

Inventory and Channel Assessment Report For Springfield Waterways



Pierce Channel
Reach Plot



Q St Floodway
Concrete Control Structure



August 2004

Environmental Services, Water Resources

Acknowledgements

This report was prepared by the Water Resources section of the Environmental Services Division of Springfield Public Works by Sunny Washburn.

The Project Overview-Summary includes information provided by the “Summary of Internship Activities” prepared by Shawn Krueger and David Irons, interns with the City of Springfield on the channel assessment 2002 project.

Site-specific assessment reports and maps were prepared by Sunny Washburn; City of Springfield / Environmental Services, Water Resources Section.

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CC	Moon Mt. West System
DD	Mt Vernon Channel
EE	North Ridge & 9th Channel
FF	Over/under Channel
GG	Pierce Channel
HH	Q St Floodway
II	Q St Floodway - 30 th Channel
JJ	Riverview - Augusta Channel
KK	River Glen Channel
LL	Sportsway Channel

Introduction and Background

This report is an assessment of the condition of the City's open channel stormwater drainage system. Data in the report categorizes, describes, and summarizes the physical characteristics of the various systems throughout the City, in terms of the channel configuration, the adjacent land uses, and certain water quality parameters. To this end, it represents a 'snapshot' of the City's drainage system at the time of the survey (summer, 2002) as viewed through several qualifiers, and seeks to present this large amount of data in a usable and informative format.

The assessment includes basic water quality data, surrounding land use, observed plant and animal species, and measured channel configuration data at plot locations. Knowing channel configuration will enable City staff to refine the water storage potential of the channels, and so determine discharge and flow rates. Other information will assist with land use planning, state and federal water quality permitting and compliance, and provide important information to the City's Engineering, Maintenance and Planning staff, with regard to the overall condition and capacity of the City's open drainage system. It serves as an inventory of baseline information to assist with development of the City's Storm Water Management Plan Program and the associated Stormwater Management Plan, and important background information to assist with Springfield's Stormwater Facilities Master Plan. It's in this capacity that this report becomes an active and integrated part of the City's stormwater management program. Finally, it provides a significant amount of 'real time' information for staff regarding channel condition and capacity, riparian health, invasive species, and water quality in the City's open drainage system.

Regulatory Context

This assessment is situated in, and contributes to, a complex regulatory landscape. Specifically, the assessment was designed to address the following 'data gaps' within the City system:

- Collects baseline information on channel configuration and capacity for future stormwater modeling efforts and maintenance activities, and identifies potential point sources of pollution.
- Gathers baseline information on existing water quality, riparian vegetation, and bank damage from invasive plant and animal species.
- Using a defined scoring system, evaluates the overall health of the water quality system and riparian areas.
- Gathers information on and provides for mapping in-channel structures such as staff or stadia gauges, weirs, culverts, abutments, and drop structures.
- Identifies project opportunities to enhance the system, stabilize channel and riparian zones or initiate neighborhood education projects.
- Identifies native plant seed collection sites for City riparian restoration projects.

Springfield is affected by several state and federal regulations which make this assessment especially relevant. The Federal **National Pollutant Discharge Elimination System (NPDES)** permit program is a provision of the Federal Clean Water Act (CWA), and regulates stormwater discharges to waters of the State. Implementation of this program has been delegated to the States. The Oregon Department of Environmental Quality is responsible for implementation in Oregon.

Under this program, the City of Springfield is a 'Phase II' Municipal Separate Storm Sewer System (MS4) community. As an NPDES MS4 permittee, the City is subject to requirements regarding how it manages stormwater runoff, both water quantity and quality. This assessment was conducted, in part, to assist with meeting the long-range requirements of this program. The result, the data presented in this report will support the City's CWA-NPDES Storm Water Management Program Plan.

Another provision of the CWA is the requirement that the State develops and implement a **Total Maximum Daily Load (TMDL)** for certain waterways. Provisions of the TMDL program limit the amount of specified pollutants that may be discharged to a listed waterway. In Springfield's case, both the Willamette and McKenzie rivers are listed as 'Water Quality Limited' waterways, and are receiving waters for stormwater runoff from the City of Springfield. While the state's TMDL program is still under development, both of these waterways will receive TMDLs, with the McKenzie being listed for temperature, and the Willamette being listed for both temperature and mercury.

Other programs which benefit from this assessment include the City's response to the Endangered Species Act (ESA), and the Safe Drinking Water Act (SDWA).

The federal **Endangered Species Act** (ESA) provides protection for threatened and endangered plant and animal species. The City of Springfield has a considerable concern regarding the presence of endangered Spring Run Chinook Salmon in the receiving waters of the City's stormwater runoff, primarily in the McKenzie River.

These concerns are two-fold: first, pollutants in contaminated stormwater runoff may present a direct hazard to the health of migrating salmon. Secondly, work practices within the city, both by City crews or developers and contractors, may create adverse conditions in side channels and tributaries affecting spawning and rearing activities by the fish. These 'adverse' conditions consist primarily of erosion from construction sites and sedimentation into spawning and rearing areas of the tributaries. A third concern spanning these two, is creating an adverse temperature regime within the tributaries, which would directly impact spawning, rearing, and migrating populations, both in tributaries and within the main channel of the river.

This assessment identifies factors which may pose a concern for endangered salmonids, including temperature concerns, impediments to migration, and channel/bed conditions. Further, it recommends capital projects intended to remediate identified problems and provides baseline information to assist with assessing any proposed remediation projects.

Springfield relies on groundwater for much of its domestic water supply. The federal **Safe Drinking Water Act** (SDWA) includes provisions for developing wellhead protection plans, including hazardous material storage and handling requirements, mapping and delineation of wellhead-time-of-travel information, and emergency response program development.

Since surface water can influence ground water wells, including long-term contamination of underground aquifers, this assessment included water quality screening and a brief overview of the riparian health and adjacent land uses, which can be useful for wellhead protection planning. Additional information collected by the assessment team included the presence of invasive species, a determination of the dominant plant communities, and the identification, mapping, and seed collection sites of native and threatened riparian plant communities.

Use of this Document

This report presents the project data, and includes a summary of the survey methodologies and protocols. It represents an extensive field effort by City staff, and development of a significant database of information which is summarized in the report. Supporting this information, and not included in the report, is a field manual and data collection forms which were developed especially for this project, and provide detailed inspection and assessment procedures and protocols. The digital database of the survey data is also available. Methods and protocols followed in this field survey are primarily a synthesis of other accepted survey protocols utilized by other agencies and jurisdictions, tailored to more closely fill the needs of the City.

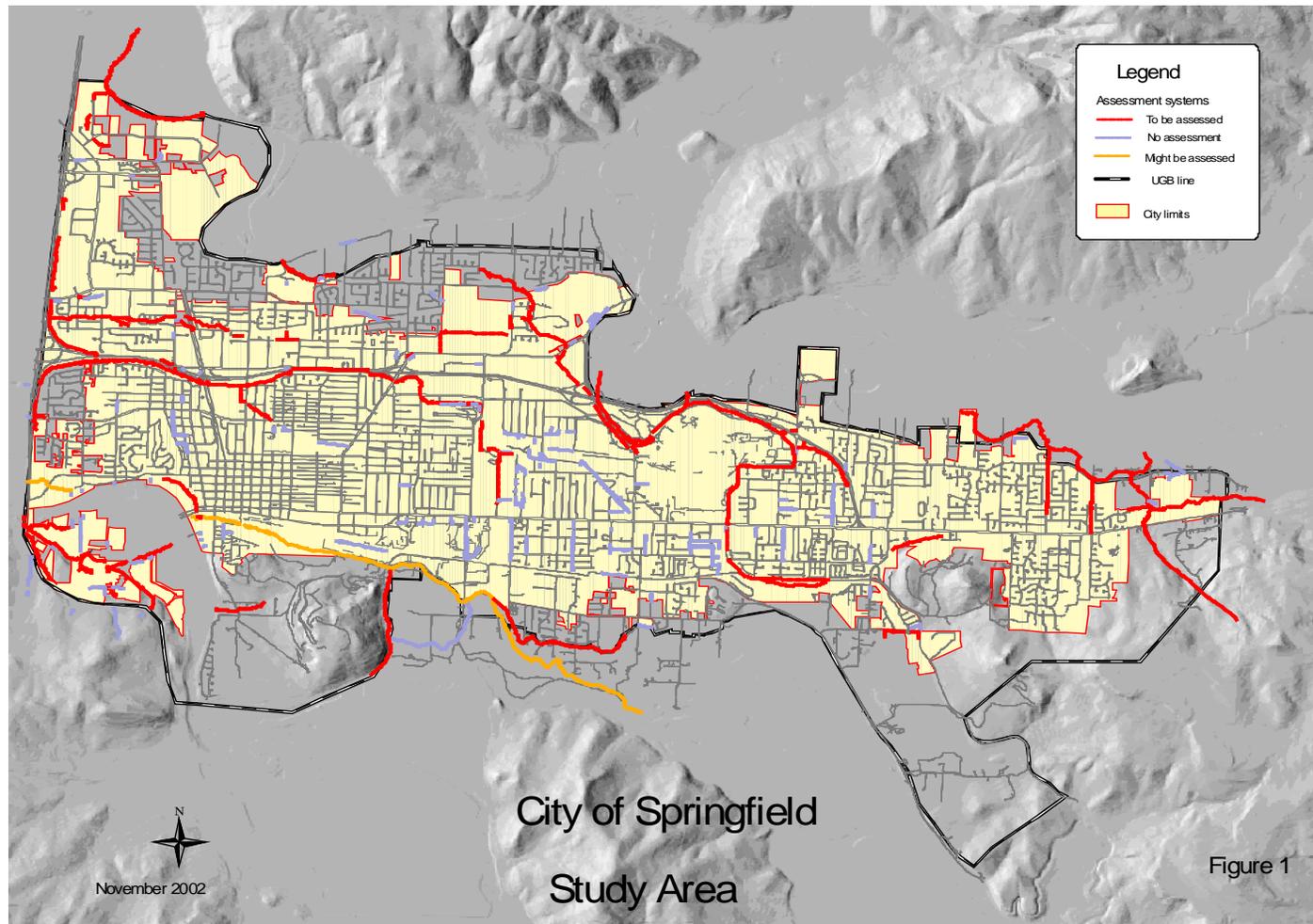
The intention of this study is to be an 'iterative' document, with a capability of seamlessly including new or better data as it is developed. Further, the databases summarized in its development are retained, so data is 'searchable' as new data is included or unidentified needs arise. In this way, the Inventory will stay current, and the Assessment portion becomes a useful tool to track and document the effectiveness of improvement projects, new policies, and growth over time.

This document will be updated periodically, both to include new or refined data and to track the evolution of the present sites, their plant communities, channel condition, and water quality. The original digital databases will be preserved on the City's computer system, both for easy updating and to allow for future searches of the database for other as-yet-unidentified purposes. If you have any questions concerning this data or the assessment or survey methodologies, please contact the Environmental Services Division of the Springfield Public Works Department.

Overview-Summary

Scope

In June 2002, the Water Resources section of the Environmental Services Division for the City conducted a city-wide inventory and assessment of all surface drainage stream and channel systems that discharge to the Willamette and McKenzie Rivers. At the time of this assessment 44 stream systems within the Urban Growth Boundary (UGB) had been identified for the assessment study area. See figure 1, study map.



Methodology

The channel assessment methods were synthesized from several existing assessment protocols, and were enhanced to gather specific information on channel configuration and condition, as well as information from the adjacent riparian areas. Most definitions, protocols and indicators came from the *USDA - Stream Visual Assessment Protocol* and *Clean Water Services (CWS) - Rapid Stream Assessment*. Other sources used were: *The Summary of Current Status and Health of Oregon's Riparian Areas* by Professor Stan Gregory; Oregon State University, the *Oregon Department of Fish and Wildlife (ODFW)*; *The Streamkeeper's Field Guide*, and the *Natural Resources Conservation Service (NRCS) Stream-A-Syst* guide.

The synthesized methodology was reviewed, 'field proofed' to insure its ability to be easily implemented in the field, and assembled into handbook form. Field sheets were developed to record the information in the field. The handbook listed specific objective criteria to be used in assessing and recording relevant information for each section of the field assessment form. The assessment handbook is on file at the City of Springfield Environmental Services Division (ESD).

