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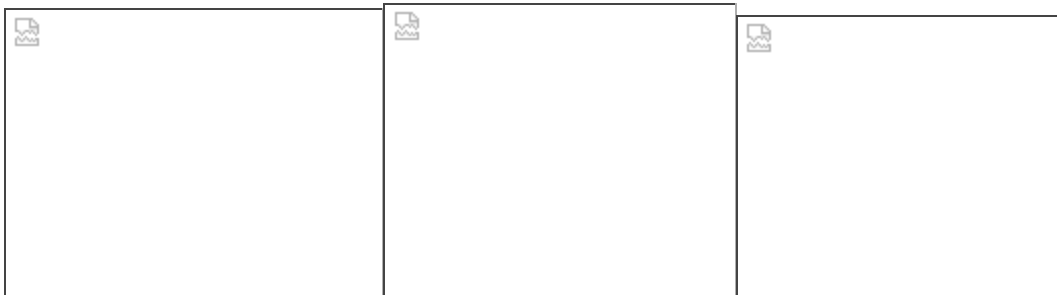
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City of Lafayette Watershed Management and Action Plan

Lafayette Watershed Action Plan

Recommended Actions



Presented to the **City Council**, City of Lafayette, Oregon

By the Watershed Citizens Advisory Board

February 4, 2003

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~~November 12, 2002~~

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Executive Summary

The City of Lafayette Watershed Management and Action Plan (Plan) identifies key projects for the City of Lafayette to undertake to protect and enhance the attributes of the watershed for the benefit of the residents of the City of Lafayette, and those residents residing adjacent to the City and the Henry Creek Watershed. The goal of these projects is consistent with the mission of the Watershed Citizens Advisory Board (WCAB).

Purpose

The purpose of this Plan is to provide recommendations to the City of Lafayette to protect and enhance the watershed as a primary source of drinking water for the City, and as a habitat for diverse species of flora and fauna. The goals of the Action Plan are also in keeping consistent with the goals of the Yamhill Basin Council whose mission is to assess and develop an Action Plan for the Yamhill Basin, (of which Henry Creek is a subbasin within the Yamhill River Basin/Palmer Creek Subbasin), and implement the actions.

The WCAB

The Action Plan was developed by a group of volunteer City residents, residents adjacent to the City and residing near the Lafayette City Watershed, and technical experts appointed by the Lafayette City Council of Lafayette, Oregon. The event catalyst which resulted in for enabling the formation of the WCAB, was a 1999 clear cut logging of approximately 45 acres of the Watershed by the City to secure revenues to initiate water infrastructure improvements. The resulting concerns raised by a group of City residents and near-by residents caused the City to form the WCAB to provide guidance and recommendations to the City for future actions regarding the Watershed.

During development of the Plan, members of the WCAB recognized that the Watershed owned by the City of Lafayette represented only a portion of the entire watershed. The entire watershed includes approximately 1,189 acres north and northeast, and southeast of the City-owned portion (122 acres). Activities conducted on land surrounding the Watershed not owned by the City could also impact the Watershed. Although the land use surrounding the Watershed is primarily privately held agriculture and forest lands with some residences, the assessment completed by the WCAB recognizes that certain "windows of opportunity" exist to protect and enhance important areas within the entire watershed in the face of rapidly changing adjacent uses. Even so, the Plan focuses on actions the City can undertake within that portion of the Watershed owned by the City, and recommends certain actions outside the City-owned acreage that could further protect and enhance the City's water supply.

Approach

Prior to the establishment of the WCAB, numerous Watershed studies were undertaken with respect to water supply and timber harvest. In order to maximize the use of the information contained in these historical documents, information was compiled and reviewed as appropriate. Following a review of the information, an assessment of the Watershed was conducted based in part on the Oregon Watershed Enhancement Board Watershed Assessment Manual. The assessment was not a comprehensive

assessment but streamlined to reflect the resources available to the WCAB.

The purpose of the assessment was to identify impairments to the Watershed and gaps of information that would help inform the WCAB. In order to supplement the historical information and fill in the gaps of information, additional work was contracted out to environmental consulting firms e.g., water supply to CH2M Hill; forestry and vegetation management to I.T.S., and wildlife to Flora and Fauna. This Action Plan serves as the preface to the historical documents and more recent a group of documents and reports commissioned by the City as recommended by the WCAB. Those documents serve as key references for more detailed assessment, management and action plans pertaining to the Watershed. ~~The intent of this Action Plan is not to repeat the details of those documents, but to summarize the key aspects of those documents and make reference to the supporting materials which are contained as Appendices to this Action Plan.~~

Watershed Assessment Findings and Recommendations

Assessment

~~The City of Lafayette Watershed Management and Action Plan provides an assessment of the Watershed and a Plan for City Council actions and partnerships. The Plan provides an assessment of Watershed conditions in the context of the 1999 logging and long-term use of the Watershed. This section of the Executive Summary briefly highlights the key aspects of the findings and recommended actions to address concerns raised during the assessment process. Section 3 of this Plan and the Appendices identify in more detail the results of the findings, management goals, and specific actions. A table summarizing the actions and schedule is also included in Section 3 to serve as a roadmap to Public Works staff and the City.~~

Water Quality, Hydrology and Water Use

Finding. Springs and groundwater have been intensively utilized to serve as a water supply for the City. The Oregon Health Department, Drinking Water Program, has established Drinking Water Protection Areas (DWPA's) for the Oregon's municipal water sources. The Department has identified 1-, 2-, 5-, and 10-year time-of-travel capture zones around the wells and critical and potential recharge areas for the springs. The capture zones include distances between active wells and the northwest boundary of Lafayette's watershed and beyond to the northwest. The recharge areas include much of the upper clear-cut area and beyond to the northeast. These areas extend well-beyond the area of the Watershed owned by the City.

Two of the City's springs show elevated nitrate concentrations compared to the wells. With the exception of lead observed in well #10, water chemistry tests conducted for those parameters evaluated by the City as part of their drinking water testing requirements under the Safe Drinking Water Act have not indicated other significant presence of contaminants in ground water.

Recommended Action: It is recommended that the City manage the use of springs and ground water within the watershed to better enable water use for increasing numbers of Lafayette residents and contract with environmental consulting firms to identify other primary sources of drinking water. It is further recommended that the use of chemicals and other activities that might occur within the critical recharge area with potentially adverse impacts to the water supply system be prohibited. With respect to timber harvest within the critical recharge area, it is recommended that harvest be limited to promote maintenance of forest health and ecologic benefit.

Sediment Sources

- *Finding:* Delivery of sediment to Henry Creek is primarily due to surface erosion. In certain areas roads are a source of the sedimentation and in other cases, lack of vegetation, bank destabilization, and under sizing of culverts have led to increased sediment loads.
- *Recommended Action:* It is recommended that clear cuts and roadways be prohibited in riparian areas. It is also recommended that vehicular traffic be prohibited near or onto Henry Creek. It is also recommended that the City Public Works Department resize and replace culverts to prevent erosion and sedimentation into Henry Creek. It is recommended that any new roads be earth surface, outloped to drain naturally where possible, and re-seeded after use

Chemical Management

- *Finding:* Potential chemical impacts to the Watershed may occur from two sources: sources outside and adjacent to the Watershed and from sources within the Watershed. Currently there is no direct evidence that the Watershed has been degraded from either source. Surveys of 10 other watersheds indicate that few municipalities apply chemicals within their watersheds.
- *Recommended Action:* It is recommended that the City prohibit use of herbicides and pesticides within the Watershed. Manual management of vegetation can be cost-effective when Inmate Work Crews and Juvenile Work Crews are employed.

The assessment of the Watershed includes the following:

Riparian Habitat

- *Finding:* Degraded riparian habitat e.g., vehicles passing through Henry Creek, non-native invasive plants, is evident in the areas in or adjacent to Henry Creek.
- *Recommended Action:* It is recommended that the City control invasion of non-native plants e.g., Himalayan blackberries, Scotch broom, within the riparian areas of Henry Creek and replant with native plants, and prohibit vehicular traffic in the creek and in the riparian area except for those activities which are necessary for maintenance and protection.

~~**Riparian Habitat:** Riparian habitat throughout the Watershed has been degraded. The most evident impairment of habitat is in riparian areas adjacent to groundwater well construction and springs which serve as a water supply for the City of Lafayette. This is in part due to vehicular trespass through Henry Creek, invasiveness of non-native plants, and bank erosion.~~

Channel Modification

- ~~*Finding:*~~ Several locations throughout Henry Creek showed significant channel alterations resulting from bank destabilization, dams created by roadways, and roads in-channel and next to streams.

Recommended Action: It is recommended that the City resize and replace culverts to reduce

sedimentation and allow for adequate peak flow, and prohibit vehicles in or adjacent to Henry Creek.

Fish and Fish Habitat:

Finding: Henry Creek is classified as a fish-bearing stream; however, no observations of fish or fish habitat were made. City residents and adjacent landowners have suggested that in years past populations of coho salmon and trout have been suggested to historically be inhabited found in Henry Creek. These are may be listed species under the Endangered Species Act. Stream flows are minimal during the winter rainy-season months and in most cases, non-existent during the dry summer months which decrease likelihood of presence finding of aquatic species during low flow conditions, which reduced the likelihood of finding salmonid habitat.

Recommended Action: The WCAB recommends that an expert in fisheries undertake assessment and evaluation of habitat conditions and inventory aquatic species present in the Watershed.

Wildlife Habitat

Finding: ~~The Watershed provides habitat for diverse species of avian and terrestrial species.~~ More than 82 species of birds and 38 species of mammals, 9 species of reptiles, and 7 amphibian species are likely to locate within the Watershed. Observed were 49 species of birds, 5 mammals, and 1 amphibian. The importance of maintaining connectivity to and from the watershed and nearby upland forests for certain terrestrial species i.e. black-tailed deer, ~~is, is~~ important to their continued existence within the region. Terrestrial wildlife are also important to managing the vegetation within the watershed. Browsing by deer are important in managing some of the vegetation within the Watershed. ~~Currently the Watershed is connected through adjacent fields to upland forests. However, with increased pressure from adjacent landowners e.g., perimeter fencing by agriculture and local vineyard owners/operators, these connections may be more difficult to maintain and cease altogether.~~

Recommended Action: It is recommended that the City work with adjacent landowners to arrange for conservation easements to prevent the elimination of wildlife corridors which pass through adjacent lands into and out of the Watershed.

~~**Water Quality, Hydrology and Water Use:** The Henry Creek Watershed is dominated by streams, and springs within the Watershed and high quality groundwater which serve as a primary source of drinking water to the City of Lafayette. Springs and groundwater have been intensively managed to serve as a water supply for the City. Low summer flows are a principal limiting factor in restoring aquatic habitat and species.~~

~~Groundwater and spring water quality have been observed to be of good quality. Water chemistry test conducted by the City as part of their drinking water testing requirements under the Safe Drinking Water Act have not indicated significant presence of contaminants in ground water and spring water.~~

~~**Sediment Sources:** Delivery of sediment to Henry Creek is primarily due to surface erosion. In certain areas roads are a source of the sedimentation and in other cases, bank destabilization and undersizing of~~

~~culverts have lead to increased sediment loads.~~

~~**Chemical Impacts:** Potential chemical impacts to the Watershed may occur from two sources: sources outside and adjacent to the Watershed and from sources within the Watershed. Currently there is no direct evidence that the Watershed has been degraded from either source.~~ **Vegetation Management**

~~*Finding:* Non-native invasive plants are evident throughout the Watershed. Species such as Himalayan blackberries, Scotch broom, elderberry, and milk thistle are found throughout the Watershed. These non-native species are also encroaching on the planted Douglas fir seedlings and interfering with the growth of native plants.~~

~~*Recommended Action:* It is recommended that non-native plants in riparian, mixed conifers and clear-cut areas be manually removed e.g., blackberries, scotch broom, milk thistle, big leaf maple, with a priority given to areas near new Douglas fir seedling plantings (each fall, spring, summer). It is recommended that the City protect oak seedlings and sprouts, select maples for retention and remove others manually, and release selected mature oaks. It is also recommended that selected maples be thinned and managed. It is recommended that no clear cutting occur within the Watershed; however, periodic thinning to maintain the health of the Watershed is recommended.~~

Access and Security

~~*Finding:* Public access to the Watershed is currently limited to those with permits issued by the City. City residents and adjacent landowners attending WCAB meetings expressed an interest in making the Watershed accessible to the public.~~

