 118 acre property will provide some landscape linkages promoting gene flow between the two restored habitat areas. Gophers also will be able to continue wandering between the Olympia Airport and other nearby properties.

7.3 Plantings

The grass species used in the mitigation plan were chosen for a variety of qualities, including: nativity to western Washington prairies, adaptation to site-specific environmental characteristics, ability to compete with aggressive non-native pasture species, value to the Mazama pocket gopher, value as wildlife habitat, pattern of growth, and aesthetic qualities. It is anticipated that the prairie area restored on the site will require maintenance to eliminate invading shrubs and trees through periodic mowing.

Native grass species were chosen to increase both the structural and species diversity of the mitigation areas, thereby increasing the area's value to the Mazama pocket gopher and other wildlife for food and cover. Species of vegetation that are both beneficial to the Mazama pocket gopher and other wildlife and competitive to non-native pasture grasses is desired. Plant materials will consist of native grass seed mixes. If plant species for installation listed in **Table 6** are not readily available as nursery stock during the mitigation planting period, other available plant species that are similar in composition and characteristics will be installed in their place.

Recruitment of native prairie plants also is expected to occur originating from the nearby airport property. These plant species are expected to become established with the elimination of cattle grazing on the subject property. The natural recruitment of prairie plant species from the airport property and other surrounding prairie habitats are expected to establish initial populations of prairie plant species and a seed bank.

Table 6. Mitigation Plant List

Common Name	Scientific Name	Plants
NATIVE PRAIRIE GRASSES		
Idaho fescue	*Festuca idahoensis*	Seed
bent grass	*Agrostis diegoensis*	Seed
Pacific wood-rush	*Luzula comosa*	Seed
long-stolon sedge	*Carex inops, Carex pensylvanica*	Seed
native oatgrass	*Danthonia spp.*	Seed
If plant species listed for installation are not readily available as nursery stock during the mitigation planting period, other available plant species that are similar in composition and characteristics will be installed in their place.		

7.4 Goals and Objectives

Goal 1: Restore pasture to prairie habitat preferred by the Mazama pocket gopher.

Objectives:

- Eliminate cattle grazing from gopher habitat to promote prairie habitat.
- Disk compacted soils to loosen soil structure.
- Eliminate invading non-prairie shrubs and trees, especially conifers, through periodic mowing.
- Restrict the use of herbicides in the mitigation area.
- Plant grass species palatable to Mazama pocket gopher.
- Maintain landscape linkages with habitat on neighboring properties.

8.0 CONCLUSION

The mitigation measures proposed in this Habitat Protection Plan meet the City of Tumwater Code (Chapter 16.32) mitigation standards designed to maintain the functional values of critical areas by offsetting potential unavoidable impacts. With the mitigation measures, the Tumwater Commerce Industrial Park project would not significantly impact important habitats. In fact, mitigation measures would transform grazed pasture into habitat more desired by the Mazama pocket gopher. Currently, the gopher population is not utilizing the entire property as habitat because of the poor habitat conditions of the maintained cattle grazed pasture. The mitigation areas would provide an enhanced habitat over the harsh conditions of the existing intensively grazed cattle pasture where the on-site gopher population is currently struggling to survive. The mitigation plan proposed as a part of this project closely follows the WDFW PHS Management Recommendations for the preservation and protection of the Mazama Pocket Gopher and its habitat.

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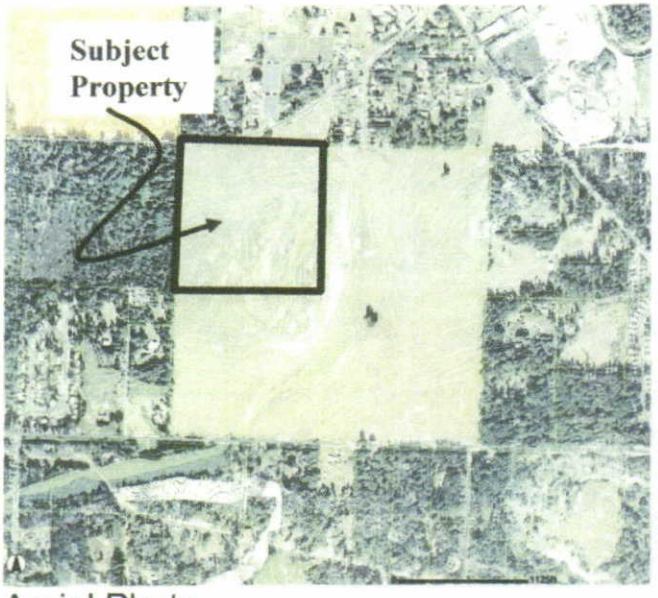
APPENDIX A