Data defining the *system/reach structure*, *water/bank profile*, and *riparian profile* was gathered on a reach-by-reach basis. Each system was inspected in the field, using the standardized assessment technique and scoring methodology. Several aspects of each survey site (plot) were subjectively scored from 1 to 10 (see table 3), representing general waterway and riparian area health. An overall health rating was derived from the scoring results. The overall health rating results returned a condition or functional value of poor, fair, good or excellent for the system. This subjective scoring was always based on the consensus of at least two trained observers. While several trained assessors were involved in the study, at least one highly experienced assessor was participating at all times.

All assessment information was recorded on a reach-by-reach basis, with one field data sheet generated for each reach plot. Plots were selected based on the site being representative of the reach. Each system was given a unique identifying name and reach number. A Global Positioning System (GPS) device was used in addition to field maps for recording longitude and latitude of each reach plot, any in-channel structures, or other significant points within the reach. Once the assessment was completed, each site was flagged using surveyors tape with the reach ID, location, and date written on the tape. A digital photo was taken at each assessment plot site. All data was later entered into a database.

Scoring / Rating Methodology

A stream is a complex ecosystem in which several biological, physical, and chemical processes interact. Changes in any one characteristic or process have cascading affects throughout the system (see figure 2). Due to the complexity and changing nature of these variables not all influences in the chart could be investigated. However, this scoring and rating methodology attempts to record the most critical elements of a stream system.

Riparian areas provide critical ecological functions and high biological diversity because they contain components of both terrestrial and aquatic ecosystems. As interfaces between land and water, riparian areas are important for both terrestrial and aquatic biota. Streamside corridors strongly influence water quality, including stream temperature, nutrient loading, sedimentation, and contaminants from terrestrial sources. Food webs in stream ecosystems depend on terrestrial vegetation as source of food (such as leaves, needles, wood) and habitat structure (such as large wood, pool formation, bank stabilization). Birds, mammals, amphibians and other terrestrial animals depend on riparian areas for a variety of habitat, cover, and food sources in close proximity to water (*Gregory, 2000*).

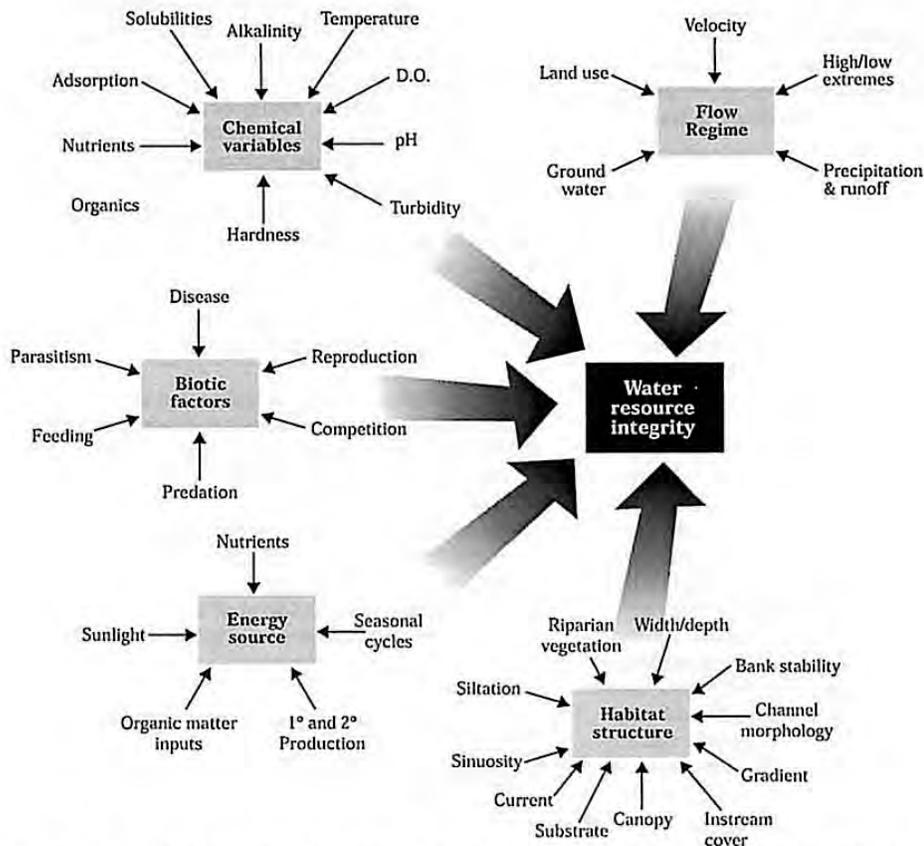


Figure 2 Factors that influence the integrity of streams (modified from Karr 1986)

The eight general scoring categories that were rated in the assessment, with '1' being poor, to '10' being excellent are:

- Channel condition
- Water appearance
- Nutrient enrichment
- Bank stability
- Canopy density/cover
- Invasive damage by plants
- Invasive damage by animals/amphibians
- Manure/Waste presence (waste consisting of human feces or transient camps)

Three additional categories were used for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

- Barriers to fish passage
- Insect/Invertebrate habitat
- In-stream fish cover

(See table 4 for set scoring criteria)

In general, the scoring range of poor (1) described the reach as follows: heavily channelized, down-cut channels with very turbid or visually polluted water, pea green or severe algae blooms, unstable banks with sloughing, <20% of the surface shaded in the reach, extensive damage from invasive plants choking the waterway or overrunning the

riparian area, extensive damage from invasive animals burrowing the banks, extensive amounts of manure or human waste on bank or in the system. If an SBW or WQLW then poor (1) included; drops or weirs >1 foot in the reach, 0 to 1 type of insect habitat, and 0 to 1 type of in-stream fish cover.

The scoring range of excellent (10) described the reach as: a natural channel or altered <50% with no downcutting, very clear water, diverse aquatic plant community, stable banks, >75% of the surface water shaded, invasive plants <10%, invasive animal damage <10%, no evidence of livestock or transient camping activity in the riparian area. If an SBW or WQLW, then excellent (10) included: no drop structures or weirs, at least 5 types if insect habitat, and >7 types of in-stream fish cover.

The scoring of each reach was then totaled and divided by the number of categories scored. This returned an overall health rating. The overall health ratings are based on the functional value of a stream or channel system. Functional values are benefits provided by resources (see figure 2). The ratings return a value that is interpreted as poor (<6.0), fair (6.1 - 7.4), good (7.5 - 8.9), and excellent (>9.0), this numeric value represents the “Functional Value” of the system or reach. The functional value can be used as a general statement about the “state of the environment”, or over a period of time as an indicator of “trends” in the conditions, or as a baseline study to characterize health.

$$\frac{\text{Total Score of Categories}}{\text{Number of Categories}} = \text{Functional Value (Health Rating)}$$

Seed collection

The City of Springfield periodically re-vegetates soils disturbed by construction activities or other causes. City restoration projects, such as the Mill Race Ecosystem Restoration Project, and stormwater management facilities, such as detention ponds, require re-vegetation with plant species well-suited to the soils, hydrology and eco-region. Native plant sources are needed to provide seed stock for a wide variety of applications, and a list of suitable native species was developed by ESD staff prior to this project.

The assessment crew was trained in plant identification and seed collection techniques by BLM wetland and native plant specialists. Since this work required working in areas where local native riparian plants were seeding, the flagging, collection, and mapping of native seed and location sites was viewed as an opportunity to efficiently and cost-effectively develop an inventory of seed to be used on public infrastructure and restoration projects.

During the assessment, the assessment team located seed sites, which were flagged and monitored until the seeds were ready for harvest. Each species that was collected required slightly different methods for maximum efficiency. Once collected, the seeds were dried, cleaned, sorted, and stored for future use. There will be an ongoing effort to produce a guidance manual for Springfield’s maintenance and landscape crews to use. As well, the seed stock will be made available to the Army Corps of Engineers for use in the Mill Race Ecosystem Restoration Project.

Data Management

All field data collected by the assessment team was entered onto paper ‘field forms’. Later, the data was entered into a computer database and spreadsheet program for future reference.

- A Microsoft Access database was set up with an on-screen assessment form for data entry of the assessment data. All data from the field forms were entered into the database.
- An Excel spreadsheet of all seed collection sites was created. The seed collection information included the common and scientific names of the plant, stream system where it was found, reach ID and/or GPS location of the plant(s), and date of seed collection. A Geographical Information System (GIS) data-file showing the seed collection area was also created. This data will be used for future seed collect projects and provide an interface to track these efforts with GIS.
- An Excel spreadsheet index of all photos was created and stored in the project directory along with digital photos of each assessment site. This photographic record will allow for future comparisons of the site, to identify project sites, and provide reference.

Interim Findings/Conclusions

A majority of the open channel systems have been surveyed. However, a channel assessment has not been completed for all waterways at this point. Approximately 8.6 linear miles remain to be assessed, to be completed during the summer of 2004-05. A summary of the data collected during the summer survey of 2002-03 includes the following information:

Outcome of data collected on systems during summer 2002-03:

- 44 systems to be assessed. 33.14 linear miles.
- 38 systems completed containing 210 reaches. 24.54 linear miles.
- 6 Systems not completed totaling 8.6 linear miles:
 - 2 Largest systems: Mill Race, South Cedar Creek. 6.18 linear miles.
 - 3 Difficult Systems: Keizer Slough, Maple Island Slough and Quarry Creek.
(Two of the 3 were attempted but incomplete). 2.70 linear miles.
 - 1 will be re-classified as a ditch, not a channel, and will not be assessed.
- Overall health rating for 38 systems: 23 rated poor, 15 rated fair, 0 rated good, 0 rated excellent.
- Average health rating for the city as a whole is **5.8** which is a health rating of **poor**.

Outcome of Seed Collection efforts:

- 12 drainage systems identified for potential seed collection sites.
- 35 sites identified within the 12 systems.
- 29 species identified plus 1 species of Threatened/Endangered/Sensitive (T/E/S).
- 7 varieties of seed collected in varying quantities.
- All seeds collected have been dried, sorted, processed, and safely stored pending use either as seed-stock for further seed propagation or direct use to re-vegetate riparian areas.

Outcome of Photos collected:

- 236 digital photos were taken of plots and in-channel structures.

System and Reach Profile

44 systems within the Urban Growth Boundary (UGB) were identified and chosen for the assessment. Of those systems, 38 were completed, containing 210 individual reaches. Of these reaches, all relevant field data was collected and logged into the database, and all GPS waypoints consisting of plots and in-channel structures were converted to a GIS data-file.

Using visual observation, the dominant land use within the 200 foot buffer on each side of the stream was determined. In cases of multiple uses, the most prevalent usage was recorded. Residential use was the most common land use followed by Undeveloped, Commercial, Agricultural, Transportation Corridor, Public/Park, Utility Corridor and Industrial.

Human-made impingements (for this project: structures that impinge, infringe, or encroach upon) have a high potential for interrupting or modifying the hydrology of a channel. Impingements occurring in the active channel, within the bank or immediately adjacent to top of bank were mapped, recorded, and in some cases photographed. These structures were categorized into three classifications: Fully impinged (>60% of bank length of a reach effected), partly impinged (40% or less), and non-impinged.

Fully impinged systems were most often observed. The most common impingements, in order of occurrence, are: fences, asphalt roads/parking lots, gravel road/drive/lot, house/shed/building, sidewalks, guard rails, bike paths, concrete walls and railroad tracks. Partially impinged systems were second most common, consisting of: fences, asphalt roads/parking lots, mobile homes/houses/building, gravel roads/drive/lots, sidewalks, bike paths, guardrails,

Measuring the physical dimensions, including the bank top and bottom width, depth, and side slope of the banks of the channel provides an indication of the water-storing capability of the channel during high water levels. This cross section information is important when trying to size new contributing outfalls or re-working older infrastructure to accommodate new development. At each reach plot, measurements of the top of bank, active channel, bottom of channel and bank slope were taken. Measurements were recorded in feet and tenths of feet. There were several reaches where it was impractical to get exact measurements for all categories. Some sites required visual estimates due to inaccessible banks. In cases where a bank was inaccessible, the run was calculated by subtracting the known run and bottom of channel from the total top of bank measurement (measured or estimated). The average slope for all banks and all systems is 50.62%. The average range is from 25.28% to 210%. The minimum slope is 4% and the maximum slope is 750%. Normally, steep banks are more prone to erosion and bank sloughing; shallower banks tend to provide more storage of stormwater peak flows. However, each system is different, with different optimal conditions, and there is no one 'optimal' bank slope.