~~*Recommended Action:* The WCAB recommends that the issue be referred to the City Parks and Recreation Committee to evaluate concerns and recommend to the City future use of the Watershed e.g., park, access to the Watershed with/without permit, as part of a City sanctioned tour group, and means to address security concerns.~~

Monitoring and Assessment

~~*Finding:* Other than monitoring to comply with the Safe Drinking Water Act requirements as part of a municipal water supply, no other monitoring is conducted within the Watershed.~~

~~*Recommended Action:* As part of the commitment to OWEB, and as a requirement under the Forest Practices Act, the WCAB recommends that a monitoring program be established and implemented through an ongoing volunteer program, support from the Yamhill Soil and Water Conservation District, and/or through the City's Public Works Department.~~

~~**Vegetation Management:** Non-native invasive plants are evident throughout the Watershed. Species such as Himalayan blackberries, Scotch broom, elderberry, and thistle are found. These non-native species are encroaching on the planted Douglas fir seedlings, seedlings planted in 2001 to improve diversity of the flora, and are interfering with the growth of native plants.~~

Management Goals

~~The Plan describes a future vision for the watershed, management goals, and specific actions to support that vision.~~

~~Management goals include (refer to Lafayette Watershed Stewardship Management Plan, February 2002, Individual Tree Selection, refer to Appendix H):~~

~~**Water Quality and Aquatic Resources.** Water quality, riparian and aquatic biological productivity shall be maintained and enhanced through the use of good stewardship management practices and the implementation of watershed improvement projects.~~

~~**Wildlife Resource Management.** Protection of existing habitats and restoration of threatened or degraded habitats are necessary to promote species diversity and ensure populations of indigenous species are maintained. In order to meet this management goal, vegetation management practices will exceed the legal minimum requirements.~~

~~**Vegetation Management.** Maintaining native diversity and biological richness of the Watershed is a key priority which will involve active management of mixed conifer and hardwood stands. Invasive, non-native plant species will be controlled.~~

~~Long-term timber management is intended to improve the long-term productivity and biological integrity of the forest ecosystem. Timber harvests will be targeted to create structures that benefit wildlife, increase light for understory, and retain snags and down wood debris. Harvest levels shall be based on improvement to forest health and ecological goals and shall not be revenue driven. No clearcutting is allowed.~~

~~**Chemical Management:** Use of chemicals within the Watershed is prohibited unless other alternatives have been shown to be impractical. Manual cutting and management is the preferred method.~~

~~**Access and Roads:** Roads will be managed and maintained to minimize adverse impacts to the Watershed. Any new roads shall be earth surface, outsloped to drain naturally where possible, and re-seeded after use.~~

~~**Monitoring and Assessment:** Regular Monitoring of forest health is critical to the sustainable management program. Periodic evaluation and assessment of the watershed toward specific goals followed by an adaptive management program with modification practices incorporated in the Action Plan is necessary to meet Vision and goals of the Watershed.~~

~~Recommended Actions~~

~~The following recommended actions are directly related to the impairments identified during the assessment of the watershed and the vision of the WCAB.~~

~~**Riparian Habitat:** Control invasion of non-native plants of Henry Creek riparian area and replant with native plants.~~

~~**Channel Modification:** Resize and replace culverts to reduce sedimentation and~~

~~allow for adequate peak flow and passage of aquatic species.~~

~~Fish and Fish Habitat: Evaluate the potential to remove down-stream impoundments to allow for passage of anadromous and indigenous fish.~~

~~Wildlife Habitat: Protect habitat for avian, terrestrial and aquatic species. Identify sensitive, conditional, threatened, and endangered species. Spring, summer, fall 2003, winter 2002. Identify priority corridors through adjacent land for connectivity of wildlife to the Watershed and meet with landowners to arrange for conservation easements.~~

~~Water Quality, Hydrology and Water Use: Manage the use of springs and ground water within the watershed to better enable water use for increasing numbers of Lafayette residents and identify other primary sources of drinking water.~~

~~Sediment Management: Prohibit location of future timber harvest and roadways from riparian areas. Prohibit vehicular traffic near or onto Henry Creek. Improve culverts to prevent erosion and sedimentation into Henry Creek~~

~~Chemical Management: Prohibit use of herbicides and pesticides within the Watershed especially aerial and broadcast backpack application. Chemicals will be used only when other alternatives have been shown to be impractical.~~

~~Vegetation and Forest Management: Manually remove (cut) non-native plants e.g., blackberries, scot broom, thistle, bigleaf maple, with a priority given to areas near new seedling plantings (each fall, spring, summer). Select maples for retention and remove others manually. Maples selected need to be thinned and managed.~~

~~No commercial tree harvest is recommended within the Watershed. In 2012, a forest inventory is recommended to establish baseline conditions.~~

Other Recommended Actions

In addition to the recommended actions above, the WCAB also recommends the following to meet the vision, goals and spirit of the Planat :

Additional Funding and Grants

- Finding: Grant dollars are available at the State and Federal levels which can be used to finance the recommended actions.
- Recommended Action: WCAB members have expressed interest in supporting the preparation of additional grant applications to implement recommended actions.

Outreach and Education Program

Finding: The proper functioning of the Watershed depends on the careful management of its resources and integration of human needs and natural habitat. The community will benefit from an understanding of how Watersheds function.

Recommended Action: It is recommended that the City support development of an outreach/education booklet program to inform stakeholders and school children about the value of the Watershed to their community and methods to protect the Watershed and the water supply for the City. Volunteers from the WCAB have expressed interest in carrying through with this recommendation.

~~Access and Security: Public access to the Watershed is currently limited to those with permits issued by the City. The issue of public access vs. security is unresolved. The WCAB recommends that a subcommittee be established to evaluate issues and recommend to the City use of the Watershed as a park, access to the Watershed with/without permit, as part of a City sanctioned tour group, and means to address security concerns.~~

Partnerships and Conservation Easements:

Finding: The greater part of the Watershed is outside the City-owned 122 acres and is subject to other land uses which can adversely impact the Watershed's ecosystem and the City's water supply. Drainage of these areas is toward the City's portion of the Watershed, and Open spaces adjacent to the Watershed provide for connectivity of wildlife.

Recommended Action: It is recommended that the City important for a collaborative effort initiate a collaborative effort with adjacent landowners to be established to share information e.g., regarding watershed studies, chemical applications, conservation easements, and land use surrounding the Watershed. WCAB members have expressed interest in providing volunteer hours to obtain easements from adjacent landowners.

Fire Management Plan

Finding: Fire is a priority concern for the Watershed, the City, and surrounding residences. Fires have threatened the Watershed in past years. The City of Lafayette Volunteer Fire Department contacted the WCAB prior to the final Board meeting to collaborate on the development of a fire management plan.

Recommended Action: It is recommended that the City establish a subcommittee to identify methods to assess and minimize the potential for fires. Potentially include the Lafayette Volunteer Fire Department, residents near the Watershed, the Department of Forestry, and other stakeholders.

Wetlands Inventory

Finding: No wetlands inventories or studies have been conducted within the Watershed. Vehicular

traffic and other forms of trespass were observed in wetland areas and within Henry Creek.

- *Recommended Action:* ∴ It is recommended that the City secure outside services to ~~Review of~~ National Wetlands Inventory maps and conduct field ~~reconnaissance~~ studies ~~are needed~~ to identify natural and jurisdictional wetlands within the watershed. The inventory will enable the City's Public Works Department, City contractors and other to better manage their operations within the Watershed and comply with federal and state wetland requirements.

Securing Additional Adjacent Lands

- *Finding:* ∴ The size of the City-owned Watershed is 122 acres. This is only a small portion of the entire watershed.
- *Recommended Action:* It is recommended that a subcommittee be formed to evaluate the potential for acquiring additional acreage within the Henry Creek Watershed to expand the City's ownership and control and seek to prevent potential adverse impacts to the City's Watershed from external sources.
- ~~**Additional Funding and Grants.** Identify other grant opportunities to implement recommended actions.~~

Development of Watershed Protection Plan ~~Best Management Practices for the Watershed~~

- *Finding:* Based on the findings of potential impacts from outside sources, observations of degraded habitat and sedimentation issues, the City could benefit from a Plan focused on Watershed protection.
- *Recommended Action:* ∴ ~~In addition to the actions described within this Action Plan,~~ The WCAB ~~further~~ recommends that a Watershed Protection Plan be prepared. This would include a Plan focused on spring as well as well-head protection, management within the Critical Recharge Area, and best management practices to ensure the safe use of machinery and day-to-day actions to prevent adverse impacts to the Watershed. This Plan may also include a training program for City staff as to best management practices.
- ~~Best Management Practices be developed together with the City's Public Works Department to provide procedures that prevent adverse impacts.~~

Next Steps

The WCAB recommends to the City Council that the recommendations made herein be considered for adoption. All the recommendations include projects designed to improve the health of the Watershed and ensure the long-term use of the Watershed as a water supply to the City.

Many of these recommendations can be implemented within existing City budgets for maintenance of the Watershed. Others can be implemented through volunteer efforts. A few of the recommendations will require outside contractor support. An important factor will be in the securing of additional funds primarily through grant awards. WCAB volunteers have agreed to support the City in preparing grant applications.

The WCAB recommends that the City Council approve the recommendations and authorize volunteers to work with the City to prepare grant applications to secure additional resources to carry out the actions.

Throughout the development and preparation of this ~~Action~~ Plan, the City of Lafayette received tremendous support from several organizations and individuals. Acknowledgement for the initiation of the Watershed Community Advisory Board (WCAB) is accorded to Bob Willoughby, former City Administrator and Teresa Syphers, former Mayor of Lafayette, Oregon, and the Lafayette City Council. Reference is made to City Council Resolution 99-39, enacted December 9, 1999 to establish the WCAB and appoint the members listed below (refer to Appendix A).

The following individuals have served as volunteer members of the WCAB:

<u>Individual</u>	<u>Representing</u>
Andy Bryant	Forester, resigned
Ron Ross	City Resident and Ex-Mayor of Lafayette
Bob Cullen	Elected Official: Council Member
Jeff Barry (CH2M Hill) (replaced)	Technical: Hydrology
Dean O'Reilly (YCSWCD)	Technical: soils
John Yuscovic (ODFW) (resigned)	Technical: fish & wildlife
Stan Hill	Resident near watershed
Gary Johnson	Agriculture near watershed
David Breneman (OTAK)	City Planning Commission member
Travis Johnson	City Resident
Susan Bovee-Picciano (resigned)	City Resident
Kathi Futornick	Chair, Technical: habitat, watershed assessments

Additional acknowledgements for continued participation and support are made to Carol Paddock, ~~Andy Bryant~~, and Walter Forster. Carol Paddock was instrumental throughout the process, provided leadership on several subcommittees, and both she and Walter Forster surveyed the newly planted seedlings. Over the course of the project, Jeff Barry was replaced by Bob Long also of CH2M Hill.

The development of the ~~Action~~ Plan was funded through a grant from the Oregon Watershed Enhancement Board (refer to Appendix B for copy of grant application), and by generous contributions of time and technical expertise from the WCAB members. In-kind support was donated by the City of Lafayette, OTAK (Dave Breneman), CH2M Hill (Bob Long), Yamhill County Soil and Water Conservation District (Dean O'Reilly), ~~Limno-Tech, Inc, and~~ Environmental Consulting Associates, LLC (Kathi Futornick).

City contractors provided extensive support at key points in the project: Barry Schreiber (Flora and Fauna), Scott Ferguson (I.T.S.) and Bob Long (CH2M Hill).

¹ Jeff Barry was replaced with Bob Long from CH2M Hill

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Introduction

~~The City of Lafayette Watershed: A Natural Resource~~

The City of Lafayette Watershed: A Natural Resource

The City of Lafayette's Watershed is a micro-cosm of the Henry Creek Watershed which is believed to span up to ~~1-mile~~ 1,189 acres beyond the boundaries of the City's Watershed. Lafayette, Oregon is located approximately 36 miles SW of Portland, Oregon. Refer to Figure 1-1, City of Lafayette.



The City's Watershed is located approximately 1.5 miles ~~Northeast~~ northeast from the center of the City of Lafayette (~~refer to Figure 1-1, City of Lafayette Watershed Location~~). The Watershed and drainage area range in elevation from 220 to 740 feet on the southwestern portion of the Red Hills of Dundee. The region receives 40 – 60 inches annual average rainfall. The soil is a Jory type and slopes within the City's Watershed range from 2 – 60%. Over the years, private forest land, which was the predominant land use of this area, was replaced by primarily agricultural use Figure 1-1, City of Lafayette, Oregon

with some residences.