PHOTOGRAPHS



Aerial Photo

Sherman Traps On Site

Mazama Pocket Gopher

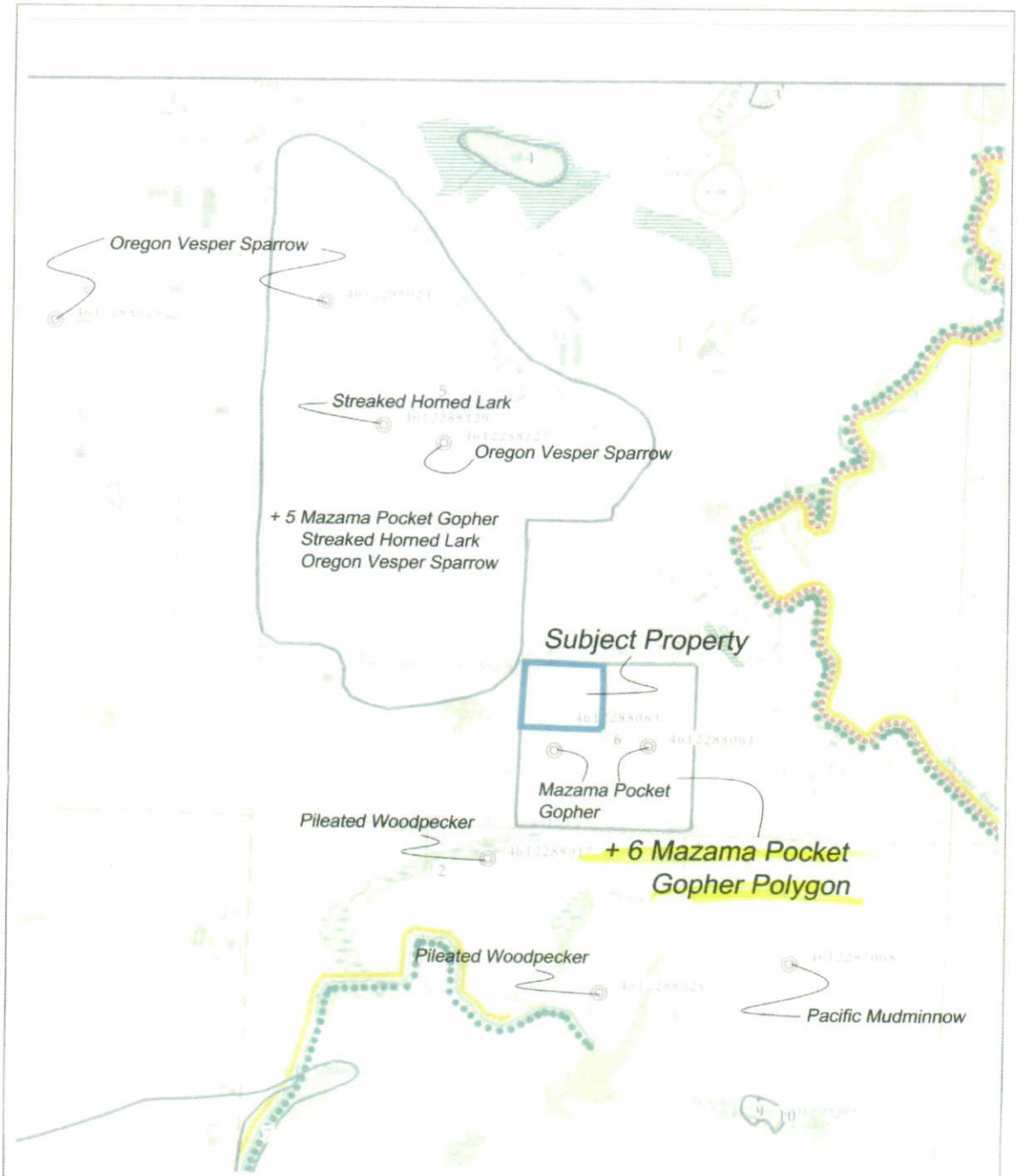
Gopher Mound

Gopher Mound

Cattle Grazing On Site

Facing the NW viewing the site. The Olympia Airport is in the Background

Left: Showing the pasture with Scott's broom and European pasture grasses in the foreground and trees off-site in the background.