The channel cross-sectional shape, or reach profile was visually estimated and recorded for the entire reach, along with measurements of the bank slope length, channel width, and bank angle to estimate the cross-sectional area of the channel. This information is useful for stormwater flow modeling and channel capacity calculations. In addition to determining channel capacity, knowing the general channel shape serves as an indicator of erosive channelization and down-cutting. Three primary streambed configurations were observed during the assessment. Most systems start out in their upper reaches as a U-shaped channel and end up downstream as a U-shaped channel. However, some systems start out V-shaped and end ponded, while other systems start out ponded and end V-shaped. This indicates that most of the systems are low-gradient systems that are channelized, and are shaped by cleaning with equipment. Two systems have sections of rectangular reaches consisting of a poured concrete channel. There is also one system with one reach that has a U-shaped poured concrete channel; all three are not subject to erosion or natural shaping processes.

Bedload refers to the silt, rocks, and other strata that make up the actual bottom of the stream. Bedload material analysis can aid in determining if channel scouring, bank instability, high sediment load from stormwater runoff, or degradation of in-stream habitat is occurring. Stream bedload material from the channel bottom to a depth of less than 6" was evaluated, and a determination made, of whether the streambed was alluvial (silt or deposited material) or bedrock, siltstone, or other geological formation. For most of the systems, the bed-load material consists of a silt, sand, and clay mixture. Several cobble and gravel reaches were observed, and three reaches were concrete lined.

In-channel structures, like impingements may alter the stream's hydrology. Any man-made structure found inside the top of bank was mapped, and in some cases digitally located and recorded using the GPS. Several forms of weirs and drop structures (all designed to modify hydrology) were encountered. Photos were taken of different styles of weirs and drop structures, and are currently stored digitally for later reference.

Riparian Profile

Riparian vegetation is a critical element of stream health. A healthy riparian area provides water filtering functions for runoff as well as shade for cooling and covers for wildlife. Broadly categorizing the riparian areas in the survey helps identify problematic areas for future remediation, as well as identifying high-value areas for preservation or enhancement.

Eight plant community definitions were used in defining the riparian plant community. For this evaluation, a narrow riparian buffer of ten feet (10') each side of, and inclusive of, the drainage system channel was used. Knowing the makeup of the plant community will assist City maintenance crews with carrying out maintenance work, and in planning where trees might be planted, erosion mitigated, or native plant communities developed. Further, it identifies sites which may be targeted for mitigation of invasive species, and provides a baseline 'snapshot' of the riparian area to track future changes in the riparian area.

Most of the reaches are in urban or suburban areas, resulting in the surrounding plant communities that are fragmented. Only the most prevalent community was listed. Most systems consisted of a "grass/field" plant community. The next most prevalent community was a "Hardwood" community. "Dominated by invasive" was the third largest and was used where virtually the entire plant community was overgrown with invasive and ornamental species.

The City conducts ongoing actions against invasive plant and animal species. By locating and documenting the presence of invasive species, the survey data can guide future control programs. The staff that performed the survey was trained prior to field deployment in plant identification of 21 invasive species and field identification of invasive animal species, mainly nutria and bullfrogs. The invasive species were recorded as being ‘Dominant’, ‘Co-dominant’, ‘Present’, and ‘Others’. This system was used to identify invasive that are most prominent from those that are starting to appear.

From the list of 21 species, 16 showed up repeatedly as ‘Dominant’, ‘Co-dominant’ or ‘Present’. 5 species showed up under the ‘Other’ category. The most common invasive species recorded in all three categories was *Rubus armeniacus* (Armenian Blackberry). Armenian Blackberry and *Phalaris arundinacea* (Reed Canary-grass) formed large monocultures which choke out the active channels as well as any other plant life. *Festuca arundinacea* (Tall Fescue) was included on the list of invasive species, however, the difficulty in identifying this species from other fescues in the field made it difficult to adequately assess its impact. See table 2 below for the top ten invasive species, in order:

Table 2 - Leading Invasive Species

Dominant	Co-dominant	Present	Others
Armenian Blackberry	Armenian Blackberry	Armenian Blackberry	Ornamentals
Reed Canary grass	Reed Canary grass	Velvet grass	Butterfly Bush
Velvet grass	Nightshade	Teasel	Knotweed
Tall Fescue	Teasel	Reed Canary grass	Poison Hemlock
Nightshade	English Ivy	Nightshade	Vinca Major (periwinkle)
English Ivy	Velvet grass	Morning Glory	
Evergreen Blackberry	Morning Glory	English Ivy	
Morning Glory	Yellow Flag Iris	Penny Royal	
Yellow Flag Iris	Broom	Broom	
St John’s Wort	Harding grass	Evergreen Blackberry	

The project had a list of 22 native riparian/wetland species targeted for seed collection. 7 species were collected, 33 sites were mapped on 10 systems and 1 non-waterway. When these species were observed, the actual plant was flagged, a GPS waypoint was recorded and the location was mapped.

Given the highly disturbed nature of most of the streamside environments, potential for locating Threatened, Endangered and Sensitive (T/E/S) species of plants was limited. However, a rare *Sidalcea* species (Mallow) along the I-105-55th St Channel was recorded and mapped. Efforts will continue to be made to acquire more information on T/E/S species and their locations.

Invasive animal species cause thousands of dollars of damage to City infrastructure through burrowing, feeding, and property destruction. Identifying and locating high concentrations of these species is the first step toward eliminating them. The most regularly encountered invasive animals were Nutria (a South American rodent related to muskrats). Beaver, although native, were viewed as an invasive in the context of urban drainageways, due to the damage they can cause to vegetation and hydrology. Bullfrogs were the most common invasive amphibian. Due to the number and wide spread habitation of these three pests, no special mapping was done, but their presence was noted. The most commonly encountered forms of damage were from Nutria, primarily from heavily tunneled, undercut and vegetation-stripped banks. Live and dead Nutria were encountered daily, which was both an aesthetic and water quality (bacterial contamination) concern. The most heavily damaged banks were found along the lower reaches of the Q St. Floodway, the I-5 Gateway Channel and portions of Channel 6. Two fairly large Beaver dams were found on the I-5 Gateway Channel just west of Don St.

Any unusual bird populations observed in the area during the assessment were noted. Most of the species observed were, to some degree, dependent on riparian habitat or stream health. Great Blue and Green herons were encountered in several reaches, as were Belted Kingfishers, and Common Yellowthroats. Mallard ducks (adults and ducklings) were found regularly. Pacific Green Tree frogs, small minnows, fish and tadpoles (unidentified to

species) were found in many systems. Raccoons were seen twice. Commonly encountered wildlife evidence included feces, burrowing, nests, dens, trails and tracks.

4 types of riparian or stream restoration project opportunities were identified. The most frequently recorded was riparian buffer enhancements (with 'no' to 'very little' native riparian vegetation in most reaches). Next was neighborhood education (to eliminate dumping of yard debris and properly manage herbicide use), bank stabilization, and then culvert retrofit/replacement.

Scoring and Overall Health Rating

Averages for the waterways are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of times it was scored. Overall health rating averages were derived by adding each health rating for each system together then dividing it by the number of waterways.

The average score and averaged overall health rating for the total number of systems assessed revealed the following:

Table 3 – Averaged Overall Channel Health Scores and Rating

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.1
Water Appearance	6.5
Nutrient Enrichment	5.5
Bank Stability	6.8
Canopy Density/Cover	4.0
Invasive Damage – P	3.8
Invasive Damage – A/A	9.4
Waste Presence	8.0
Barriers to Fish (SBW)	7.5
Insect/Invert Habitat (SBW)	6.1
In-stream Fish Cover (SBW)	3.7

Average Overall Health Rating
5.79

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

The Overall Health Rating for **all the systems averaged together is 5.79, which is a (functional value) health rating of POOR.** Refer to scoring methodology section for description and process.

The scoring averages reveal that channel condition, canopy density/cover, and invasive damage from plants rated lower than average. On SBW or WQLW; channel condition, canopy density/cover, invasive damage from plants, and in-stream fish coverall rated lower than average (refer to table 3).

Actions

Urban streams are subject to a wide range of impacts, from physical barriers, habitat loss and adverse water quality influences. This reach assessment broadly focuses on overall stream conditions and riparian health, using a number of assessment parameters, in an effort to identify high-value restoration areas and projects. However, opportunities for project implementation are moving targets, with shifting priorities as the community develops, priorities change, and unforeseen opportunities present themselves. For that reason, the recommendations outlined in the section should be considered a starting point, and not a completed project list. This assessment also looked at only one part of a “Unified Stream Assessment” (a Reach Assessment) therefore it is difficult to pinpoint precise restoration or project opportunities. Implementing some or all of the 1 to 3 year suggestions as well as performing “Impact Assessments” as suggested in the 3 to 5 year suggestions, is a starting point for urban watershed restoration development and pollution point source elimination.

Impact Assessments collect information at individual problem sites along a stream corridor. There are eight types of impact assessments:

1. Outfalls
2. Severe erosion
3. Impacted buffers
4. Utilities in the corridor
5. Trash and debris
6. Stream Crossing
7. Channels modifications
8. Miscellaneous or unusual features

Even though this assessment did evaluate certain elements of an impact assessment, performing complete impact assessments will allow for identifying exact actions to be taken on reach-by-reach bases.

Reach Assessments look at a stream channel on a section-by-section basis, and determine an average condition for the bank stability, in-stream habitat, riparian vegetation, connectivity, access, and flow over an entire reach.

As a result of this study, we now know more precisely where Springfield’s main waterway systems flow, the condition of the channels and the associated riparian areas, and the uses of the land surrounding them. Detailed mapping is being performed in GIS format to provide connectivity with the piped systems, benchmarks are established for water quality and for vegetation, and some “hot spots” have been identified for future investigation.

The following sections outline both short- and long-term suggested actions for implementation, as well as recommendations for future impact assessments.

Suggestions for immediate actions (1 to 3 years)

A waterway with an overall health rating of “Poor” can be improved by looking at the below-average scored criteria and applying some immediate actions. The following suggestions will improve the overall health of low-scoring reaches:

- Channel Condition - overall average score: 3.1
 - Implement an “Impact Assessment” for Channel Modifications using Use the *Center for Watershed Protection’s Urban Subwatershed Restoration Manual No. 10; Unified Stream Assessment: A User’s Manual*. Perform an assessment on channels that rated below average for Channel Conditions. Review rating systems on impact assessments so they don’t conflict with channel designs, based on City engineering standards and City erosion issues.
 - Work with Public Works Maintenance crews to broaden their understanding of channel condition and erosion concerns related to maintenance practices.
 - Initiate budget process to implement stream management BMPs and/or restoration measures.
- Canopy Density/Cover - overall average score: 4.0
 - Develop a priority list of channels based on below average scores for canopy density/cover that can be targeted for tree or shrub planting, to provide shade. This list will also identify easement and private property issues in advance to facilitate restoration efforts.