The Henry Creek Watershed is a valuable resource for the City of Lafayette. Not only as a valuable water supply serving the residents of the City, but also as a diverse habitat. Henry Creek, which runs east-west through the Watershed, is a small stream that is believed to have provided historic habitat to cutthroat trout and coho salmon. Henry Creek, upon exiting the City's Watershed, passes through adjacent farmland through a series of earthen dams and surface impoundments, and discharges into the water-quality limited Yamhill River. ~~Wildlife Other species~~ known to inhabit the Watershed ~~include~~ includes Roosevelt Elk, great-horned owls, ~~C~~coopers hawks and golden eagles, to name a few (~~refer to Appendix F~~). During the past 2 decades, the Watershed and its habitat have been degraded from misuse and trespass, drought and invasive plant species. The Watershed's unique location, a rich and diverse habitat located next to one of the fastest growing populations in Oregon, make it imperative that this area be protected and enhanced for current and future populations.

Background

~~The~~ Many Oregon communities are facing unprecedented population growth, and the City of Lafayette is no exception. During the 1990's, the City experienced double-digit growth in population. With increased population came increased strains on the City's water supply system. Faced with limited revenues and requirements to improve the water supply system, the City contracted with a logging company to log portions of the watershed in order to secure revenues to upgrade the City's aging water system. City officials faced an outraged community in 1999 angered at the prospect of logging the Watershed (~~refer to Appendix A for documents referring to the 1999 special hearing~~). The City quickly established an advisory board to address the issues and apply for grant dollars to identify management options for the Watershed.

During 1999, the City Council established the Watershed Citizens Advisory Board (WCAB) ~~recognized~~ recognizing the importance of preserving this unique Watershed and the need to balance the demands placed on City officials to meet the growing water needs of the community (~~refer to Appendix A for documents relating to the creation of the WCAB~~). Once formed, the WCAB prepared a grant application requesting funds from the Oregon Watershed Enhancement Board (OWEB, although at the time the Board was referred to as the Governor's Watershed Enhancement Board, GWEB). ~~Refer to Appendix B for a copy of the grant application~~. Toward the end of 1999, funds were granted (\$22,000) and the WCAB held its first meeting in January 2000 and monthly thereafter. ~~In 1999, the City Council established the WCAB and~~ Shortly after the WCAB's first meeting, the City adopted a Mission Statement

for the ~~Watershed~~ WCAB.

Mission Statement

“Before July 1, 2001, the Watershed Citizen Advisory Board (WCAB) ~~shall~~ shall complete a comprehensive master plan document (“the Master Plan”) for the management of and use by the City of Lafayette, Oregon (“the City”) of its Henry Creek Watershed property (“the Watershed”). The primary goal of the Master Plan shall be to preserve and maximize the quality and quantity of the water available in the Watershed for use by the City, in its drinking water system. While protection of drinking water is the primary beneficial use to be ensured in the Master Plan, other areas that should be considered by the WCAB in developing the Master Plan include:

- (1) The enhancement, preservation of wetlands or riparian areas for fish and wildlife habitat;
- (2) Protection and ~~of~~ enhancement of fish and wildlife habitat;
- (3) Protection of aquifers and wellheads from contamination;
- (4) The desirability and feasibility of establishing a sustainable tree harvest program in the Watershed to raise money for the enhancement or enlargement of the Watershed or for improving the City’s water system;
- (5) Gaining an increased understanding of the nature of the Watershed including its ecology, geology, and hydro-geology;
- (6) The feasibility or desirability of expanding that acreage owned by the City;
- (7) The management and use by others of the larger Henry Creek watershed area and how those activities affect the Watershed; and
- (8) Development of a resource plan for the Watershed that will ensure that the Watershed is managed and used in a way that maximizes its value as a natural resource for residents of the City and other consumers of City water.

The Master Plan shall be developed in a way that involves as many residents of the City and interested parties as possible. The Master Plan, to the extent possible, should also integrate the interests and concerns of City residents, interested persons, and the mandates of state and federal agencies and relevant studies.”

The City of Lafayette Watershed Action Plan recognizes that the City’s 122 acres encompasses unique habitats surrounded by private ownerships, and communities ~~(refer to Figure 1-2, Aerial Photo)~~. The City of Lafayette is home to approximately 2,200 people and has experienced double-digit growth for the past 5 years. As population demands increase within the City, demands for additional water will also increase. Therefore, the purpose of this Action Plan is to provide direction to the City as it accommodates increased growth and demands for additional water.

Historical Studies

The WCAB identified several water related and timber related studies that had been conducted within the Watershed. The purpose in researching historical information was to maximize the use of the information and better inform the WCAB during the preparation of the ~~Action~~ Plan. The following is a summary of the information utilized.

Yamhill Basin Council (YBC): Oversees assessment and management of the entire Yamhill Basin of which the Yamhill/Palmer sub-basin ~~and~~ Henry Creek are part of.

~~20014~~ ~~Yamhill~~ Yamhill Basin Watershed Action Plan completed. During the time the WCAB was developing the Plan, it met with officials from the YBC to ensure that the goals of the WCAB were not in conflict with the YBC and to ensure that there not be duplication of

information. The WCAB learned that the YBC gave ~~P~~ prioritization ~~given~~ to Muddy Creek, Willamina, Panther, Deer, Baker, Mill and Turner Creeks (~~refer to Appendix C~~).

- and that the assessment of the Yamhill/Palmer subbasin would not be completed for at least 2 years.

USDA Bureau of Land Management. Mainly focused watershed analyses on BLM ownerships.

- 1998 ~~--watershed-~~ watershed analyses completed within the Yamhill Basin.

City of Lafayette Assessment for Additional Water Supply. Historically, the ~~The City~~ City has contracted with CH2M Hill to complete water supply and groundwater studies including ~~for~~ the following ~~-studies~~:

- 1998 ~~--assessment-~~ assessment of additional water supply from wells and springs within the City's Watershed, and to file applications for water right transfers.
- March 5, 1998 ~~--Source-~~ Source Evaluation and Proposed Emergency Source Locations. This report summarizes the status of available water supplies, pumping capacity, and water rights controlled by the City.
- June 24, 1998 ~~--City-~~ City of Lafayette Limited License Application for Wells 8 and 10. This report presents a discussion of the hydrogeologic setting in the Watershed and ~~relationship between the groundwater system and Henry Creek.~~ It also includes the results of the pumping tests.

City of Lafayette Forestry Studies.

The City recognized that students at Oregon State University could provide a cost-effective approach to evaluate the revenue opportunities within the Watershed. As a result, they contracted with Oregon State University forestry students for the following studies (~~refer to Appendix C~~):

- 1998 ~~--inventory-~~ inventory of merchantable timber, evaluation of recreational opportunities, and strategy to pursue future management actions. Two reports were produced. One was entitled, *City of Lafayette Watershed Proposed Management Plan (May 1998)* and the second report, *Watershed Management Plan Groups 1 and 2 (June 1998)*.
- 1999 ~~--focus-~~ focus on timber management and harvest alternatives. The report was entitled, *Lafayette Watershed Management Plan (May 1999)*.

Although the Oregon State University studies recognized the commercial value of the timber within the Watershed, the City contacted several other foresters including Andy Bryant, for their evaluation of logging the Watershed. Their recommendations differed from those expressed in the Oregon State University reports. Copies of those correspondences are included in *Appendix D*.

Following completion of the Oregon State University studies, ~~T~~the City contracted with an outside contractor, Stuntzner Engineering and Forestry (~~refer to Appendix EE~~) to further explore the potential of commercial harvest within the Watershed. Stuntzner Engineering and Forestry produced the following documents.

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- July 1999 ~~--proposed-~~ proposed harvest plan identifying 2 harvest areas (~~refer to Figure 1-3, Location of Harvest Areas~~). Refer to Map 1-1, Aerial Photo Illustrating Clear-cut Locations.

Studies Undertaken by ~~the~~ City As Recommended by the WCAB

The WCAB reviewed the existing studies and relied on WCAB technical experts to interpret and identify information gaps. As a basis for evaluating the reports, the WCAB relied on the OWEB Watershed Assessment Manual for evaluation criteria and assessment process. Although the WCAB did not have resources do complete a total assessment of the Watershed, it sought to maximize the information available and conduct field surveys to better understand the conditions within the Watershed. From that information, information gaps were identified. Those gaps included: a comprehensive understanding of the hydrogeology of the Watershed, sustainable vegetation management options, and wildlife (aquatic and terrestrial) present in the Watershed.

Based on the a information gap analysis, the WCAB recommended to the City Administrator that specific studies be undertaken to better inform the Action Plan and help prioritize actions within the watershed.

- Wildlife (refer to Appendix F):** The use of the Watershed by diverse species of wildlife ~~was ere~~ observed yet the most recent report on wildlife within and surrounding the Watershed had been was undertaken approximately 25 years previously. Information regarding current ~~w~~Wildlife conditions and management methods to further enhance habitat were necessary. The City contracted with Flora and Fauna of Corvallis (Barry Schreiber) to complete a study within the Watershed and provide recommendations to the WCAB. The report was completed in May 2001, *Wildlife Management Plan for the Lafayette Watershed (refer to Appendix F)*. This document is used as a source of information for identifying and ~~prioritization~~ prioritizing recommendations.

~~**Water Quality and Hydrogeology (refer to Appendix G):** Protection and enhancement of the Watershed as a water supply for the City of Lafayette is a primary objective of the Action Plan. Although significant studies had been previously undertaken, additional information was needed to better understand the geology and hydrogeology of the region to discern, if possible, potential impacts from external and internal sources to the springs and wells within the Watershed. The City, as recommended by the WCAB, contracted with CH2M Hill to complete a hydrogeologic study. The report was completed in 2002 and entitled, *Lafayette Watershed Analysis of Water Use, Water Quantity and Quality; Henry Creek Watershed Wells and Spring Sources*. The report was prepared by Bob Long of CH2M Hill under contract with the City and is used a reference throughout this Action Plan.~~

- Water Quality and Hydrogeology.** Protection and enhancement of the Watershed as a water supply for the City of Lafayette is a primary objective of the Plan. Although significant studies had been previously undertaken, additional information was needed to better understand the geology and hydrogeology of the region. The purpose of these studies was to discern, if possible, potential impacts from external and internal sources to the springs and wells within the Watershed. The City, as recommended by the WCAB, contracted with CH2M Hill to complete a hydrogeologic study. The report was completed in 2002 and entitled, *Lafayette Watershed Analysis of Water Use, Water Quantity and Quality; Henry Creek Watershed Wells and Spring Sources. (Refer to Appendix G)*. The report was prepared by Bob Long of CH2M Hill under contract with the City and is used a reference throughout this Plan.

- At the time Bob Long was beginning to develop the Scope of Work for his report, the State of Oregon was conducting a state-wide review of municipal water supply systems utilizing springs. The City of Lafayette benefited from studies being conducted by both the Oregon Department of Environmental Quality and the Oregon Department of Health. Dennis Nelson of the Department of Health provided the WCAB with the results of his work (refer to Appendix H).

· **Sustainable Forest Management and Watershed Stewardship.** Overall sustainable practices are desirable within the Watershed to protect and enhance the Watershed for current and future generations. I.T.S. (Scott Ferguson) provided an understanding of the nature of these practices, with sustainable options for forest and timber management. The sustainable options were needed to provide alternative practices to recommendations made in historical studies which created controversy and were perceived to adversely impact the Watershed. The study was completed by I.T.S. Management, Inc. of Portland, Oregon and entitled *Lafayette Watershed Stewardship Management Plan* prepared by Scott Ferguson (refer to Appendix I). This report was used as a reference throughout development of this Plan.

~~· **Watershed Stewardship (refer to Appendix H).** Overall sustainable practices are desirable within the Watershed to protect and enhance the Watershed for current and future generations. An understanding of the nature of these practices with alternatives for forest and timber management were needed to provide alternative practices to recommendations made in historical studies which created controversy and were perceived to adversely impact the Watershed. The study was completed by I.T. S. Management, Inc. of Portland, Oregon and entitled *Lafayette Watershed Stewardship Management Plan* prepared by Scott Ferguson. This report was used as a reference throughout development of this Action Plan.~~

Approach: The Watershed Planning Process

- The WCAB met regularly (monthly ~~the and first 1.5 years and~~ as needed through to ~~the present~~ December 2002 ~~time~~) to evaluate information, discuss and prioritize issues, and resolve controversies. Subcommittees were established to further research chemical management, public access, natural resource management, and to better characterize the Watershed. All meeting were held under public meeting laws and whenever a quorum was present, meeting minutes were prepared and actions voted on. Copies of meeting agendas and minutes are included in Appendix J.