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Tumwater Commerce

WDFW Priority Habitats and Species Database

18 December 2005

N

Scale: 1" = 1500'

0 1500'

Modified from WDFW Priority Habitats and Species Database

APPENDIX C

GOPHER DATA

GOPHER DATA

Notes: set in pairs; mound observation = mole or gopher; plugged = gopher

#	DATE	TIME SET	/CHECKED	GPS UTM - 10T	GPS UTM	QUAD#	STAKE #	DEGREES	FEET	CAUGHT?	MOUND?
1	10/20/04	11am	3pm	508517	5200649	5	1	78	168	gopher	?
2	10/20/04	11am	3pm	508440	5200676	5	1	100	384	gopher	?
3	10/20/04	12pm	3pm	508847	5200615	13	1	98	181	no	mole
1	10/21/04	10am	3pm	508893	5200621	13	1	104	68	no	mole
2	10/21/04	10am	3pm	508879	5200618	13	1	108	121	no	mole
3	10/21/04	10am	3pm	508885	5200621	13	1	122	102	plugged	?
4	10/21/04	10am	3pm	508989	5200703	1	1	222	370	plugged	gopher
5	10/21/04	10am	3pm	509008	5200690	1	1	230	388	plugged	gopher
1	10/27/04	8:30am	12:30pm	508994	5200703	26	15	264	150	no	mole
2	10/27/04	8:30am	12:30pm	508724	5200302	26	15	274	139	no	mole
3	10/27/04	8:30am	12:30pm	508726	5200281	26	15	288	152	no	mole
4	10/27/04	8:30am	12:30pm	508728	5200331	26	15	230	182	no	mole
5	10/27/04	8:30am	12:30pm	508722	5200333	26	15	232	170	no	mole
6	10/27/04	8:30am	12:30pm	508727	5200330	26	15	242	179	no	mole
1	10/27/04	12:30pm	3:30pm	508797	5200384	26	10	54	61	no	gopher
2				508772	5200362	26	10	68	102	no	mole

GOPHER DATA

Notes: set in pairs; mound observation = mole or gopher; plugged = gopher

#	DATE	TIME SET	/CHECKED	GPS UTM - 10T	GPS UTM	QUAD#	STAKE #	DEGREES	FEET	CAUGHT?	MOUND?
3	10/27/04	12:30pm	3:30pm	508744	5200358	26	10	80	199	no	mole
4	10/27/04	12:30pm	3:30pm	508768	5200357	26	10	72	130	plugged	gopher
5	10/27/04	12:30pm	3:30pm	508785	5200337	26	10	20	192	no	gopher
6	10/27/04	12:30pm	3:30pm	508787	5200321	26	10	26	193	plugged	gopher
1	10/28/04	8:30am	12:30pm	508677	5200702	4	3	192	180	plugged	gopher
2	10/28/04	8:30am	12:30pm	508678	5200699	4	3	186	177	plugged	gopher
3	10/28/04	8:30am	12:30pm	508658	5200693	4	3	152	190	plugged	gopher
4	10/28/04	8:30am	12:30pm	508653	5200690	4	3	164	184	no	gopher
5	10/28/04	8:30am	12:30pm	508650	5200688	4	3	164	182	no	gopher
6	10/28/04	8:30am	12:30pm	508501	5200670	4	4	270	113	no	gopher
7	10/28/04	8:30am	12:30pm	503618	5200677	4	4	260	172	gopher	gopher
1	10/28/04	12:30pm	4:30pm	508559	5200674	5	4	22	13	no	gopher
2	10/28/04	12:30pm	4:30pm	508520	5200671	5	4	100	120	no	gopher
3	10/28/04	12:30pm	4:30pm	508562	5200706	5	4	146	14	no	gopher
4	10/28/04	12:30pm	4:30pm	508555	5200690	5	4	136	130	plugged	gopher

GOPHER DATA

Notes: set in pairs; mound observation = mole or gopher; plugged = gopher

#	DATE	TIME SET	/CHECKED	GPS UTM - 10T	GPS UTM	QUAD#	STAKE #	DEGREES	FEET	CAUGHT?	MOUND?
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