- Re-assess Maintenance Division’s practice of herbicide spraying and the cutting or mowing of native trees in riparian areas, with a goal of removing or trimming only what is needed for access and maximizing shade.
 - Implement and/or enforce City Code to minimize tree-cutting, and herbicide use in riparian areas by developments and by property owners.
 - Implement riparian setbacks from open waterways to promote stream shading vegetation.
 - Develop a public awareness program that will better inform the community on stream protection and water quality issues.
 - Identify project areas which will work well for volunteer or community-oriented invasive brush clearing, tree planting or native shrub planting events, and work with local groups to advance this idea.
- Invasive Plant Damage – overall average score: 3.8
 - Work with maintenance crews on identifying invasive species. Identify staff that can later develop BMPs for eradication of various common species.
 - Develop a priority list for maintenance crews to use when targeting species for herbicide use and/or hand removal programs. Use the *City of Springfield Invasive Plants List* as a guide.
 - Work with Engineering and Planning departments to develop and implement lists for invasive plant species, Springfield native plants, and Springfield native riparian plants for distribution to homeowners, community groups, and other interested parties. Current lists for wetland planting and pond planting are also in need of updating.
 - Develop educational handouts for the public regarding native and invasive plants, and distribute door to door along waterways and in other appropriate venues.
 - Continue mowing and other maintenance activities. Concentrate more effort on blackberry and English Ivy eradication that can promote native plant growth.
- In-stream Fish Cover (Salmon Bearing Waterways only) - overall average score: 3.7
 - Inform key maintenance personnel as to what SBW and WQLW waterways are and the restrictions surrounding them.
 - Alter mowing and maintenance practices that may remove beneficial woody debris in waterways designated as SBW or WQLW.
 - Identify project areas which will work well for volunteer or community-oriented invasive brush clearing, tree planting or native shrub planting events, and work with local groups to advance this idea.
 - Reassess the Maintenance Division’s practice of herbicide spraying and the cutting or mowing of native trees in riparian areas, with a goal of removing or trimming only what is needed for access and maximizing shade.
 - Implement, enhance, and/or enforce City Code to minimize tree-cutting and herbicide use in riparian areas by developments and property owners.
 - Implement and enforce riparian area setbacks from open waterways for new development, where appropriate, to promote stream shading vegetation.
 - Develop a public awareness and outreach program that will identify and better inform the community on stream protection, water quality facilities such as ponds and water quality issues.
 - Coordinate with community groups, stakeholders, other jurisdictions, and citizens to engage them in awareness, outreach, and service programs, with an emphasis on water quality and stewardship.

Suggestions for long-term actions (3 to 5 years)

- Perform another channel assessment to measure progress (or lack of progress) with implementation and track channel and riparian health. Schedule assessments to be performed earlier in the season for systems with no- or low summertime flows, to obtain water quality data.

- Perform Impact Assessments to obtain a complete unified stream assessment. Use the *Center for Watershed Protection’s Urban Subwatershed Restoration Manual No. 10; Unified Stream Assessment: A User’s Manual*.
- Add City owned/maintained detention ponds and any City owned/maintained wetlands, swales, etc. to the assessment process. Develop and implement criteria similar to that developed for the channels. This can be included in an impact assessment or an assessment project by itself that has contributing factors to the channel assessment.
- Continue to perform maintenance activity for invasive species eradication. Use the *City of Springfield Invasive Plants List as a guide*.
- Continue mowing and maintenance activities.
- Coordinate with ODF&W and City Maintenance to develop a priority list and plan to provide woody debris to systems designated as SBW or WQLW where appropriate.
- Budget, prioritize, and implement a plan for large woody debris introduction.

Future Assessments

Methodology and approach

- Evaluate *the City of Springfield’s Channel Assessment Manual* and update as needed.
- Incorporate “Impact Assessments” into the assessment process.
- Locate as close to same reach plot location as that used in the previous Channel Assessment.
- Conduct additional water quality sampling during the assessment when a low pH, chemical smell, or other indicators of unusual water quality are observed.
- Incorporate ponds, swales and other existing natural stormwater filtering systems into the assessment process.
- Use precision GPS equipment for gathering point information that will be incorporated into GIS data sets. GIS datasets needs to meet survey and GIS standards.
- Acquire missing flow and/or elevation data that will aid in stormwater modeling for Stormwater Facilities Master Plan (SWFMP). Needs to meet survey and GIS standards.

Schedule

- Target March as a starting month for in-stream assessment work to be able to incorporate more water quality parameters.
- Use the *Center for Watershed Protection’s Urban Subwatershed Restoration Manual No. 10; Unified Stream Assessment: A User’s Manual* for guidance on timelines for performing impact assessments.

Appendices

Site-specific inventory information

Site-specific information for waterways included in this survey is available for review as separate reports, and are included as appendices to this report. See the table of contents for a list of systems assessed and their appendix number. The following information is reported for each system that was assessed, and classified by reach.

Each system report (Appendix) addresses:

- **Overview** (site location and waterway information).
- **Findings / Conclusions** (site-specific findings and conclusions).
- **Actions** (site-specific suggestions for immediate and long-term actions).
- **Maps and GIS information** (site maps, major drainage basins, impervious surface).

Table 4 - Set Scoring and Rating Criteria

Channel condition

<p>Natural channel; no structures, dikes. No evidence of down-cutting or excessive lateral cutting.</p> <p>Only used for Natural System.</p>	<p>Natural channel; evidence of past channel alteration, but with significant recovery of channel & banks.</p> <p>Only used for Natural System.</p>	<p>Altered channel; <50% of the reach with riprap and/or channelization. Excess aggradations or downcutting occurring. Dikes or levees at or close to channel.</p>	<p>Channel is actively downcutting or widening. >50% of the reach with riprap or channelization. Dikes or levees define the channel.</p>
10	7	3	1

Water appearance

<p>Very clear, or clear but tea-colored; objects visible at 100% or to the bottom. (90%-99% if slightly colored); no oil sheen on surface; no noticeable film on submerged objects or rocks.</p>	<p>Some cloudiness, objects visible at ¾ or 75% of the depth; may have slightly green color; no oil sheen on water surface.</p>	<p>Considerable cloudiness most of the time; objects visible to ½ or 50% of the depth; slow sections may appear pea-green; bottom rocks or submerged objects covered with heavy green or olive-green film.</p>	<p>Very turbid or muddy Appearance; objects visible to < ¼ or 25% of the depth; slow moving water may be bright-green; other obvious water pollutants; floating algal mats, surface scum, sheen or heavy coat of foam on surface.</p> <p>or</p> <p>Strong odor of chemicals, oil, sewage, other pollutants.</p>
10	7	3	1

Nutrient enrichment

<p>Clear water along entire reach; diverse aquatic plant community. Includes low quantities of many species of macrophytes; little algal growth present.</p>	<p>Fairly clear or slightly greenish water along entire reach; somewhat diverse aquatic plant community moderate algal growth on system substrates.</p>	<p>Greenish water along entire reach; overabundance of lush green macrophytes; abundant algal growth, especially during warmer months.</p>	<p>Pea green, gray, or brown water along entire reach; dense stands of macrophytes clogging system; severe algal blooms creating thick algal mats in system.</p>
10	7	3	1

Bank stability

<p>Banks are stable. No erosion, bare banks, rills, gullies, or sloughing.</p>	<p>Moderately stable; some erosion or sloughing starting to occur. May have some rills starting.</p>	<p>Unstable banks; straight reaches and inside edges of bends are actively eroding as well as outside bends. Bare bank. Numerous mature trees falling into system. Numerous slope failures apparent.</p>
10	5	1

Canopy Density/Cover

<p>> 75% of water surface shaded in the reach.</p> <p>Dense</p>	<p>50% to 75% of water surface shaded in the reach.</p> <p>Sparse</p>	<p>20% to 50% of water surface shaded in the reach.</p> <p>Open</p>	<p>< 20% of water surface shaded in the reach.</p> <p>None</p>
10	7	3	1

Table 4 - Set Scoring and Rating Criteria - Continued

Invasive damage by plant species

Very little damage- <10%. Not forming monocultures, not over running riparian area or under-story, not choking the waterway or trees/shrubs. Native species present.	Some damage 10% to 25%.	Moderate damage >25% - 50%	Extensive damage >50%. Forming large monocultures or over running riparian area and or under-story. Choking of the waterway and or trees/shrubs – no native species present.
10	7	3	1

Invasive damage by animal/amphibian species

Very little damage: <10%. No burrows or bank tunneling, no damaged trees or shrubs, no damming or dens in waterway. No bank failure and/or erosion. No Large loss of vegetation – from feeding and/or erosion.	Some damage 10% to 25%.	Moderate damage >25% - 50%	Extensive damage: >50%. Burrows or bank tunneling, damaged trees or shrubs, damming or dens in waterway. Causing bank failure and/or erosion. Large loss of vegetation – from feeding and/or erosion.
10	7	3	1

Manure/Waste presence

No Evidence of livestock access into riparian zone. and/or Evidence of homeless camp, or transient activity in riparian zone.	Evidence of livestock access into riparian zone. and/or Evidence of homeless camp, or transient activity in riparian zone.	Occasional manure or human waste in system. and/or waste storage structure located on the flood plain.	Extensive amount of manure or human waste on banks or in system. and/or Untreated human waste discharge pipes present.
10	5	3	1

Barriers to fish movement

No drop structures, dams, weirs, and/or culverts. or Piped sections	Drop structures, dams, weirs, and/or culverts: < 1 foot drop within the reach. and/or Piped sections under 150'	Drop structures, dams, weirs, and/or culverts: > 1 foot drop within the reach. and/or Piped section over 150'
10	5	1

Insect/invertebrate habitat

At least 5 types of habitat available. Habitat is at a stage to allow full insect colonization (woody debris and logs not freshly fallen).	3 to 4 types of habitat. Some potential habitat exists, such as overhanging trees, which will provide habitat, but have not yet entered the system.	1 to 2 types of habitat. The substrate is often disturbed, covered, or re-moved by high system velocities and scour or by sediment deposition.	0 to 1 type of habitat.
10	7	3	1

In-stream fish cover

>7 cover types available	6 to 7 cover types available	4 to 5 cover types available	2 to 3 cover types available	None to 1 cover type available
10	8	5	3	1

Glossary

- Active channel width:** The width of the stream at the bankfull discharge. Permanent vegetation generally does not become established in the active channel.
- Aggradations:** Geologic process by which a stream bottom or flood plain is raised in elevation by the deposition of material.
- Bankfull discharge:** The stream discharge (flow rate, such as cubic feet per second) that forms and controls the shape and size of the active channel.
- Bankfull stage:** The stage at which water starts to flow over the flood plain.
- Baseflow:** The portion of stream flow that is derived from natural storage; average stream discharge during low flow conditions.
- Bed load:** Refers to the silt, rocks, and other strata that make up the actual bottom of the stream.
- Boulders:** Large rocks measuring more than 10 inches across.
- Channel:** A natural or artificial waterway of perceptible extent that periodically or continuously contains moving water. It has a definite bed and banks that serve to confine the water.
- Channelization:** Straightening of a stream channel to make water move faster.
- Cobbles:** Medium-sized rocks which measure 2.5 to 10 inches across.
- Degradation:** Geologic process by which a stream bottom is lowered in elevation due to the net loss of substrate material. Sometimes referred to as downcutting.
- Downcutting:** See Degradation.
- Ecoregion:** A geographic area defined by similarity of climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.
- Emergent plants:** Aquatic plants that extend out of the water.
- Flood plain:** The flat area of land adjacent to a stream that is formed by current flood processes.
- Functional Value:** The functional value of a stream, returned as a mathematical number referred to as Health Rating. Variables include: flow regime, chemical variables, biotic factors, energy source, and habitat structure.
- Gradient:** Slope calculated as the amount of vertical rise over horizontal run expressed as ft/ft or as percent.
- Gravel:** Small rocks measuring 0.25 to 2.5 inches across.
- Gully:** Runoff cuts rills deeper & wider, several rills come together & form a larger channel called a gully.
- Habitat:** The area or environment in which an organism lives.
- Impingement:** Human-made structures that impinge, infringe, or encroach upon and have a potential for interrupting or modifying the hydrology of a channel. Impingements occur in the active channel, within the bank or immediately adjacent to top of bank. Examples include fences, roads, bridge foundations, and/or buildings.

In-channel Structures: Human made structures inside the channel banks and or channel. Used for the purpose of water quality and hydrology. Examples include culverts and drop weirs.

Macrophyte bed: A section of stream covered by a dense mat of aquatic plants. A Macrophyte is a large water plant opposed to small & microscopic plants such as algae.

Meander: A winding section of stream with many bends that is at least 1.2 times longer, following the channel, than its straight-line distance. A single meander generally comprises two complete opposing bends, starting from the relatively straight section of the channel just before the first bend to the relatively straight section just after the second bend.

Macro invertebrate: A spineless animal visible to the naked eye or larger than 0.5 millimeters. Example: an insect.