- Decisions were made based on a vote of the majority of the members. Input from the public was accepted during the meetings and during discussions. At times, input was solicited from agencies e.g., Oregon Department of Health, Oregon Department of Environmental Quality or from experts i.e. chemical management.

- Priorities, listed in descending order from the highest priority to the lowest, for undertaking the assessment of the Watershed are as follows:

- Water Quality and Water Quantity
- Vegetation Management
- Chemical Management
- Channel Modification
- Soil Erosion and Sedimentation
- Fisheries and Aquatic Habitat

- . Wildlife
- . Riparian Habitat
- . Public Use

Subcommittees were established to identify concerns, survey expert opinions, and prepare summaries of findings and recommendations for the WCAB to consider. These recommendations included information gaps which were referred to the City with a request for additional information. The City contracted with consulting firms: CH2M Hill to complete a study with respect to Water Quality and Quantity; Flora and Fauna to complete a study on wildlife; I.T.S. to complete a study on vegetation and forest management with an emphasis on sustainable practices.

Information from these reports together with the respective opinions of WCAB members and the public were compiled and included in this Plan. Several drafts of the Plan were developed, reviewed by WCAB members, and comments incorporated into the final Plan.

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Federal and State Environmental Regulations

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The management of the Watershed is governed by ~~the~~ Federal, State and local requirements. The Clean Water Act and Safe Drinking Water Act are federal laws and implemented through state-authorized programs, rules and guidance. The Endangered Species Act (ESA) may impact watershed actions and is protective of listed species under federal law. Watershed ~~and c~~ construction, operational and maintenance ~~programs~~ activities ~~need to take~~ are regulated by these ~~and other~~ ~~into account the~~ requirements. ~~of the ESA.~~ It is not the intent of this Plan to provide a comprehensive listing of the applicable laws and regulations. ~~There is potential for the requirements of the ESA to impact Watershed actions.~~

Organization of the ~~Action~~ Plan

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The remainder of the Plan is organized in five sections. Following the Introduction, Section 1:

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Section 2 describes the *Watershed Characteristics* including physical, ecological, and social attributes. For each ecological attribute, a summary of findings is followed by an information gap and a recommended action or series of action items. Note that the *Watershed Characteristics* is not intended to be a comprehensive assessment of the Watershed but a summary based on visual observations and readily available information.

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Section 3, *Recommended Actions and Schedule*, summarizes the recommended management goals as well as the specific recommended actions. A summary table and schedule is included to assist the City and Public Works Department in carrying out the recommended actions, should they be approved by the City Council.

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Section 4, *Public Involvement* describes the public process implemented by the WCAB during the development of the Plan.

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Section 5. *Budget*, lists two approaches to completing some of the actions. One approach utilizes manual labor for field activities from consulting firms and the other utilizes the Inmate Work Crew. This section also lists available grants that might be used to fund the actions.

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: Section 6, *Supplemental Information*, describes a number of activities that have occurred within the Watershed to implement some immediate actions such as planting of native trees and shrubs by the WCAB and removal of invasive species with the help of the Yamhill County Soil & Water Conservation District and the Inmate Work Crew.

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~~The Action Plan is intended to directly serve the needs of the City of Lafayette.~~ The Plan itself summarizes key findings of the reports from Dennis Nelson (Oregon Department of Health), Bob Long (CH2M Hill), Barry Schreiber (Flora and Fauna), and Scott Ferguson (I.T.S.). For a complete review of all findings and recommendations, the reader is encouraged to review these reports as well. These reports are made Appendices to this Plan.

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~~The Action Plan encompasses specific actions only. Assessment, characterization and detailed discussions are made reference through three documents cited above under the previous subsection, Studies Undertaken by the City As Recommended by the WCAB.~~

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Section	<u>Watershed Characteristics</u>
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Sect Sectionn	<u>Watershed Characteristics</u>
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Functions and Values of a Healthy Watershed

Watersheds are often described as sponges, capturing and storing water. A healthy watershed provides many benefits to the flora and fauna and human communities which rely on them. While plant roots channel water into the ground where it percolates through the soil, moisture evaporates from leaf surfaces where it is lifted by the wind. As air rises, it cools and its moisture condenses to create rain. Some of the rainwater enters the ground and is collected in large storage areas known as aquifers. Soils protected by plant cover e.g., shrubs and trees, diminish the surface runoff created by rainstorms and thereby reduce movement of soils known as soil erosion. As rainwater percolates through the soil, it also recharges groundwater, vast systems of saturated soils located beneath the soil surface. Groundwater is then released to streams and lakes, such as Henry Creek. Groundwater can also resurface through fissures in rocks or be channeled to the surface and emerge as a spring.

Forested watersheds, such as the Lafayette Watershed, are unique. The Watershed provides a mixed canopy of legacy oaks, Douglas fir, grand fir, madrone, and some stands of yew among many others. As in other western Oregon forests, the underbrush is dense and together with the tree canopy moderates rainfall and allows the precipitation to percolate into the soil, The tree canopy further extracts and holds moisture from fog and low-lying morning clouds some of which evaporate and some of which mist, and then drop to the ground. Root systems provide a conduit for rainfall to recharge groundwater. Although trees and shrubs also extract rainfall, overall they provide the necessary physical and biological processes needed for a healthy ecosystem.

Assessment Process

~~The assessment used to inform the Action Plan was undertaken using the guidance developed by the Oregon Watershed Enhancement Board (OWEB). The functions and values described within the OWEB Guidance Watershed Assessment Guidance were Manual were used to guide the development of the City's Action Plan. A complete evaluation based on the OWEB Manual was not intended to be undertaken due to limited staff resources and budget. However, the general criteria used to evaluate each of the ecological attributes were used. The WCAB identified impairments were identified primarily through visual reconnaissance and field studies and data provided by technical members of the WCAB and outside contractors.~~

The purpose of the assessment ~~is~~ was to identify impairments to the Watershed ~~that~~ that have the potential to adversely impact natural conditions, and then present to the City Council specific recommended actions to remedy the impairments. ~~The following section summarizes the characteristics observed.~~

Characterization and Assessment of the Watershed

This section is divided into physical, ecological, and social attributes. Physical attributes describe the site features and geology of the region while the ecological attributes detail each area of the ecosystem, the findings and recommended actions to be taken. Social values recognize the potential of the Watershed as a community amenity.

Physical Attributes

The 122 acre Watershed owned by the City of Lafayette encompasses most of Henry Creek. Henry Creek is a small stream which flows southwest to join the Yamhill ~~river~~ River just downstream from Lafayette. Located on the west-facing slopes of the Dundee Hills, the City's Watershed is about 1.5 miles NE of Lafayette. Henry Creek's southwest flowing main stem is joined by several side channels (seasonal tributaries that divide the Watershed). The low foothill slopes of the Watershed range in elevation from 500 feet on the west to 1,000 feet on the upper east end.

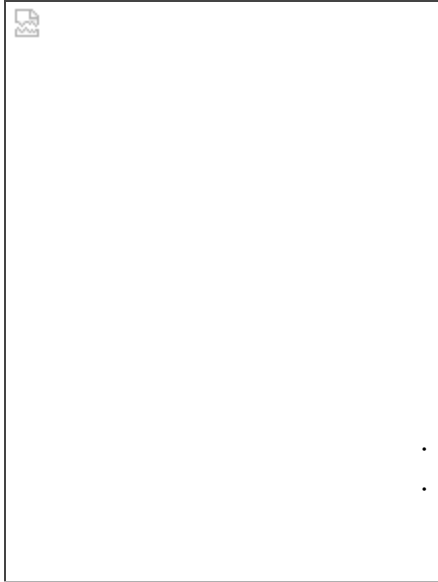
The topography of the Lafayette Watershed is dominated by the Henry Creek drainage with moderate to steep slopes in places. The landform of the low-lying hills (the Red Hills of Dundee) rises from the valley floor and is comprised of basalt and sedimentary rocks formed during the Oligocene age.

The regional maritime climate features an extended winter rainy season with hot, dry summer months. Snow can accumulate in the upper Watershed during brief, cold stormy events. This is usually followed by warm, melting rains a few days later, often creating a surge of elevated water levels that drop soon afterward. Average annual precipitation is 40 to 60 inches.

The City of Lafayette lies within the Willamette Lowland, which is a series of structural and erosional basins that are situated between uplifted marine rocks of the Coast Range and volcanic rocks of the Cascade Range. There are five regional hydrogeologic units that have been delineated and mapped in the Willamette Lowland. Of these, the Columbia River Basalt Group aquifer (CRBG) is an important source of water where it is at or near the ground surface. Basalt, which is a part of the CRBG is underlain primarily by fine-grained marine sedimentary rocks. (Refer to Map 2-1). Two faults or fault zones are inferred from water well reports. This faulting was probably associated with localized folding or warping of the CRBG, processes which likely resulted in the formation of the Red Hills of Dundee.

Ecological Attributes

Riparian Habitat



Riparian vegetation along Henry Creek (refer to Figure 2-1) and its tributaries varies from native plant species to invasive non-native plants such as Himalayan blackberries, ~~elderberry, Scotch Broom, thistle~~. The riparian area provides shade for temperature control; however, the invasiveness of non-native plants may decrease the needed habitat for native aquatic species. Refer to Appendices F and I for more detailed information.

Information Gaps:

- Historic riparian conditions assessment
- Field surveys of large woody debris potential

Action

Figure 2-1

Recommended Actions

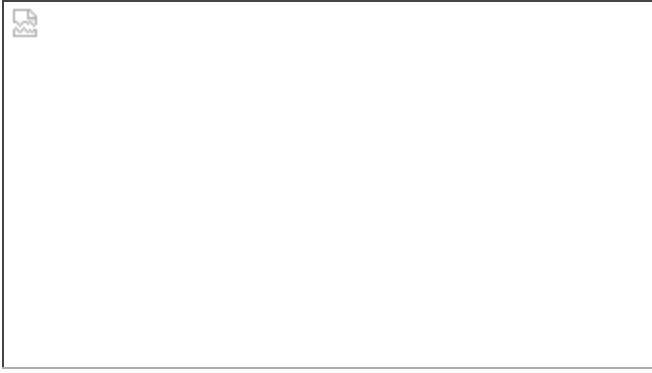
- Cut Himalayan blackberry patches above Well 10 and along Henry Creek.
- Replace with a variety of hardwood shoots (cottonwood, red alder, willow, creek dogwood, Pacific ninebark) or other desirable shrubs, hardwoods, and conifer including Western red cedar.
- Select one area, ~~then~~ and then monitor results before continuing in successive years. Shoots are obtainable from cuttings within the Watershed and from sales of the Yamhill County Soil and Water Conservation District.
- ~~Timber removal is prohibit~~ Prohibit timber removal ~~ed~~ within stream riparian ~~reserves, reserves~~ except for restoration activities. Promote ~~(no commercial harvest is allowed).~~ P practices ~~promote~~ to support older forest structure and diversity.
- Retire or relocate ~~S~~ skid trails or roads in riparian areas ~~are retired or relocated~~ wherever possible.
- Prohibit ~~E~~ equipment operation in riparian areas ~~is prohibited~~, except for restoration activities.
- Use methods with the lightest possible impacts with respect to ~~R~~ restoration activities within riparian areas ~~use methods with the lightest possible impacts.~~

Fisheries and Aquatic Species

Figure 2-2



The Lafayette watershed includes most of the headwater drainage's of Henry Creek, classified by the Oregon Department of Forestry as a "small fish



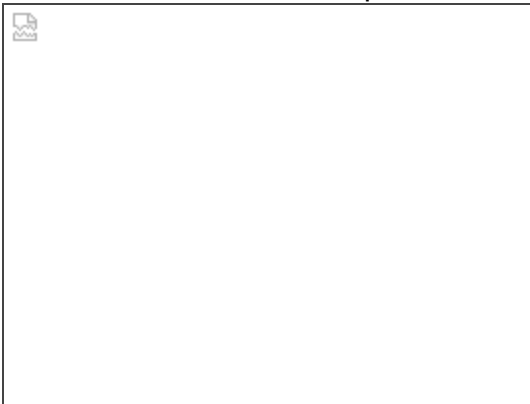
bearing stream". The east-west flowing main stem channel (refer to Figure 2-2) is joined by a number of small, side-channel, temporary tributaries which bisect the site.

Although classified as fish bearing, the current low water flow would preclude the presence of fish on the Watershed property. In addition, the limited pool habitat would make it unlikely for a fishery to develop and become established. Populations of

cutthroat trout and coho salmon have been suggested to historically populate the Henry Creek Watershed. There were no observed sitings sightings of fisheries during the site reconnaissance visits. Though current conditions are unlikely to harbor fish on city property, the stream habitat is still important in a potentially improved fishery in the lower reaches of Henry Creek and eventually the Yamhill River. Given the limited pool habitat present in this small drainage, it is unclear whether this effect is impacting fish populations downstream. It is likely that cutthroat trout utilize the lower reaches of the Watershed during winter when flows increase. It's important to note that spring and well withdrawals may impact the flow of Henry Creek.

Figure 2-3

Culverts are absent or inadequate at four of six road crossings, representing areas of potential siltation.



Two upper-reach creek mainstem crossings of the gravel access road have 6" poorly functioning culverts present. A mainstem crossing of a dirt access road, road and a tributary crossing of an old haul road have no visible culverts present. Additional information is located in Appendices F and I.

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Information Gaps

- Surveys of aquatic species
- Stream flow data for high and low flow conditions

Recommended Actions ~~Item~~

- Install or replace culverts at the current road crossings to reduce silt and ensure connectivity through the Creek
- Restore natural flows
- Promote conservation of water especially during the summer months to increase the potential base flows
- Protect riparian buffers

Chemical Management

Figure 2-4



Invasive exotics are ~~not~~ common in the Watershed in certain locations, however, some do exist (e.g. Himalayan blackberries, Scotch Broom, milk thistle,) and will need to be controlled to improve degraded habitats and restore a species mix indigenous to mixed woodland and Douglas fir communities (refer to Figures 2-4, Milk thistle ~~3 and 2-4~~). Additionally big leaf maple will need to be controlled in the clear cut areas. The WCAB, specifically Carol Paddock evaluated the use of chemicals by surveying 10 municipal watersheds in Oregon. Three were timbered but none engaged in commercial forestry. Of the three, none used chemicals except that one would consider fire retardant if so directed by the Forest Service. The remainder of the communities had legally defined watersheds ranging from the size of a city lot to a couple acres (except for Boardman which considers the Columbia River drainage its watershed). Of those (including Boardman), three used herbicides occasionally in weed control. The remainder did not use chemicals. The WCAB researched chemical use, the types of herbicides, and conferred with specialists. Inquiries were also made of chemical use on adjacent lands. Gary Johnson (local farmer and WCAB member) supplied useful information for those areas he farmed.

Information Gaps

- Detailed Survey of chemicals applied on adjacent land areas
- Monitoring data for chemicals potentially impacting surface water, springs and groundwater

Recommended Actions Items

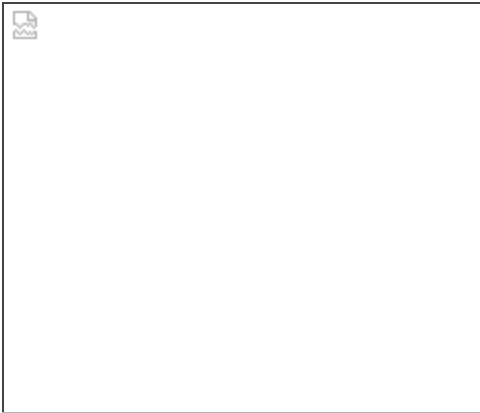
- Based on the survey information and a review of the herbicides typically used to control invasive species (refer to Appendix K), use of chemicals is not recommended by the WCAB. The members of the WCAB believe that if chemical use is considered in the future, chemicals should not be applied in or near the Critical Recharge Areas, the springs, wells, riparian area, or Henry Creek, and only when manual methods have been shown to be ineffective or impractical. Additional information is located in Appendices I and K.
- ~~Resolve issues of chemical management within the watershed~~
- Survey use of chemicals outside and immediately adjacent to the Watershed

Channel Modification

Henry Creek ~~flows from the Watershed area. Even though it is a seasonable stream, there appears to be~~ has experienced significant modifications at road crossings and where culverts have been placed. These channel modifications have resulted in scouring in some areas and in silt deposit in other areas of Henry Creek.



Extensive modifications have been due to channel erosion near the ~~headwaters~~ entry of Henry Creek into the Watershed (refer to Figure 2-55) ~~as it enters the watershed~~ and ~~farther~~ down stream where sediment deposits and scouring have occurred. The dynamic nature of Henry Creek, high flow during the winter rainy season and low to no flow during the summer dry season



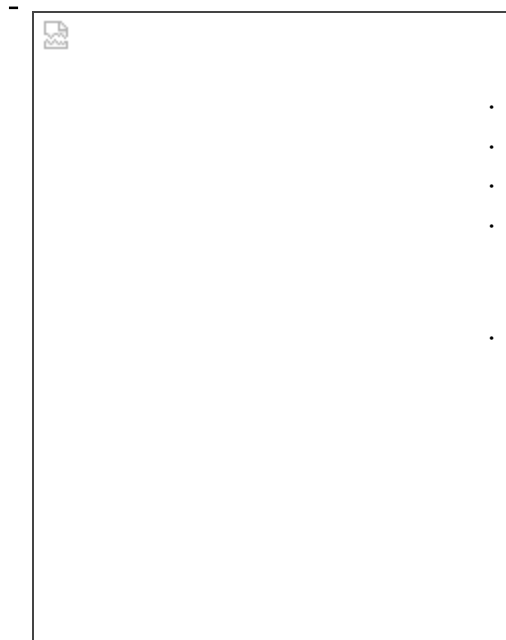
(August) has created pools and scouring of the creek bottom on the north and south sides of the Watershed. In addition, vehicular traffic through the creek in the area of the City wells has created an area of low water velocity.

Culverts have intercepted portions of Henry Creek. In some cases, they are absent or inadequate at four of the six road crossings of the gravel access road. (Refer to Figure 2-6) A mainstem crossing of a dirt access road and a tributary crossing of an old haul road have no visible culverts present.

Information Gaps

Figure 2-5

- Classification and typing of channels and tributaries



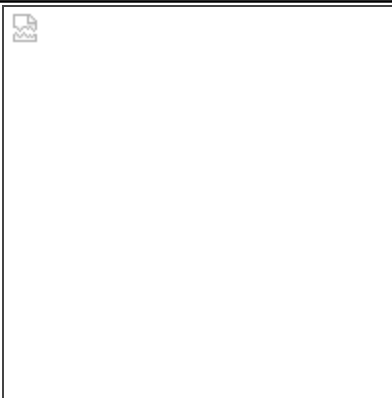
Recommended Actions Items

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- Improve roadways and allow for 4-foot crossings
- Replace culverts to allow for peak flow
- Improve channel canopy to minimize evaporation
- Minimize erosion by manual brush removal of non-native species and replant with native plants indigenous to the Watershed
- Limit human access to Henry Creek and the riparian area

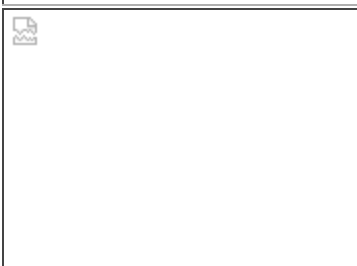
Figure 2-6

Wildlife Habitat

Figure 2-7



The Watershed provides habitat for diverse species of wildlife. More than 82 species of birds, 38 species of mammals, 9 species of reptiles, and 7 amphibian species are likely to locate within the Watershed and may have done so in past years. The consulting firm, Flora and Fauna, identified 49 species of mammals, 5 mammals, and 1 amphibian during a site visit. Since the first wildlife inventory conducted more than 25 years ago, there has been a decrease in the wildlife present e.g., no viewings of great horned owls, cooper's hawks. However, the Watershed today still maintains a healthy habitat for red-tailed hawks (refer to Figure 2-7), western tanager and other avian species.



Snags are critical habitat for many species. Snags are dead trees. Over 30% of bird species rely on cavity-nesting habitat. Refer to Figure 2-8 for an image of a nesting cavity.

The importance of maintaining connectivity to and from the Watershed and nearby habitats for certain terrestrial species i.e. black-tailed deer, is important to their continued existence within

the region. Presence of wildlife is also important to control vegetation in the Watershed. Currently the Watershed is connected through adjacent fields to upland forests. However, with increased pressure from agriculture and local vineyard owners/operators, these connections may be more difficult to maintain and cease altogether. Additional information is located in Appendix F.

Information Gaps

Seasonal surveys of flora and fauna with particular emphasis on species at risk, threatened, and endangered species

Recommended Actions

- Release oaks to further renew oak canopy
- Survey for the presence of sensitive, conditional, threatened, and endangered species
- Arrange for conservation easements to prevent the degradation of wildlife corridors which pass through adjacent lands into and out of the Watershed

Water Quantity and Hydrology

City of Lafayette has developed the Watershed to serve the City's water needs. Refer to Maps 2-2 and 2-3 for locations of the City wells and springs. Wells 2 and 10 terminate approximately at the faulted contact between the CRBG and the marine sedimentary rock units. The low permeability of the marine sedimentary rocks serves as a confining unit or barrier for deeper groundwater. Refer to Map 2-4 for a diagram of the inferred geology of the area.

Groundwater flow direction and gradient in the vicinity of the Watershed were estimated by Dennis Nelson from the Oregon Health Division - Drinking Water Program for their delineation of Drinking Water Protection Areas for the City wells and springs. Groundwater flow patterns were inferred. The results suggest that the groundwater flows from the upland of the Red Hills of Dundee towards the Yamhill River. Local recharge of the basalt aquifer through fractures and exposed interflows likely occurs from rainfall within the Red Hills. Much of the local aquifer probably discharges to the Yamhill River.

City wells (1, 2, 8, and 10) are authorized for consumptive use of groundwater to the City and are located within the well recharge area within the Watershed. Based on 1999 usage data, City Wells 1, 2, 8, and 10 use approximately 50-70% of the annual estimated recharge to the lower watershed basalt aquifer.

Geologically, springs occur when the water table is provided an avenue directly to the ground surface. The most common method for spring development is the presence of an impermeable rock body underlying a more permeable rock unit in an area of significant topographic relief. For what is assumed to be the geologic control of Lafayette Springs, the primary control is the contact between the overlying Columbia River Basalt flows and the underlying less-permeable marine sedimentary rocks, (refer to Appendix H for detailed information of the geology of the springs).

Of primary importance to the integrity of City springs, is the delineation of the Critical Recharge Area for the springs. The actions that might occur in these sensitive areas have the potential to degrade water quality. Refer to Maps 2-5 and 2-6 for identification of the Critical Recharge Areas and hydrogeologic mapping. For the City springs, the Potential and Critical Recharge Areas delineated by the Oregon Health Department staff encompasses approximately 1,189 acres, and the Critical Recharge Area approximately 438 acres. Based on the planning level water budget reviewed by CH2M Hill and the

Department of Health, the water right allocation in the Critical and Potential Recharge Areas for the City springs appears to be maximized or possibly even over-appropriated. In recent years, the City has drawn approximately 700,000 cubic feet per month from the watershed. The most reliable supply is from Blue Bird Springs which supplies most of the water during the winter to the residents of Lafayette, together with Wells #8 and # 10. ~~(refer to Figure 2-6 and 2-7).~~

Springs within the Watershed which also provide water to the City. These diversions, together with the draw down from the wells, may have an adverse impact on the water table and Henry Creek itself. Well #10 has reached capacity and no further improvements are recommended to Well #10. Other developed groundwater sources within the Watershed have reached maximum potential as well. Water diversions directly affect the summer flows of Henry Creek. Additional information is located in Appendices G and H.

Information Gaps

- Impact of rainfall on water quantity
- ~~Streamflow~~ Stream flow data for entire watershed
- Impact of water well withdrawals from adjacent landowners
- Groundwater and spring data and its relationship to surface water

Recommended Actions

- Install gauging stations in Henry Creek to measure ~~streamflows~~ stream flows
- Conduct a groundwater/surface water evaluation to determine relationship

Water Quality

Water quality is based on records developed by the City as part of their chemical and physical characterization of drinking water, and reports from CH2M Hill. Based on records to date, there is no significant chemical impact to the water supply system, with the exception of ~~N~~ nitrate levels which are slightly in excess of federal standards, and lead levels ~~MCLs~~. The assessment only included an evaluation of water quality directly related to potential impacts within the Watershed, and did not include water quality concerns as part of the City's water supply infrastructure.