Nickpoint: The point where a stream is actively eroding (downcutting) to a new base elevation. Nickpoints migrate upstream (through a process called headcutting).

Plot: An area or section within the reach and within the banks of the system that best represents the reach. All information for the reach is gathered based on this area or section.

pH: Parts Hydrogen.

Point bar: A gravel or sand deposit on the inside of a meander; an actively mobile river feature.

Pool: Deeper area of a stream with slow-moving water.

Reach: A section of stream (defined in a variety of ways, such as the section between tributaries or a section with consistent characteristics).

Riffle: A shallow section in a stream where water is breaking over rocks, wood, or other partly submerged debris and producing surface agitation.

Rill: As surface flow changes from sheet flow to deeper concentrated flow along the low spots of the soil surface it creates rivulets. Cutting grooves called rills. Rills are small but well-defined channels that are a few inches deep.

Riparian: The zone adjacent to a stream or any other waterbody (from the Latin word ripa, pertaining to the bank of a river, pond, or lake).

Riprap: Rock material of varying size used to stabilize streambanks and other slopes.

Scouring: The erosive removal of material from the stream bottom and banks.

Stadia Gauge: Also referred to as a staff gauge. An upright, mounted or free standing measuring stick. Used to measure water depth.

Substrate: The mineral or organic material that forms the bed of the stream; the surface on which aquatic organisms live.

System: For this project a system refers to the type of waterway. Examples include creeks, channels, and sloughs.

Top of Bank: For this project will be the point at bankfull stage that the water will breach the bank into the flood plane.

Turbidity: Murkiness or cloudiness of water caused by particles, such as fine sediment (silts, clays) and algae.

Waypoint: Generated by the GPS device. Recorded point in the GPS database by Longitude/Latitude, and name.

Acronym Glossary

CWA	Clean water Act
CWS	Clean Water Services
DSD	Development Services Department (City of Springfield)
ENG	Engineering Division (City of Springfield)
ESA	Endangered Species Act
ESD	Environmental Services Division (City of Springfield)
GIS	Geographical Information System
GPS	Global Positioning System
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Services
ODFW	Oregon Department of Fish and Wildlife
OSU	Oregon State University
SDWA	Safe Drinking Water Act
SBW	Salmonid Bearing Waters
SWMPP	Storm Water Management Plan Program
T/E/S	Threatened, Endangered, Sensitive species
TMDL	Total Maximum Daily Load
UGB	Urban Growth Boundary
USDA	United State Department of Agriculture
WQLW	Water Quality Limited Watercourses (City of Springfield)

Appendices

Appendix A - 48th & Highbanks Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

48th & Highbanks Channel starts north of I-105 (west bound), also known as Hwy 126 east bound. West of Highbanks Rd intersection and west of the 52nd St exit off I-105.

This system flows to the southwest, crosses under I-105 and into the 48th St Channel. It receives stormwater runoff from Highbanks Rd. It flows parallel to the highway easement and is approximately 0.03 miles long.



48th & Highbanks Channel looking west



Findings/Conclusions

Data outcome:

- Consists of two (2) reaches.
- Not listed as a SBW or Springfield WQLS system.
- The averaged overall health rating for this system is 6.5 which is a rating of fair (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection recorded for this system.

Photos:

- Two photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed on July 23rd, 2002. Ambient air temperature was between 28.9° C & 36.5° C (84° F & 97.7° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Undeveloped and Transportation on both sides of system.
- Partially impinged on the north side with asphalt road and fences. South side is non-impinged.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is V-shaped to U-shaped with bank slopes between 17% & 51% with an average of 34.25%.
- Bed material consists of silt/sand/ clay.
- No in-channel structures recorded.

Riparian Profile details

- Plant community is grass/field.
- Dominant invasive plant species: *Festuca arundinacea* (Tall Fescue) and *Rubus armeniacus* (Armenian Blackberry).
- No co-dominant invasive plant species was recorded.
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Convolvulus sp.* (Morning Glory/Bindweed) and *Phalaris arundinacea* (Reed Canary-grass).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife observed.
- No wildlife evidence recorded.

- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	2.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	10
Canopy Density/Cover	5.5
Invasive Damage – P	2.0
Invasive Damage – A/A	10.0
Waste Presence	9.5
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.5 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (2.0) and damage by invasive plants (2.0) received the lowest rating (below mid scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Channel condition (2.0)

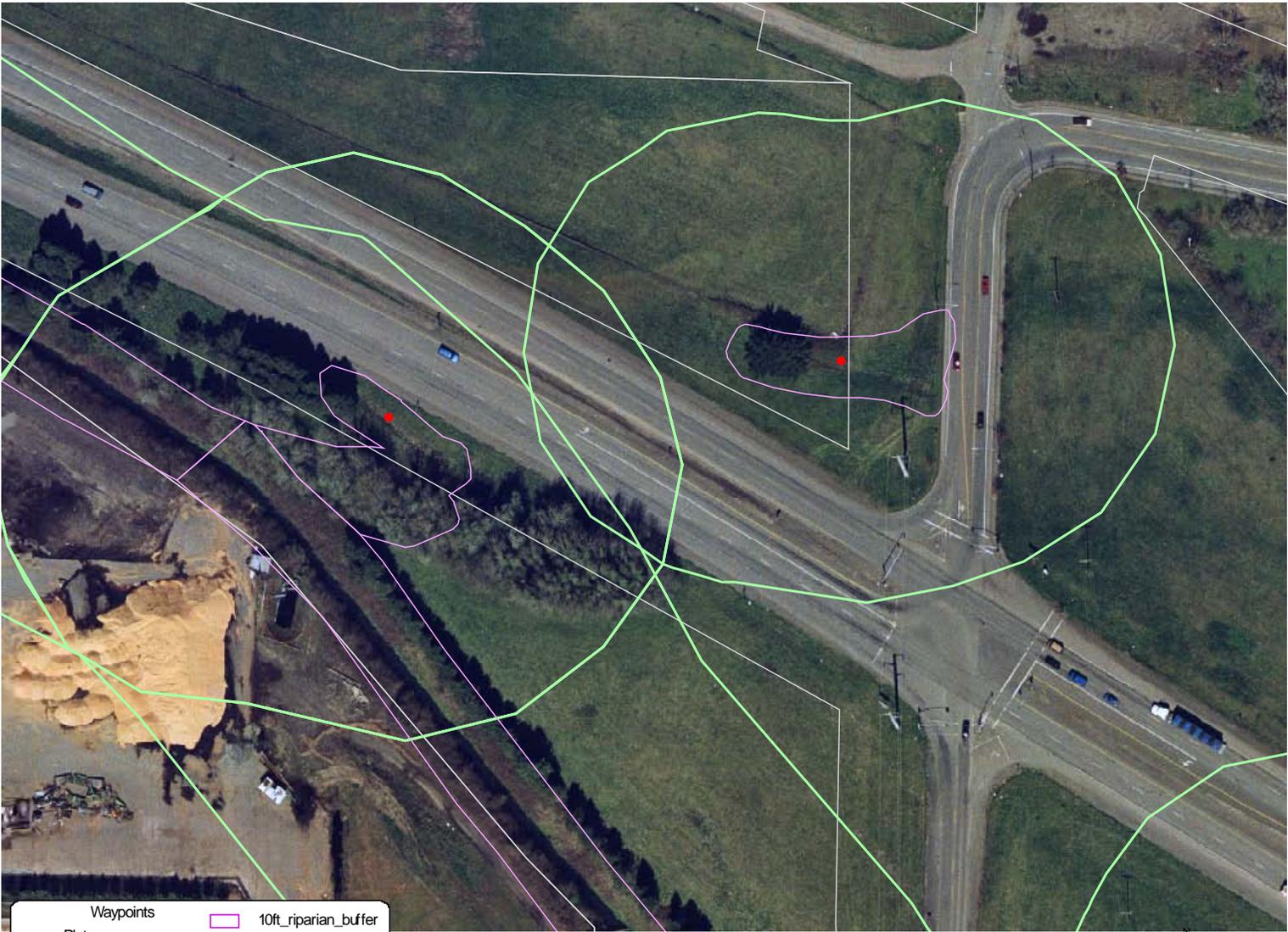
- Work with maintenance crews to broaden their understanding of channel condition and erosion concerns related to maintenance practices.

Damage by invasive plants (2.0)

- Work with maintenance crews on identifying invasive species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use the *City of Springfield Invasive Plants List* as a guide.

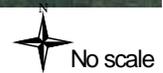
In-general

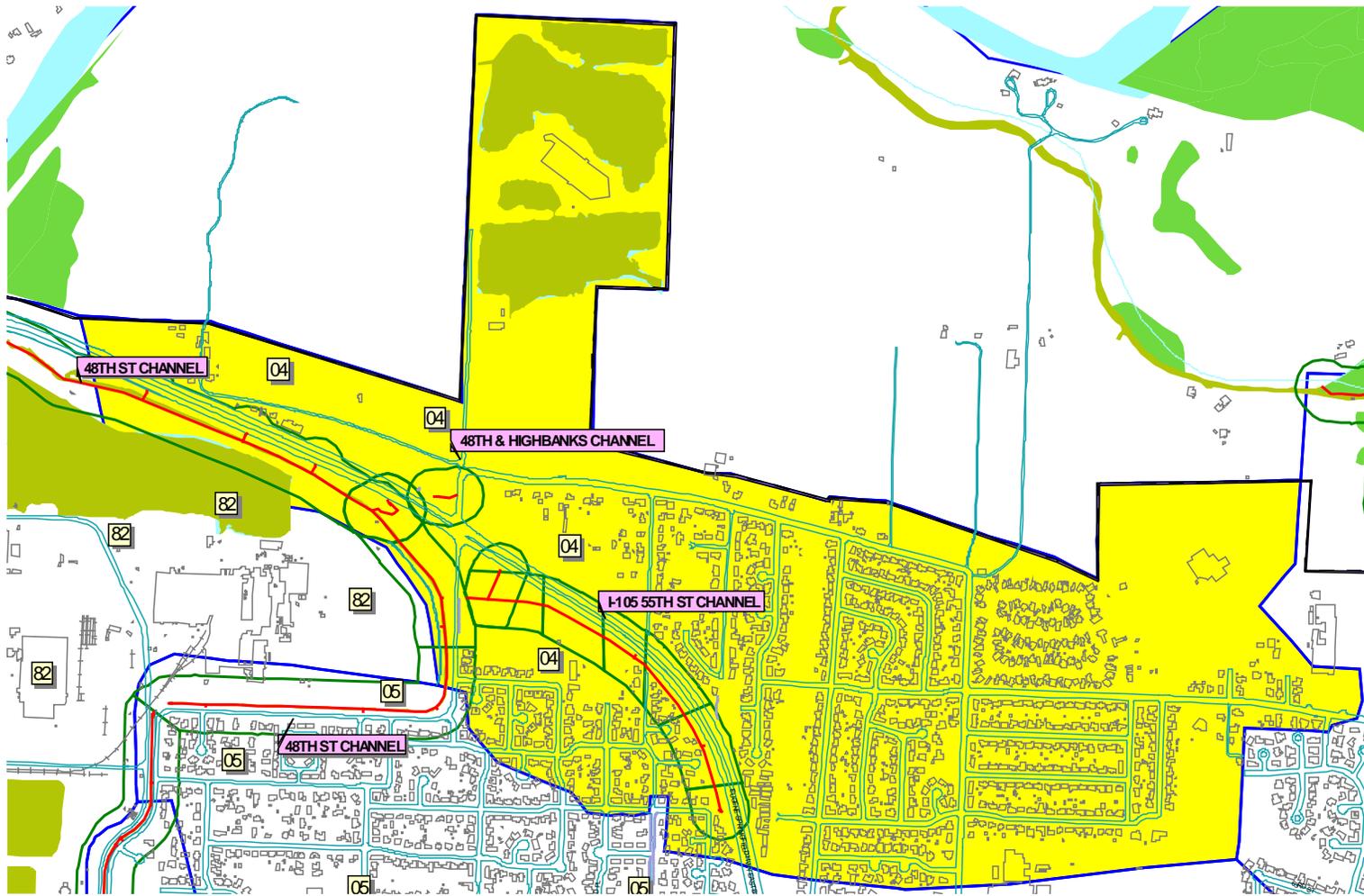
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

48th & Highbanks Channel





48th & Highbanks Channel: 0.03 miles
 Sub Basin: 04
 Major Basin: Weyerhaeuser Outfall Basin
 Sub Basin Acres: 521.34
 Sub Basin Percent imperv.: 34.11%

Appendix B - 48th St - Haul Rd Pond Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

48th St – Haul Rd Pond Channel flows out of a pond on the south side of the old Georgia Pacific Haul Rd west of South 57th St.