Information Gaps

- Turbidity levels, ~~t~~ Temperature have not been determined in Henry Creek
- Water chemistry of Henry Creek has not been characterized
- Herbicide and pesticide use for surrounding areas of agriculture ~~al~~, forest, residential has not been determined
- Nonpoint source pollution data

Recommended Action ~~Items~~

- Expand water quality monitoring to Henry Creek
- Conduct physical and chemical analysis of Henry Creek surface water
- Assess nonpoint source pollution which has not been characterized

Sediment Sources



Soils of the Watershed are from the Jory series. These are well drained, moderately deep clay loams and silty clay loams that formed from colluvium derived from basalt rock (Columbia River Flows). Runoff from bare soil is rapid and erosion hazards on the steeper slopes of the Watershed (>30% grade) can be severe (refer to Figure 2-9). On steeper slopes there is a hazard of landslides or ground slumping of soil from the base of basalt rock. This can be seen in a recent and on-going headwall slide area located below the southern corner of the upper clear-cut.

The productivity of Jory soils is good ranging from site Class III to II2. These soils are well suited for growing Douglas-fir and mixed conifer/hardwood forests. Roots penetrate to a depth of 40 inches to more than 60 inches.

Figure 2-9

Watershed roads are stable and show few signs of erosion problems (refer to Map 2-7, Watershed System Roads and Streams). The main, rock road enters the Watershed on the west line near the southwest corner. It stays low on the Watershed, crossing Henry Creek once (18-inch concrete culvert) before the maintained rock surface stops about half-way up the Watershed just past Well #10. From that point the earth-surface road continues along the Creek to the riparian zone, crossing the Creek twice (culverts are tiny 6-inch pipes and undersized) and terminating at Pringle Spring (refer to Figure 1-4).

For the most part, sediment sources to Henry Creek are limited. Although steep upland slopes (refer to Figure 2-8) are located adjacent to Henry Creek, these areas include approximately a 50 foot buffer where no roads or logging has taken place. Sediment which does impact Henry Creek comes from upland areas where roadways intercept the Creek and where upstream scouring has occurred. Fine sediments on the south side of the Watershed have accumulated at turns and bends in Henry Creek causing a fanning out of the Creek bed.

Information Gaps

- Field verification of eroding stream banks

Recommended Action Items

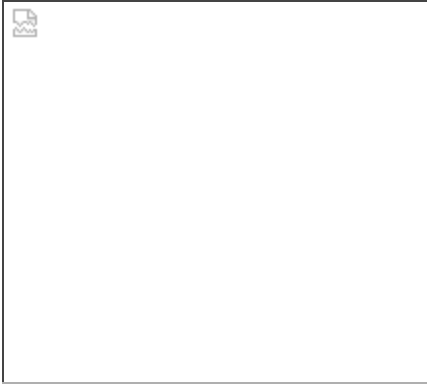
- Replace culverts
- Re-establish eroding stream banks

Vegetation

Figure 2-10



The Watershed contains a rich variety of botanical sources. The most notable plant community is the stand of mixed conifer/hardwood forest, particularly those containing large Oregon white oak (refer to Figure 2-10), some remnants from the more open landscape of 200+



years ago. Oak woodland forests are of special interest to the wildlife and botanical community because of the rapid disappearance of this habitat type and the declining populations of animals and plants that depend on them (refer to Map 2-8, Aerial Photo of Timber Types).

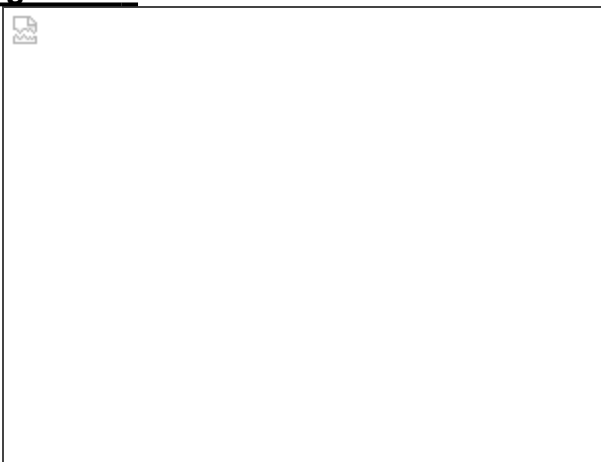
Mature forest stands. The forested acres are primarily mixed stands of big_leaf maple, Douglas fir and Oregon white oak. ~~Minor~~ Other tree species include Pacific madrone (primarily on the upper, drier slopes below the large clear_cut), Pacific dogwood, grand fir, Pacific yew, cascara and cherry. The riparian forest of Henry Creek is dominated in places by red alder, black cottonwood, and the

non-native flowering cherry. Many Oregon white ~~oak~~oaks are near or in this zone, especially in the upper reaches of the Watershed~~Henry Creek~~.

The mixed conifer and hardwood type is quite varied. The Douglas fir/oak association is prevalent on some of the dryer, south facing slopes; in most areas the mix is comprised mainly of big_leaf maple and Douglas fir. On steep north facing slopes (particularly above the draws, big_leaf maple often makes up more than 50 percent of the timber volume. Near the tops of minor ridges and on south slopes fir tends to dominate (refer to Figure 2-11). Although no formal timber inventory has been conducted, randomly taken prism-point samples indicate that most stands are fairly low in density (in the range of 80- to 120 sq. ft. basal area/acre). Low density has slowed the loss of sun loving Oregon white oak.

-
-
-

Figure 2-11



Most of the Douglas-fir and maple in the mixed stands are between 50 and 70 years old. The current forest began as natural regeneration following heavy cutting around the time of World War II (about the mid-1940's). Much of the Oregon white oak was left uncut at that time because a market was lacking. Patches of smaller fir, legacy oak and big_leaf maple remained after the harvest. Natural regeneration of fir and maple filled in the harvest openings, leading to the mixed variable stands we see today.

In scattered stands, older (legacy) Oregon white oak are being overtopped by faster growing big_leaf maple and

Douglas-fir. If nothing is done about this forest succession process, many of the oak will be crowded out within the next -20 years. (~~refer~~Refer to Appendix I~~H~~, Pages 21 and 24).

Information Gaps

- None

Actions

- ~~Refer to ITS Management Report in Appendix~~ Release white oak by topping up to 24 Douglas fir
- Conduct timber inventory to establish baseline
- Reinventory timber in 2012

- Control big leaf maple sprouts, Himalayan blackberries, Scotch broom, elderberries, and other invasive plants, by manual methods
- Replant areas with native plants
- Continue to mow roadsides
- Seed landings and roadsides after disturbance
- Survey vegetative communities and identify rare and threatened species^H

Social Attributes

-
The Watershed has provided a social and cultural value to the residents of the City and residents adjacent to the Watershed for many years. With increased reliance on the Watershed City of Lafayette for its current and future water supply ~~and increased improvements to the Watershed~~, the City has a valuable and irreplaceable resource. The WCAB recognizes the balance the City has had to make in supporting its revenue needs to provide sufficient and high quality water to City residents at the same time managing the Watershed for diverse uses such as wildlife and public access. ~~The City must protect this resource as well as integrate the historical social values that its citizens and nearby residents have come to appreciate~~

Information Gaps

None.

Recommended Action

- It is recommended that the City not only protect this natural resource but integrate the historical social values that its citizens and nearby residents have come to appreciate
- Refer concerns of the Watershed, to be used as a community amenity, to the City Parks and Recreation Committee.

Section

3

Recommended Actions and Schedule**General Recommendations**

The WCAB divided its recommendations into 2 categories: policy directions described as Recommended Management Goals, and specific activities, described as Recommended Actions. The Recommended Management Goals are intended to provide to the City general policy goals for each ecological attribute based on input from the members of the WCAB, the general public who at times attended the WCAB meetings, and from the public during informational meetings. The Recommended Actions are activities that are intended to be carried out in the short term and long-term and on an ongoing basis to remedy the deficiencies identified, and take preventive actions to prevent future degradation. Specific activities are also outlined in a separate table with a recommended timeframe for carrying out those activities. The following section summarizes the Findings, the Recommended Management Goals, and the Recommended Actions.

Riparian Habitat

· Finding: Degraded riparian habitat is evident in the areas adjacent to Henry Creek. Although there is evident degradation from human intrusion, degradation is also evident from the recent absence of water during the majority of the year due to a combination of capture by the City and persistent drought conditions. Additionally, non-native plants such as Himalayan blackberries, Scotch broom, milk thistle, and others are prevalent throughout the riparian area.

· Recommended Management Goal: Restore, enhance and maintain the riparian areas to support native flora and fauna, and eradicate non-native invasive species and limit human intrusion.

· Recommended Action: It is recommended that:

- The City remove non-native plants within the riparian areas of Henry Creek and replant with native plants, and hardwoods to re-establish forest canopy in the riparian area.

Channel Modification

· Finding: Several locations throughout Henry Creek showed significant channel alterations resulting from bank destabilization, dams created by roadways, and roads in-channel and next to streams.

· Recommended Management Goal: It is recommended that roadways, culverts, and banks which have significant erosion, be restored and maintained.

· Recommended Actions: It is recommended that:

- The City resize and replace culverts to reduce sedimentation and allow for adequate peak

flow and passage of aquatic species.

- It is also recommended that the City prohibit vehicles from entering Henry Creek and damaging the riparian area.

Fish and Fish Habitat

Finding: The fisheries expert for the WCAB was unable to provide sufficient resources to inventory fish and aquatic habitat. It has been suggested that in years past populations of cutthroat trout and Coho salmon inhabited Henry Creek. These are listed species under the Endangered Species Act. Stream flows are minimal during the winter rainy-season months and in most cases, non-existent during the dry summer months which decrease likelihood of finding aquatic species during low flow conditions, and subsequently, the likelihood of finding salmonid habitat. Based on interviews with long-term residents and adjacent landowners, these minimal to non-existent stream flows are new - within the last few years. Refer to Appendices F and I.

Recommended Management Goal: Maintain Watershed function and restore fish habitat to historic conditions, wherever feasible.

Recommended Actions: It is recommended that:

- An expert in fisheries undertakes assessment and evaluation of habitat conditions and inventory aquatic species present in the Watershed.
- City staffs evaluate the potential to remove down-stream impoundments to allow for passage of anadromous and indigenous fish.
- Although not part of the City-owned watershed, the down-stream impoundments connect fish habitat to the confluence with the Yamhill River and Henry Creek. The WCAB recommends that the City restore the flow of Henry Creek headwaters to the extent possible and practically feasible. The increased flow would serve to provide for fish passage as well as improve water quality within Henry Creek.

Wildlife Habitat

Finding: The Watershed provides habitat for diverse species of avian and terrestrial species. Many species of wildlife have been observed in the watershed. The importance of maintaining connectivity to and from the watershed and nearby habitats for certain terrestrial species i.e. black-tailed deer, is important to their continued existence within the region. There is also mutual value to the City to continue to allow wildlife to pass through the Watershed. Deer and other terrestrial animals help manage the vegetation through browsing. Currently the Watershed is connected through adjacent fields to upland forests. However, with increased pressure from agriculture and local vineyard owners/operators, these connections may be more difficult to maintain and cease altogether. Refer to Appendices F and I for additional information.

Recommended Management Goal: Protection of existing habitats and restoration of threatened or degraded habitats are necessary to promote species diversity and ensure that populations of indigenous species are maintained. In order to meet this management goal, it is recommended that vegetation management practices include management of vegetation to meet the Forest Practices Act requirements and supplement those requirements with additional practices i.e. releasing oaks, in order to maintain the diverse wildlife habitat prevalent within the Watershed.

Recommended Actions: It is recommended that:

- The City protect and enhance habitat for avian, terrestrial and aquatic species such as releasing oaks to renew oak canopy.
- The City conduct a survey for the presence of sensitive, conditional, threatened, and endangered species.
- The City work with adjacent landowners to arrange for conservation easements to prevent the elimination of wildlife corridors which pass through adjacent lands into and out of the Watershed.
- The City maintain riparian areas and limit riparian intrusion to restoration practices; selectively top 24 Douglas-fir trees that threaten Oregon white oak; mark wildlife trees, legacy trees and snags. When lacking, create snags and down logs; provide additional small mammal, amphibian, and reptile habitat by creating brush piles;
- The City manage abundant resprouting maple for future snags and down logs.

Water Quality, Hydrology and Water Use

Finding: The Henry Creek Watershed is dominated by streams, and springs within the Watershed and high quality groundwater which serve as a primary source of drinking water to the City of Lafayette. Springs and groundwater have been intensively utilized to serve as a water supply for the City. Maximum use of low summer flows is a principal limiting factor in restoring aquatic habitat and species.

The Oregon Department of Health identified 1-, 2-, and 5- and 10-year time-of-travel capture zones around the wells and critical and potential recharge areas for the springs. The capture zones include distances between active wells and the northwest boundary of Lafayette's watershed and beyond to the northwest. The recharge areas include much of the upper clear-cut area and beyond to the northeast.

The City has little to no control over the activities within the Critical Recharge Area which include farming, forestry, and residences. Chemicals and hazardous materials used in these areas have the potential to adversely impact the water quality of the Watershed.

Recommended Management Goal: It is recommended that water quality, riparian and aquatic biological productivity be maintained and enhanced through the use of good stewardship management practices and the implementation of watershed improvement projects. It is recommended that the City manage the use of springs and ground water within the watershed to better enable water use for increasing numbers of Lafayette residents and identify other primary sources of drinking water.

Recommended Actions: It is recommended that :

- The City complete a hydrologic and hydrogeologic study of the Watershed; refine the location of recharge areas building off the work of CH2M Hill and Dennis Nelson with the Oregon Department of Health; manage the use of springs and ground water within the watershed (develop and Watershed Protection Plan)
- Identify other primary sources of drinking water
- Collaboration with forest and agricultural owners to identify potential impacts from chemicals/fertilizers and develop a management agreement to help protect and limit potential impacts to the City water supply.

Sediment Sources

- · *Finding:* Delivery of sediment to Henry Creek is primarily due to surface erosion from removal of vegetation or other type of disturbance. In certain areas of the Watershed, roads are a source of the sedimentation. In other areas, bank destabilization and under sizing of culverts have led to increased sediment loads.
- · *Recommended Management Goal:* It is recommended that roads and culverts be managed and maintained to minimize adverse impacts to the Watershed.
- · *Recommended Actions:* It is recommended that:
 - Location of future timber harvests (if any) be prohibited and roadways be prohibited in riparian areas, except as may be needed for ecological benefits and to maintain the health of the watershed.
 - Vehicular traffic be prohibited near or into Henry Creek.
 - Culverts be resized and replaced to prevent erosion and sedimentation into Henry Creek.
 - Any new roads be earth surface, outsloped to drain naturally where possible, and re-seeded after use.

Chemical Impacts

- · *Finding:* Potential chemical impacts to the Watershed may occur from two sources: sources outside and adjacent to the Watershed and from sources within the Watershed. Currently there is no direct evidence that the Watershed has been significantly degraded from either source.
- · *Recommended Management Goal:* Chemical management received intense attention during WCAB discussions due to the varying opinions of chemical use within a Watershed used as a drinking water supply. Because chemical use has the potential to adversely impact the City's water supply and because low-cost alternative manual practices are available, it is recommended that chemical use be prohibited unless other alternatives have been shown to be impractical. Manual cutting and management is the preferred method.
- · *Recommended Actions:* It is recommended that:
 - Use of herbicides and pesticides within the Watershed especially aerial and broadcast backpack application be prohibited. Manual management of vegetation can be cost-effective when Inmate Work Crews and Juvenile Work Crews are employed.
 - Use of chemicals be considered only when these other alternatives have been shown to be impractical, and then only after review by the City Council.

Vegetation Management

- · *Finding:* There are three main areas of vegetation within the watershed: the riparian area; the clear-cut area, and the mixed forest. Non-native invasive plants are evident throughout the Watershed. Species such as Himalayan blackberries, Scotch broom, elderberry, and milk thistle are found throughout the Watershed. These non-native species are also encroaching on the planted Douglas fir seedlings and interfering with the growth of native plants.
- · *Recommended Management Goal:* Maintaining native diversity and biological richness of the

the City's water supply. With respect to use of the Watershed as a community resource, the Watershed can serve multiple functions as long as those actions do not further degrade the quality of the Watershed.

"Recognizing the watershed holds potential for human recreation and education which may serve the community", the WCAB recommends that the City of Lafayette's Parks and Recreation Committee further explore the potential for these values in the Watershed. The most vulnerable areas are the water supply facilities, the critical recharge area, and others, and it is recommended that these areas be restricted. The WCAB recommends that any access accommodate higher priorities - specifically the protection of the Watershed for reasons of water quality and quantity; protection of water supply facilities from damage, vandalism or security measures, and protection of the ecosystem and flora and fauna. It is also suggested that access must further respond to, and accommodate the potential for changing water facility infrastructure on the site, and address legal access requirements. The WCAB favors a measured/phased approach to ensure priorities are being met, and recommends that public access be restricted to group guided tours and permits only.

The WCAB feels that heightened security concerns since September 11, 2001 render additional access incompatible at this time, but does not wish to eliminate such consideration in the future in the event that conditions become more favorable.

Recommended Action: It is recommended that:

- o The City's Parks and Recreation Committee evaluate issues and recommend to the City future use of the Watershed e.g., park, access to the Watershed with/without permit, as part of a City sanctioned tour group, and means to address security concerns. **Note:** Access and security were the second most discussed areas by the WCAB.

Monitoring and Assessment

Finding: Other than monitoring to comply with the Safe Drinking Water Act requirements as part of a municipal water supply, no other monitoring is conducted within the Watershed.

Recommended Management Goal: Regular monitoring of forest health is critical to any sustainable management program. It is recommended that periodic evaluation and assessment of the watershed toward specific goals followed by an adaptive management program is necessary to meet the vision and goals of the Watershed

Recommended Action: As part of the commitment to OWEB and as a mechanism to continue to monitor the success of the Action Plan recommendations, it is recommended that:

- o A monitoring program be established and implemented through an ongoing volunteer program, with the Yamhill County Soil and Water Conservation District, and/or through the City's Public Works Department.

Other Recommended Actions

In addition to the recommended actions above, the WCAB also recommends the following to meet the vision, goals and spirit of the Plan:

Outreach and Education Program

Finding: The proper functioning of the Watershed depends on the careful management of its resources and integration of human needs, natural habitat, and physical attributes. The community will benefit from an understanding of how Watersheds function.

Recommended Actions: It is recommended that the City support development of a watershed brochure to inform stakeholders and school children about the value of the Watershed to their community and methods to protect the Watershed and the water supply for the City. Volunteers from the WCAB have expressed interest in carrying through with this recommendation.

Partnerships and Conservation Easements

Finding: The greater part of the Watershed is outside the City-owned 122 acres and is subject to other land uses which can adversely impact the Watershed's ecosystem and the City's water supply. Drainage of these areas is toward the City's portion of the Watershed, and open spaces adjacent to the Watershed provide for connectivity of wildlife.

Recommended Action. It is recommended that the City initiate a collaborative effort with adjacent landowners to share information as it is being developed e.g., watershed studies, chemical applications, conservation easements, and land use surrounding the Watershed. WCAB members have expressed interest in providing volunteer hours to prepare conservation easements with adjacent landowners for consideration by the City Council.

Fire Management Plan

Finding: Fire management is a priority concern for the Watershed, the City, and surrounding residences. Fires have threatened the Watershed in past years. Although fire was a part of the historic disturbance regime of the Dundee Red Hills and throughout the Willamette Valley foothills, the current risk of fire is moderate to low. Fire risk is highest from July through early October, with low-to-minimal risks the rest of the year. Increased visitor use and dense, unmanaged fir plantations can lead to heightened fire hazards. The City of Lafayette Volunteer Fire Department contacted the WCAB prior to the final Board meeting to collaborate on the development of a management plan.

Recommended Actions: It is recommended that:

- The City establish a subcommittee to identify methods to assess and minimize the potential for fires. Potentially include the Lafayette Volunteer Fire Department, residents near the Watershed, the Department of Forestry, and other stakeholders.
- Practices to reduce fire risk include encouraging hardwoods as firebreaks, controlling visitor access, preventing trespass, and prohibiting open fire and overnight use.

Wetlands Inventory

Finding: No wetlands inventories or studies have been conducted within the Watershed.

Recommended Action: It is recommended that the City review National Wetlands Inventory maps and conduct field studies to identify natural and jurisdictional wetlands within the watershed. The inventory will enable the City's Public Works Department to better manage their operations within the Watershed and comply with federal and state wetland requirements.

Securing Additional Adjacent Lands

- · Finding: The size of the City-owned Watershed is 122 acres. This is only a small portion of the entire watershed.
- · Recommended Action: It is recommended that a subcommittee be formed to evaluate the potential for acquiring additional acreage within the Henry Creek Watershed to expand the City's ownership and control and seek to prevent potential adverse impacts to the City's Watershed from external sources.

Additional Funding and Grants

- · Finding: Grant dollars are available at the State and Federal levels which can be used to finance the recommended actions.
- · Recommended Action: It is recommended that additional grant opportunities be sought to carry out the recommended actions. WCAB members have expressed interest in supporting the preparation of additional grant applications to implement recommended actions.

Development of a Watershed Protection Plan

- · Finding: Based on the findings of potential impacts from outside sources, observations of degraded habitat and sedimentation issues, the City could benefit from a Plan focused on Watershed protection.

The Oregon Health Division–Drinking Water Program has established Drinking Water Protection Areas (DWPAs) for the city's water sources. It has identified 1-, 2-, 5-, and 10-year time-of-travel capture zones around the wells, and critical and potential recharge areas for the springs. The capture zones include distances between the active wells and the northwest boundary of Lafayette's watershed and beyond to the northwest; the recharge areas include much of the upper clear cut area and beyond to the northeast.

- · Recommended Action: It is recommended that:
 - o A Watershed Protection Plan be prepared. This would include a Plan focused on spring as well as well-head protection to protect the City's water supply, management within the Critical Recharge Area, and best management practices to ensure the safe use of machinery and day-to-day actions to prevent adverse impacts to the Watershed. This Plan may also include a training program for City staff with respect to best management practices.

~~**Riparian Habitat:** Control invasion of non-native plants i.e. Himalayan blackberries of Henry Creek riparian area and replant with native plants, hardwoods to re-establish forest canopy in the Henry Creek riparian area.~~

~~**Channel Modification:** Resize and replace culverts to reduce sedimentation and allow for adequate peak flow and passage of aquatic species.~~

~~**Fish and Fish Habitat:** Evaluate the potential to remove down-stream impoundments to allow for passage of anadromous and indigenous fish.~~

-
Wildlife Habitat: Protect habitat for avian, terrestrial and aquatic species. Identify sensitive, conditional, threatened, and endangered species. Identify priority corridors through adjacent land for connectivity of wildlife to the Watershed and meet with landowners to arrange for conservation easements. Maintain riparian areas and limit riparian and reserve management to restoration practices. Selectively top 24 Douglas-fir trees that threaten Oregon white oak. Mark wildlife trees, legacy trees and snags. When lacking, create snags and down logs. Provide additional small mammal, amphibian, and reptile habitat by creating brush piles.

-
Water Quality, Hydrology and Water Use: Complete a hydrologic and hydrogeologic study of the Watershed. Refine the location of recharge areas building off the work of CH2M Hill and Dennis Nelson with the Oregon Department of Health. Manage the use of springs and ground water within the watershed to better enable water use for increasing numbers of Lafayette residents and identify other primary sources of drinking water.

-
Sediment Management: Prohibit location of future timber harvest and roadways from riparian areas. Prohibit vehicular traffic near or onto Henry Creek. Improve culverts to prevent erosion and sedimentation into Henry Creek.

-
Chemical Management: Prohibit use of herbicides and pesticides within the Watershed especially aerial and broadcast backpack application. Chemicals will be used only when other alternatives have been shown to be impractical.

-
Vegetation and Forest Management: Manually remove (cut) non-native plants e.g., blackberries, scot broom, thistle, bigleaf maple, with a priority given to areas near new seedling plantings (each fall, spring, summer). Select maples for retention and remove others manually. Maples selected need to be thinned and managed. Release conifers from competition by hand cutting. Seed landings and roadsides after disturbance (use native grass/forb species).

-
No commercial tree harvest is recommended within the Watershed. In 2012, a forest inventory is recommended to establish baseline conditions.

Other Recommended Actions

-
In addition to the recommended actions above, the WCAB also recommends that :

-
Outreach and Education Program: Develop an outreach/education program to inform stakeholders and school children about the value of the Watershed to their community and methods to protect the Watershed and the water supply for the City.