This system flows west then north into the 48th St Channel. It receives groundwater and is fed by a pond and wetlands. It runs through a private fenced area that contains cattle. It is approximately 0.46 miles long.



Findings/Conclusions

Data outcome:

- Consists of four (4) reaches.
- Listed as a tributary for Springfield WQLS systems.
- The averaged overall health rating for this system is 4.6 which is a rating of poor (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Four photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed on July 29th, 2002. Ambient air temperature was between 27.6° C & 29.9° C (81.7° F & 85.8° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Agricultural on the south side and Agricultural and Residential on the North.
- Partially impinged on the north sides with fences, and non-impinged on the south sides.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped, with bank slopes between 34% and 65% with an average of 45.25%.
- Bed material consists primarily of cobble with one reach being silt/sand/clay.
- A culvert was recorded as an in-channel structure.

Riparian Profile details

- Plant community is grass/field with one hardwood reach.
- No dominant invasive plant species was listed.
- No co-dominant invasive plant species was recorded.
- Invasive plant species listed as present: *Mentha pulegium* (Penny Royal), *Rubus armeniacus* (Armenian Blackberry), *Holcus lanatus* (Velvet Grass), and *Rubus laciniatus* (Evergreen Blackberry).
- Others invasive plant species observed in the system: *Parentucellia viscosa* (Parentucellia) and *Phalaris aquatica* (Harding grass).
- Bullfrogs were observed as the invasive animals/amphibian.
- No damage by invasive animals/amphibian was recorded.
- Wildlife observed was a Green Heron and a Great Blue Heron.
- No wildlife evidence recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.3
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	2.8
Canopy Density/Cover	2.8
Invasive Damage – P	8.0
Invasive Damage – A/A	9.7
Waste Presence	1.0
Barriers to Fish (SBW)	9.5
Insect/Invert Habitat (SBW)	6.0
In-stream Fish Cover (SBW)	2.0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
4.6 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that waste presence (1.0), channel condition (1.3), in-stream fish cover (2.0), bank stability (2.8) and canopy density/cover (2.8) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these five factors.

Waste presence (1.0)

Bank stability (2.8)

- Conduct outreach to adjacent property owners regarding fencing grazing animals away from waterways. Fencing off the cattle from the channel will greatly improve the presence of waste and bank stability ratings. This may not be possible because of private land ownership and maintenance of the channel.

Channel condition (1.3)

- Work with maintenance crews to broaden their understanding of channel condition and erosion concerns related to maintenance practices.

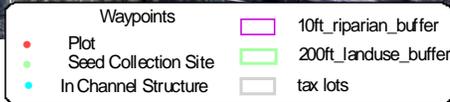
In-stream fish cover (2.0)

Canopy density/cover (2.8)

- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. This may not be possible because of private land ownership and maintenance of the channel.

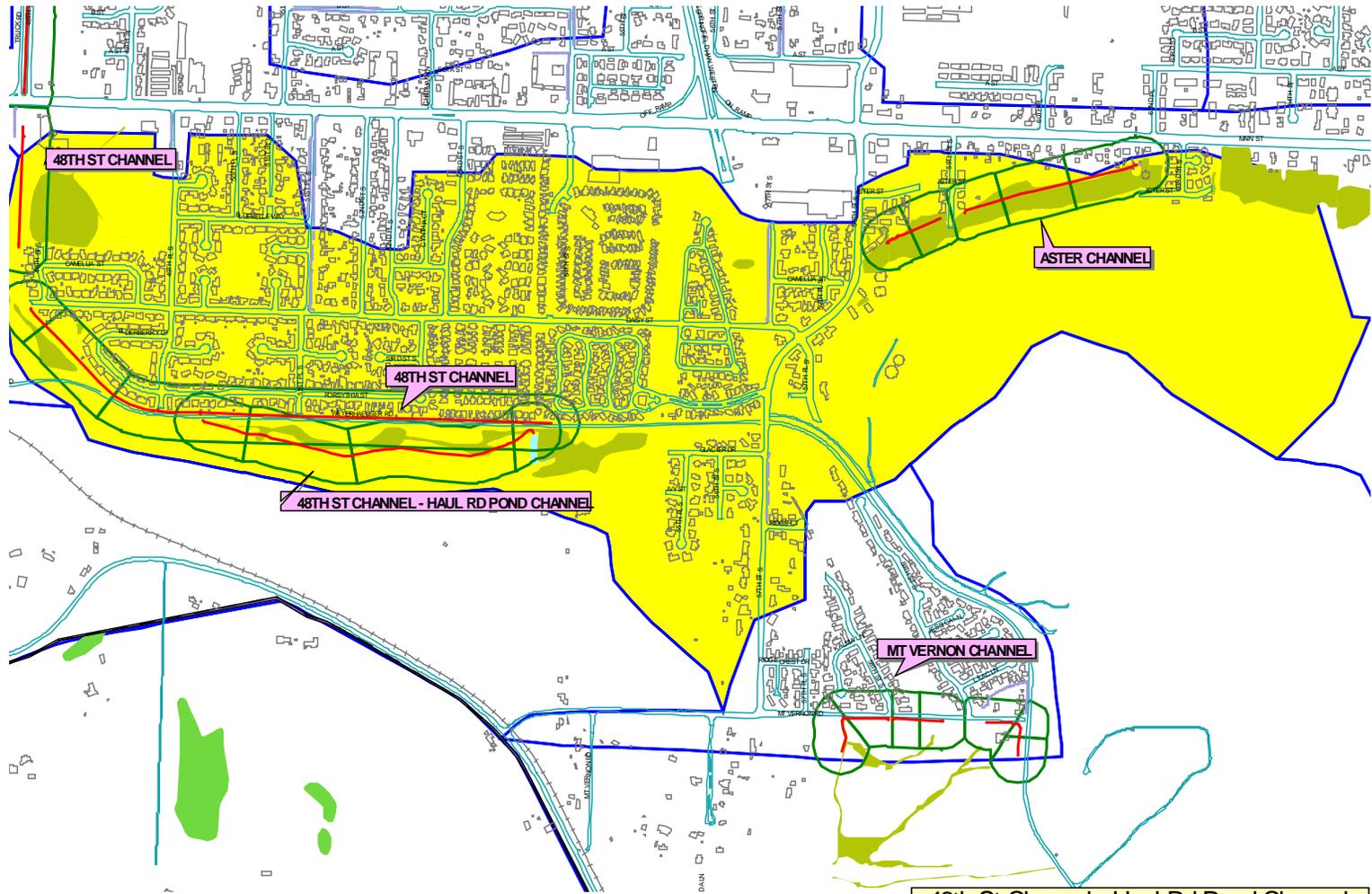
In-general

- No dominant or co-dominant plant species were listed because the area consists mostly of grasses with cows feeding on the vegetation.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



48th Haul Road Pond Channel





48th St Channel - Haul Rd Pond Channel:
 0.46 miles
 Sub Basin: 07
 Major Basin: Weyerhaeuser Outfall Basin
 Sub Basin Acres: 482.13
 Sub Basin Percent imperv.: 28.12%

Appendix C - 48th St Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

48th St Channel starts north of the Pond Channel, on the north side of the old Georgia Pacific Haul Rd, and west of South 57th St. It flows west, turns north at 48th St, then west again at I-105 to Keizer Slough.

It receives stormwater runoff, as well as water from the Pond Channel, Highbanks Channel and the I-105 – 55th St Channel. This system is considered wetlands and is listed on the Local Wetlands Inventory. It is approximately 2.94 miles long.



Findings/Conclusions

Data outcome:

- Consists of nine (9) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 6.0 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Nine photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 30th & 31st, 2002. Ambient air temperature was between 17.4° C & 31.3° C (63.3° F & 88.3° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist mainly of Industrial and Un-developed on the south and west sides and Residential and Transportation on the north and east sides.
- Fully impinged on the south and west sides with roads and fences, and fully impinged with fences and roads to non-impinged on the north and east sides.

Water/Bank Profile details

- Water pH: 3 dry - 6 reaches averaged 6.98 with a minimum of 6.7 and maximum of 7.8.
- Water temperature: 3 reaches dry. 6 reaches averaged 19.66° C with a minimum of 16.7° C and a maximum of 22.4° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to flowing full, average is dry to 3/4 flowing.
- Algae and algae color ranged from none to moderate to abundant, brown and brown/green in color.
- Channel profile is ponded to U-shaped with V-shaped and U-shaped intermittent and bank slopes are between 34% and 70% with an average of 51.94%
- Bed material consists primarily of silt/sand/clay with cobble.
- A culvert was recorded as an in-channel structure.

Riparian Profile details

- Plant community differs throughout the system ranging between grass/field, hardwoods, mixed, and dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass), and *Holcus lanatus* (Velvet Grass).
- Co-dominant invasive plant species: *Dipsacus fullonum* (Teasel), *Phalaris arundinacea* (Reed Canary-grass), *Solanum dulcamara* (Nightshade), and *Rubus armeniacus* (Armenian Blackberry).
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry), *Dipsacus fullonum* (Teasel), *Solanum dulcamara* (Nightshade), *Phalaris arundinacea* (Reed Canary-grass), and *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Cytisus scoparius* (Scotch Broom) and *Mentha pulegium* (Penny royal).
- No invasive animals/amphibian was recorded.

- No damage by invasive animals/amphibian was recorded.
- Wildlife observed was Green Heron, Lesser Gold Finch, minnows, and frogs.
- No wildlife evidence recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement and neighborhood education were recorded the most for project opportunities. One reach listed bank stabilization as a project opportunity.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.1
Water Appearance	8.7
Nutrient Enrichment	6.8
Bank Stability	7.0
Canopy Density/Cover	3.6
Invasive Damage – P	3.6
Invasive Damage – A/A	10.0
Waste Presence	9.4
Barriers to Fish (SBW)	9.2
Insect/Invert Habitat (SBW)	4.9
In-stream Fish Cover (SBW)	3.2

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.0 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.1), in-stream fish cover (3.2), canopy density/cover (3.6), and damage by invasive plants (3.6) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (1.1)

- Work with maintenance crews to broaden their understanding of channel condition and erosion concerns related to maintenance practices.

In-stream fish cover (3.2)

Canopy density/cover (3.6)

Damage by invasive plants (3.6)

- Work with maintenance crews on identifying invasive species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door-to-door along waterways for the public regarding native and invasive plants.

- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover.