-
Access and Security: Recognizing that the watershed holds potential for human recreation and education, and emotional and spiritual replenishment which may serve the community, the WCAB recommends that the City of Lafayette's Parks and recreation Committee further explore the potential for these values in the Watershed in those areas removed from actual water supply facilities, the critical recharge area, and other sensitive areas. Any resulting access must accommodate higher priorities—specifically the protection of the Watershed for reasons of water quality and quantity; protection of water supply facilities from damage, vandalism or security measures, and protection of the ecosystem and flora and fauna. Access must further respond to, and accommodate the potential for changing water facility infrastructure on the site, and address legal access requirements. The WCAB favors a measured/phased approach to ensure priorities are being met, and recommends that public access be restricted to group

~~guided tours and permits only.~~

~~Public access to the Watershed is currently limited to those with permits issued by the City. The issue of public access vs. security is unresolved. The WCAB recommends that a subcommittee be established to further evaluate issues and recommend to the City use of the Watershed as a park, access to the Watershed with permit, as part of a City-sanctioned tour group, and means to address security concerns.~~

~~**Partnerships:** The greater part of the Watershed is outside the City-owned 122 acres and is subject to use of agricultural chemicals, chemical application by residences. Drainage of these areas is toward the City's portion of the Watershed. It is important for a collaborative effort to be established to share information regarding watershed studies, chemical applications, and land use surrounding the Watershed.~~

~~**Fire Management Plan:** Although fire was a part of the historic disturbance regime of the Dundee Red Hills and throughout the Willamette Valley foothills, the current risk of fire is moderate to low. Fire risk is highest from July through early October, with low-to-minimal risks the rest of the year. Increased visitor use and dense, unmanaged fir plantations can lead to heightened fire hazards. Practices to reduce fire risk include encouraging hardwoods as firebreaks, controlling visitor access, preventing trespass, and prohibiting open fire and overnight use.~~

~~Establish a subcommittee to identify methods to assess and minimize the potential for fires. Potentially include the Lafayette Volunteer Fire Department, residents near the Watershed, the Department of Forestry, and other stakeholders.~~

~~**Wetlands Inventory:** Review of National Wetlands Inventory maps and field reconnaissance are need to identify natural and jurisdictional wetlands within the watershed. WCAB recommends the establishment of a subcommittee to review.~~

~~**Securing Additional Adjacent Lands:** The size of the City-owned Watershed is 122 acres. It is recommended that a subcommittee be formed to evaluate the potential for acquiring additional acreage within the Henry Creek Watershed to expand the City's ownership and control and seek to prevent potential adverse impacts to the City's Watershed from external sources.~~

~~**Additional Funding and Grants.** Identify other grant opportunities to implement recommended actions.~~

~~Timetable~~ Schedule for Implementation

Implementation of the actions are primarily through existing City of Lafayette budget set-asides for maintenance of the Watershed, from volunteer efforts, and from securing of additional funds through grant opportunities.

The following schedule was prepared to assist the City in implementing the actions described in the Plan. The majority of the actions can be initiated in 2003 while others such as re-inventory of timber are recommended for 2012. Other than for routine maintenance actions, e.g., mowing roadways, replanting roadways with grasses, signage and blocking to prevent unlawful trespass, which would be paid for from the City budget, the funding for the remainder of the actions would be secured through grants. Certain members of the WCAB have agreed to volunteer their time to assist the City in preparing grant applications.

For implementation purposes, the actions have been grouped together in the following categories:

-
-
- Grant Application Development
-
- Water Quality and Quantity
-
- Restoration and Enhancement
-
- Partnerships and Easements
-
- Vegetation Management
-
- Access and Security
-
- Public Outreach and Education
-

Timeframe	Action	
2002	July	Control blackberry invasion
	Spring	Selectively top 24 Douglas-firs near oak trees
	Summer	Control maple sprouts in both plantations
	Summer	Control elderberry in upper plantation by cutting
	July	Control blackberry in lower plantation by cutting
	July	Mark and clear around oak in plantations
	Summer	Waterbar steep connector road/upper plantation
	Summer	Replace 4 culverts on main road
	Spring	Post and block uncontrolled access points
2003	Jan-Feb	Plant hardwoods/conifers along Henry Creek
	Spring	Conduct timber inventory for baseline information
	Early Summer	Survey vegetative communities in the watershed for rare and threatened plants
		Survey aquatic species for sensitive species and ESA listings
2002-11	Ongoing	Investigate cooperative neighbor agreements
		Seek conservation easements with neighbors
		Mark wildlife trees, legacy trees and snags
		When lacking, create snags and down logs
		Continue to mow roadsides to control invasives
		Monitor watershed conditions
		Monitor water quality and quantity
		Establish recommended subcommittees
		Identify and apply for grants to support actions
2012		Assess 10-year management performance
		Re-write Action Plan and re-inventory resources
-		
-		
-		
-		
-		
-		

Section

4

Public Involvement

Public involvement was the impetus for the creation of the WCAB. Many community members testified at a special public hearing before the Lafayette City Council in July of 1999 to consider the proposed clear cutting in the watershed. Following the decision by the City Council to proceed, over 400 residents signed a petition asking them to reconsider. As many as half a dozen letters to the editor appeared in the News-Register during this initial period. The idea for a WCAB was developed from the concerns of those residents as well as others who wished to see that any future actions in the Watershed be based upon sound, thoughtful planning in consideration of multiple community goals (refer to Appendix J for copies of meeting minutes and to Appendix L for information regarding the special public hearing and public

involvement).

Throughout the process, the WCAB made itself available to the public in several ways:

- All meetings of the WCAB were held in accordance with Oregon's Public Meeting Laws and open to the public. Meetings were held monthly and members of the public were welcome and some did attend regularly throughout the process.
-
- As issues arose during the monthly meetings, and additional input was requested, the City of Lafayette would include Watershed-related information on the monthly water bills to Lafayette residents.
-
- The WCAB held a pre-public meeting and 2 public meetings to solicit input from the residents of Lafayette and other stakeholders.
-
- September 21, 2000 - The WCAB occupied a display table at Wascher Elementary School's open house. Photos, the WCAB Mission Statement, and fliers advertising the upcoming public meeting were displayed. Several residents left brief comments on the subject of public access.
 -
 - November 21, 2000 - A public informational meeting was held at City Hall by the WCAB board to introduce the WCAB's mission statement, describe the board's development, answer questions from the public and hear their concerns.
 -
 - Travis Johnson gave a WCAB presentation at a town hall meeting held April 7, 2001 explaining options for the future of the watershed and inviting public input.
-
- Surveys soliciting public opinion on watershed issues were enclosed in the January, 2001 monthly water bill to residents

Until grant dollars are obtained, certain priority actions within the Plan can be carried out at low cost using Inmate Work Crews and staff from the Yamhill County Soil and Water Conservation District. Funding would be secured through the City's set-aside for maintenance of the Watershed.

Budget for Recommended Actions

Budgets for the recommended actions will need to be developed prior to implementation. Because of the priority in removing invasive species, budgets were developed for both chemical treatment and manual removal; the latter being the action implemented. Therefore, an estimated budget was prepared for each approach.

The following budget summary involves the use of chemical treatment for big leaf maples and Himalayan Blackberries together with a forest inventory. The purpose in including the cost for chemical management is to compare those costs to the costs for manual removal using the Inmate Work Crew Program.

<u>Action</u>	<u>Budget Estimate (2002 Values)</u>
-	
-	
Forest Inventory	\$1,800
Upper Plantation Maintenance	
Bigleaf Big leaf Maple	\$1,750 (chemical treatment)
Red Elderberry	\$1,100 per 1,100 per visit (manual) X 3 = \$3,300 \$350 manual cutting
Lower Plantation Maintenance	
Bigleaf Big leaf Maple	\$650 (chemical treatment)
Himalayan Blackberry	\$450 per visit (manual) X 3 = \$1,350 \$400 per visit (chemical) X 2 = \$800 \$600 per visit (manual) X 3 = \$1,800
Replace 4 culverts	\$1,200
Plant Survey	\$1,500
Aquatic Species Survey	\$3,500
-	
-	

The labor for professional services e.g., surveys, Best Management Practices and Water Supply Protection Program, Aquatic Species Surveys, preparation of conservation easements will be either through volunteers or through a fee-based contract with professionals. The costs can vary.

The following is a cost summary (refer to Table 4-1) of actual costs to manually remove the invasive species utilizing Inmate Work Crews. The greatest savings can occur with the use of manual labor by Inmate Work Crews and coordination with the Yamhill County Soil and Water Conservation District.

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Table 4-1: Summary of Costs to Manually Remove Invasive Species

<u>Category</u>	<u>Hours or Units</u>	<u>Cost Per Hour</u>	<u>Total</u>
Personnel			
SWCD Project Coordinator	16	\$25.84	\$413.44
SWCD Weed Coordinator	30	\$13.44	\$403.20
Contracted Services			
Inmate Work Crew (6-12 people each time)	10 days	\$175	\$1750
Materials			
Flagging and marking tape	20	\$1.5	\$30
Travel			
Mileage for vehicle use	160	\$0.365	\$58.40
Equipment			
Weed wrench tools	3	\$20	\$60
Project Subtotal			\$2715.04
Project Administration (10% of project total)			\$271.50
Total Project Expenses			\$2986.54

Map 5-1 illustrates the sections (1-8) which are targeted for manual removal of invasive species. Based on the comparison of chemical treatment vs. manual removal, it is less costly per event to remove invasive species manually. However, this may be misleading since chemical management may have a more long-term effect than manual removal.

Grant and Cost-sharing Opportunities

State and federal programs offer grants to municipalities for protection and enhancement of watershed ecosystems. In addition, federal grants are becoming available for water supply systems which seek additional security measures in light of potential terrorist threats. The WCAB recommends that the City pursue grant funding in order to implement the recommended actions. The following is a brief listing of the grants available.

Wildlife Habitat Incentives Program (USDA) – Natural Natural Resources Conservation Service. This is a cost-share program for wildlife habitat improvement. This may cover snag creation and white oak release.

Noxious Weed Control Program, Oregon Department of Agriculture. This is a grant program for noxious weed control.

OWEB, Oregon Watershed Enhancement Board. Provides grants for water quality and fish

enhancement and protection. May cover culvert replacement and riparian and tree projects.

Jobs in the Woods Program, US Fish and Wildlife Service. Grant program for habitat restoration providing employment opportunities. May cover snag creation, maple sprout encouragement, noxious weed control, white oak release.

- Oregon Grape (20)
- Pacific Dogwood (10)
- Pacific Madrone (30)
- Red Alder (10)
- Red Elderberry (20)
- Red Flowering Current (20)
- Snowberry (24)
- Vine Maple (20)
- Grand Fir (20)
- Valley Ponderosa Pine (20)

Removal of Invasive Species Begins

During winter 2003, the City contracted with the Yamhill County Soil & Water Conservation District to begin a project to remove invasive species from the Watershed. Refer to Map 5-1 for locations. It was determined that the dormant season would be the best time to begin removal. The before and after pictures below (Figures 6-1 and 6-2, and 6-3 and 6-4) illustrate that the seedlings compete with the invasive species for nutrients and water. The seedling marked with the pink ribbon in the before picture was one of several that were overtaken by both invasives and drought. At the time of this writing, Inmate Work Crews are in the process of removing Scotch Broom, Himalayan Blackberries, Milk Thistle, and cutting back big leaf maples. Some of the effects of their work are readily seen in the following pictures.

Figure 6-1, Before Removal

Figure 6-2, After removal

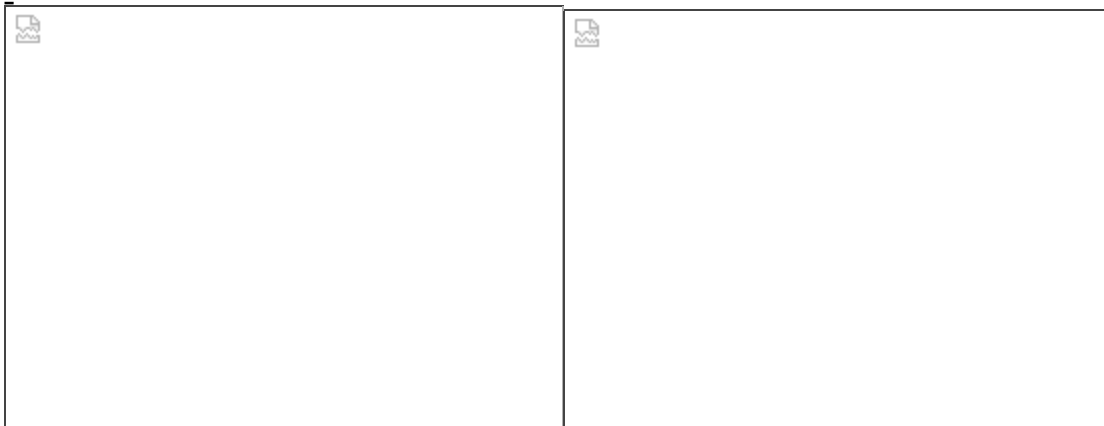


Figure 6-3. Before

Figure 6-4, After

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