In-general

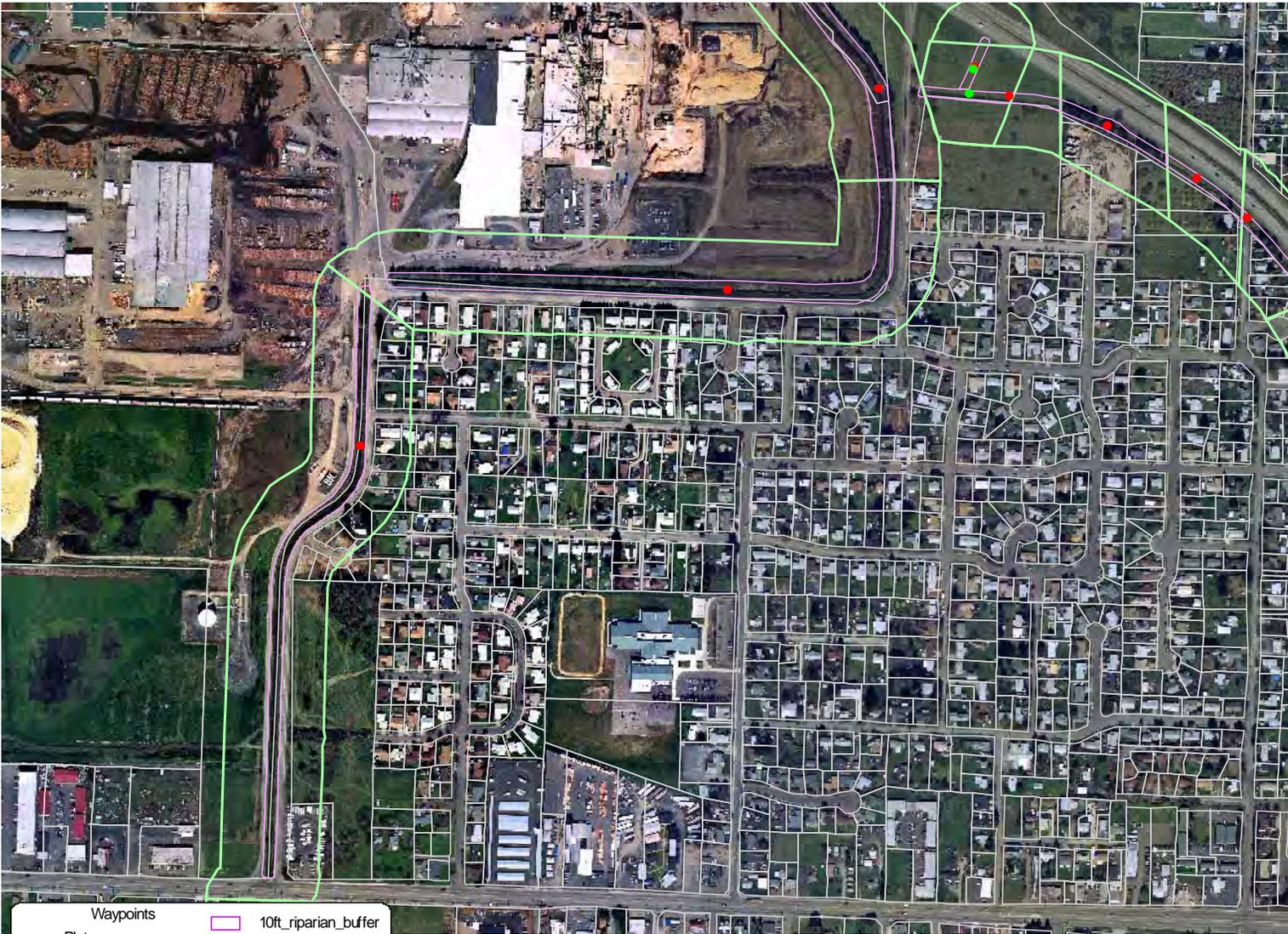
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	10ft_riparian_buffer
Plot	200ft_landuse_buffer
Seed Collection Site	tax lots
In Channel Structure	

48th St. Channel - South of Main St.

North arrow symbol
No scale



Waypoints	10ft_riparian_buffer
Plot	200ft_landuse_buffer
Seed Collection Site	tax lots
In Channel Structure	

48th St. Channel - North of Main St - middle section

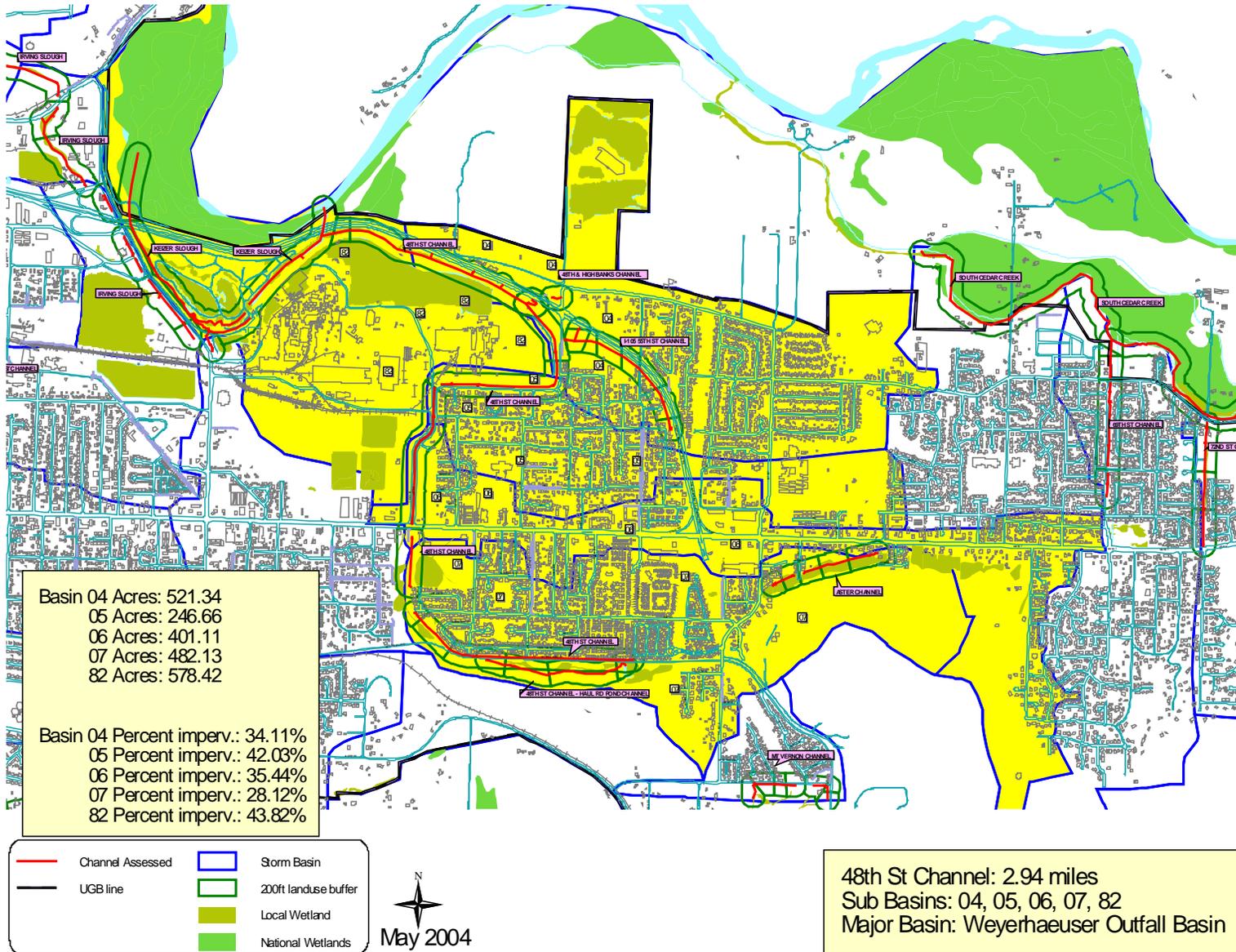




- | | |
|----------------------|----------------------|
| Waypoints | 10ft_riparian_buffer |
| Plot | 200ft_landuse_buffer |
| Seed Collection Site | tax lots |
| In Channel Structure | |

48th St. Channel - North of Main St - North section





Appendix D - 69th St Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

69th St. Channel starts south of D St. and east of 69th St. It flows north to Thurston Rd and into a culvert that empties into South Cedar Creek on the north side of Thurston Rd.

It receives stormwater runoff and groundwater. It is approximately 0.50 miles long.



69th St Channel facing south



Findings/Conclusions

Data out-come:

- Consists of four (4) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 6.3 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Four photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 21st & 24th, 2002. Ambient air temperature was between 14.5°C & 31.6°C (58° F & 88.9° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist mainly of Residential on the west and south sides and Residential, Un-developed and Agricultural on the east and north sides.
- The first two reaches are non-impinged on the east and west and the last two are fully impinged by roads and fences on both sides.

Water/Bank Profile details

- Water pH: averaged 7.48 with a minimum of 7.2 and maximum of 7.7.
- Water temperature averaged 15.58°C with a minimum of 14.7 °C and a maximum of 16°C.

➤ *Note:* Optimal is 13°C to 20°C, lethal is >25°C and TMDL standard is 17.8°C.

- Water level/movement in relation to active channel ranged from flowing less than ¼ to ½. The average was less than ¼.
- Algae are moderately abundant and brown/green in color.
- Channel profile is ponded to V-shaped with U-shaped in-between. Bank slopes are between 54% and 117% with an average of 82.5%.
- Bed material consists of cobble to gravel with silt/sand/clay in-between.
- A splash pad from an outfall was recorded as an in-channel structure.

Riparian Profile details

- Plant community consists of grass/field and hardwoods.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Phalaris arundinacea* (Reed Canary-grass).
- No co-dominant invasive plant species was recorded.
- Invasive plant species listed as present: *Phalaris arundinacea* (Reed Canary-grass), *Rubus armeniacus* (Armenian Blackberry), *Hedera helix* (English Ivy), and *Dipsacus fullonum* (Teasel).
- Others invasive plant species observed in the system: *Hypericum perforatum* (St. John’s Wort), *Holcus lanatus* (Velvet Grass), *Rubus laciniatus* (Evergreen Blackberry), and *Convolvulus sp.* (Morning Glory/Bindweed).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- Wildlife observed: A Blue and a Green Heron, Tadpoles, Lesser Gold Finch, and a Western Wood Pewee.
- No wildlife evidence recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement and neighborhood education were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	2.0
Water Appearance	8.8
Nutrient Enrichment	0
Bank Stability	3.3
Canopy Density/Cover	6.3
Invasive Damage – P	3.5
Invasive Damage – A/A	10.0
Waste Presence	9.3
Barriers to Fish (SBW)	9.5
Insect/Invert Habitat (SBW)	7.0
In-stream Fish Cover (SBW)	3.3

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.3 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (2.0), bank stability (3.3), in-stream fish cover (3.3) and damage by invasive plants (3.5) received the lowest rating (below mid-scale). Perform 'Impact Assessments' (see main document under 'Actions' for definition) to assess what may be done to improve these four factors.

Channel condition (2.0)

Bank stability (3.3)

- Bank stability problems are due to over-channelization, producing steep banks, and close location to roadway. Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

In-stream fish cover (3.3)

Damage by invasive plants (3.5)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. This may not be possible because of the roadways proximity to the channel and maintenance access to the channel.

In-general

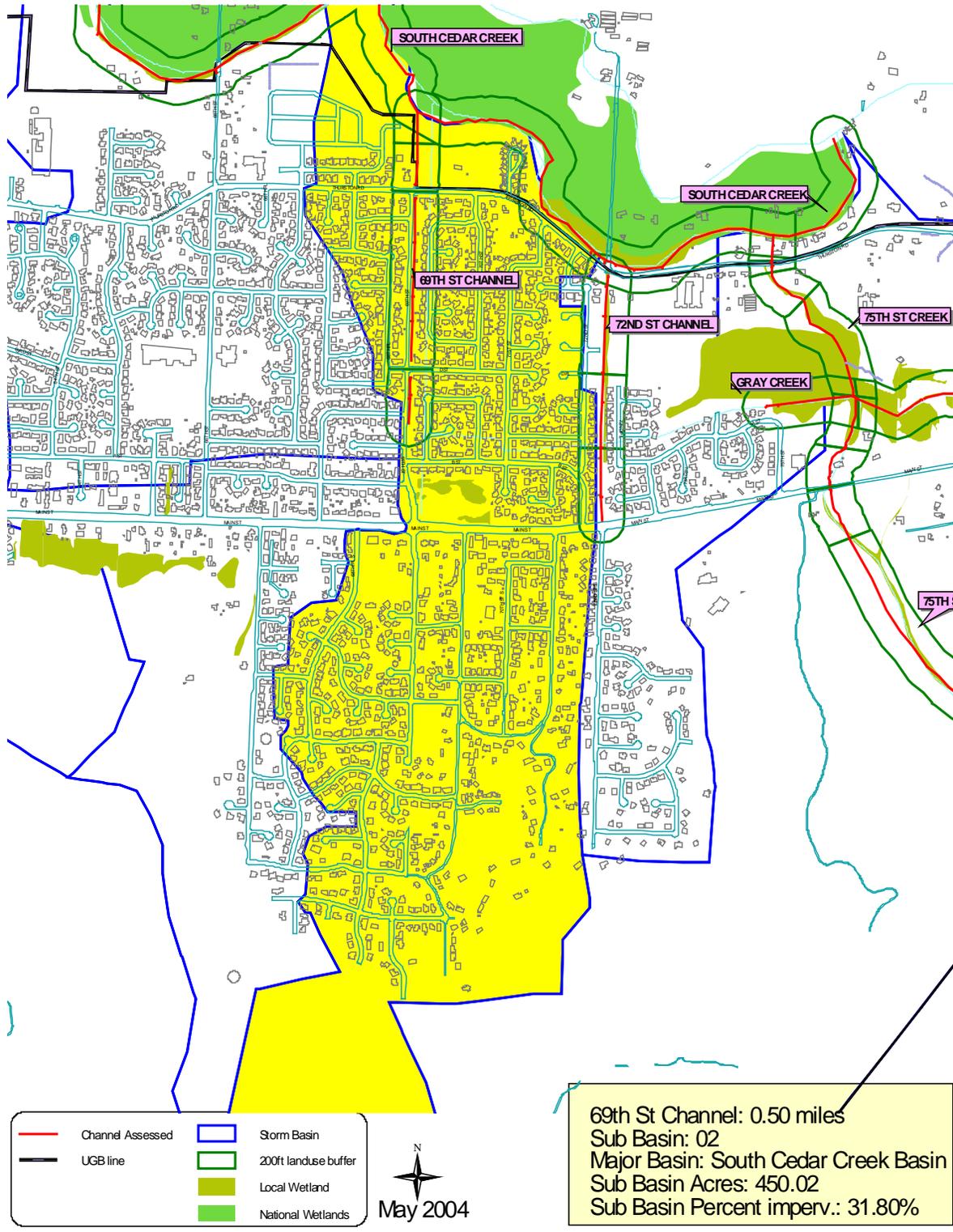
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints		10ft_riparian_buffer
	Plot	200ft_landuse_buffer
	Seed Collection Site	tax lots
	In Channel Structure	

69th St Channel





Appendix E - 72nd St Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

72nd St Channel starts north of Main St. It flows north to Thurston Rd and into a culvert that empties into South Cedar Creek on the north side of Thurston Rd.

It receives stormwater runoff and groundwater. This system is considered wetlands and is listed on the Local Wetlands Inventory. It is approximately 0.40 miles long.



72nd St Channel facing south



Findings/Conclusions

Data outcome:

- Consists of three (3) reaches.
- Listed as a SBW and a Springfield WQLW system. System is <1000cfs, requires a site plan review for property within 150' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 5.0 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Five photos of plot sites and in-channel structures were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 4th, 6th, and 7th, 2002. Ambient air temperature was between 17.4°C & 26.9°C (63.3° F & 80.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist mainly of Residential on both sides. Reach 1 is Public/Park (school) on the east.
- Most reaches are non-impinged. The last reach by Main St is fully impinged on the west side.

Water/Bank Profile details

- Water pH: averaged 6.43 with a minimum of 5.4 and maximum of 7.4.

- Water temperature averaged 20.03°C with a minimum of 17.5 °C and a maximum of 23.7°C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25°C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel was flowing less than ¼.
- Algae presence was recorded as some present and brown/green in color.
- Channel profile is U-shaped to rectangle (poured concrete) with ponded in-between. Bank slopes are between 22% and 75% with an average of 41.8.5%.
- Bed material consists primarily of silt/sand/clay. One reach is concrete.
- A concrete drop structure was recorded as an in-channel structure.

Riparian Profile details

- Plant community is grass/field and mixed.
- Dominant invasive plant species: *Holcus lanatus* (Velvet Grass).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Invasive plant species listed as present: *Dipsacus fullonum* (Teasel).
- Others invasive plant species observed in the system: *Convolvulus sp.* (Morning Glory/Bindweed).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- Frogs were listed as wildlife observed.
- Animal paths and frog noise were recorded as wildlife evidence.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	2.3
Water Appearance	9.3
Nutrient Enrichment	7.0
Bank Stability	9.3
Canopy Density/Cover	1.0
Invasive Damage – P	5.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	1.0
Insect/Invert Habitat (SBW)	1.0
In-stream Fish Cover (SBW)	1.7

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.0 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (2.3) , canopy density/cover (1.0), barriers to fish movement (1.0), insect/invertebrate habitat (1.0), and in-stream fish cover (1.7) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these five factors.

Channel condition (2.3)

- The profile of this system’s streambed was re-shaped as a result of maintenance activities shortly after the assessment. One to two reaches were affected by the reshaping. Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Canopy density/cover (1.0)

Insect/invertebrate habitat (1.0)

In-stream fish cover (1.7)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. This system is listed as SBW by the State and WQLW by the City.

Barriers to fish movement (1.0)

- Two main barriers to fish exist on this system: a large culvert under Thurston Rd. and a concrete water control structure. Both are impassable to fish. This system is listed as SBW by the State and if it is to be continued as listed then culvert retrofitting and removal or redesign of the water control structure may need to occur.

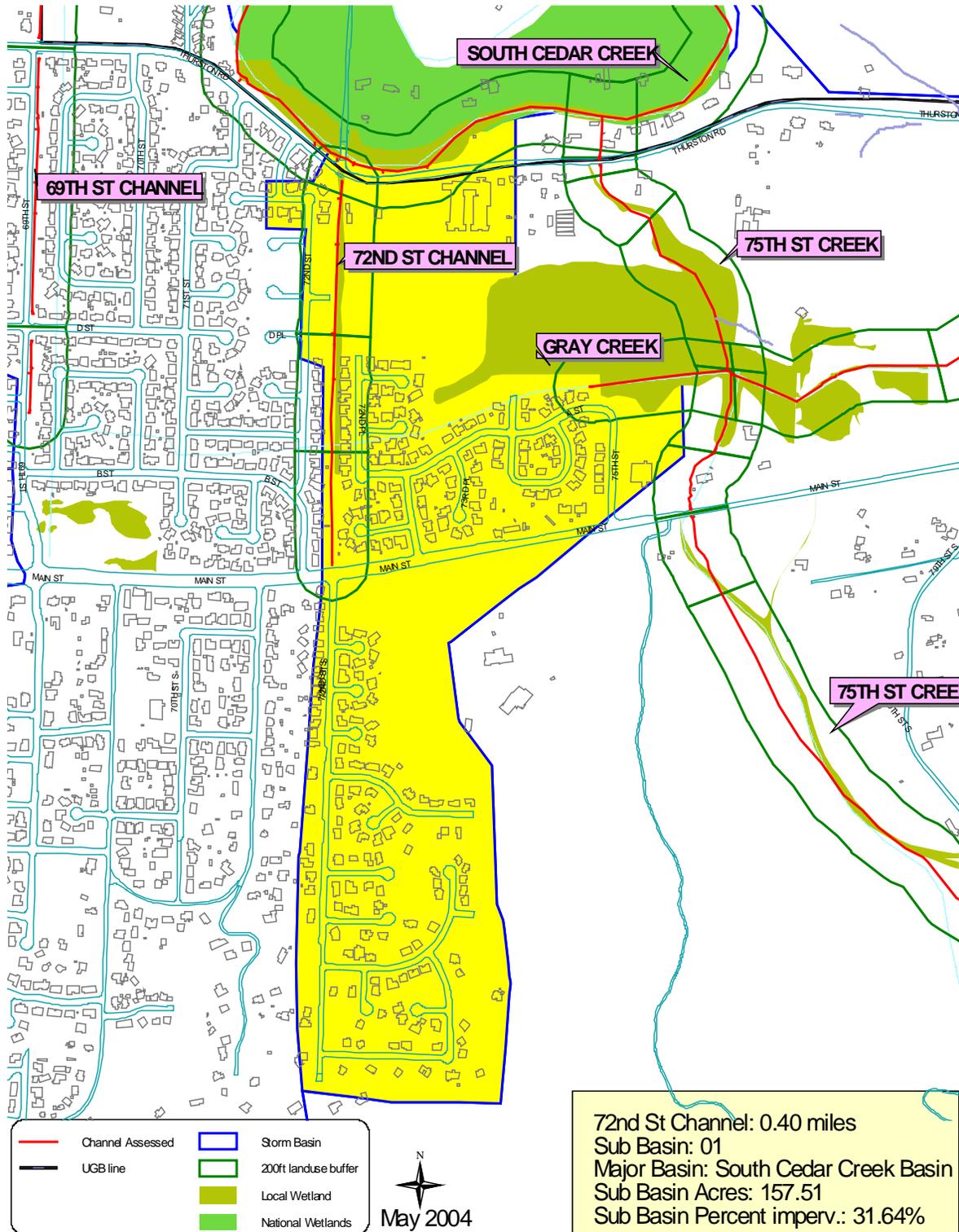
In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.
- Review which reaches require neighborhood education and target those areas for door hangers addressing yard debris and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.



72nd St Channel





Appendix F - 75th St Creek

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

75th St Creek starts south of Main St. near South 75th St. It flows north and intersects with Gray Creek where the flow splits. Some of the flow heads west in Gray Creek, then into 72nd St Channel and ends up in South Cedar Creek. The rest of the flow continues north in 75th St Creek to Thurston Rd and into a culvert that outfalls on the north side of Thurston Rd, then into South Cedar Creek. It receives stormwater runoff, groundwater and is fed by underground creeks from the hills south of Main St. There is also a wetland that feeds into it from the Bob Artz Park (75th and Thurston Rd). Sections of this system are wetlands and are listed on the Local Wetlands Inventory. The mapped section from Springfield's UGB line to South Cedar Creek is approximately 0.47 miles long.



Findings/Conclusions

Data outcome:

- Consists of seven (7) reaches. The survey was not finished due to underground springs making it hard to trace to the start of the system.
- Listed as a SBW and a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 6.4 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- *Camassia quamash* (Common Camas) was recorded for seed collection.

Photos:

- Six photos of plot sites were taken; plot site number four was missed.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 22nd, 27th, and 29th, 2002. Ambient air temperature was between 20°C & 33.4°C (68° F & 92.1°), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of a mixture of mostly Residential and Un-developed. The east side of reach 4 is Public/Park (Bob Artz Park).
- Most reaches are non-impinged. The first reach between South Cedar Creek and Thurston Rd is fully impinged on both sides with fences, roadway, a shed, and a gravel driveway.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped to U-shaped with one ponded reach in-between. Bank slopes are between 15% and 74% with an average of 39.86%.
- Bed material consists primarily of silt/sand/clay ending in cobble.
- Fences, an electrical conduit, log footbridge, a small vehicle bridge, and culverts were recorded as in-channel structures.

Riparian Profile details

- Plant community is hardwoods and grass/field with one reach being dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Holcus lanatus* (Velvet Grass).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Holcus lanatus* (Velvet Grass), and *Solanum dulcamara* (Nightshade).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Hedera helix* (English Ivy), *Dipsacus fullonum* (Teasel), and *Rubus armeniacus* (Armenian Blackberry).
- Others invasive plant species observed in the system: *Convolvulus sp.* (Morning Glory/Bindweed), *Rubus laciniatus* (Evergreen Blackberry), *Phalaris arundinacea* (Reed Canary-grass), and *Buddleia davidii* (Butterfly bush).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- Deer and Coyote scat was recorded as wildlife evidence.
- *Camassia quamash* (Common Camas) was identified for seed collection.
- Riparian buffer enhancement and bank stabilization were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	6.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	4.0
Canopy Density/Cover	6.0
Invasive Damage – P	5.4
Invasive Damage – A/A	10.0
Waste Presence	7.9
Barriers to Fish (SBW)	8.9
Insect/Invert Habitat (SBW)	6.7
In-stream Fish Cover (SBW)	2.6

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.4 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that bank stabilization (4.0) and in-stream fish cover (2.6) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Bank stabilization (4.0)

In-stream fish cover (2.6)

- Reach 1 is heavily channelized, appears to have been treated with herbicides, and consists of bare soil banks. Reach 1 falls outside of the City limits. Perform neighborhood education and target those areas for public outreach through door hangers addressing herbicide use and animal waste.
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Add the public areas to the mowing and maintenance activities list. Concentrate more effort on blackberry eradication that can promote native plant growth. This system has not been managed by City of Springfield as of this writing.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. This may not be possible because of private land ownership and maintenance of the channel.

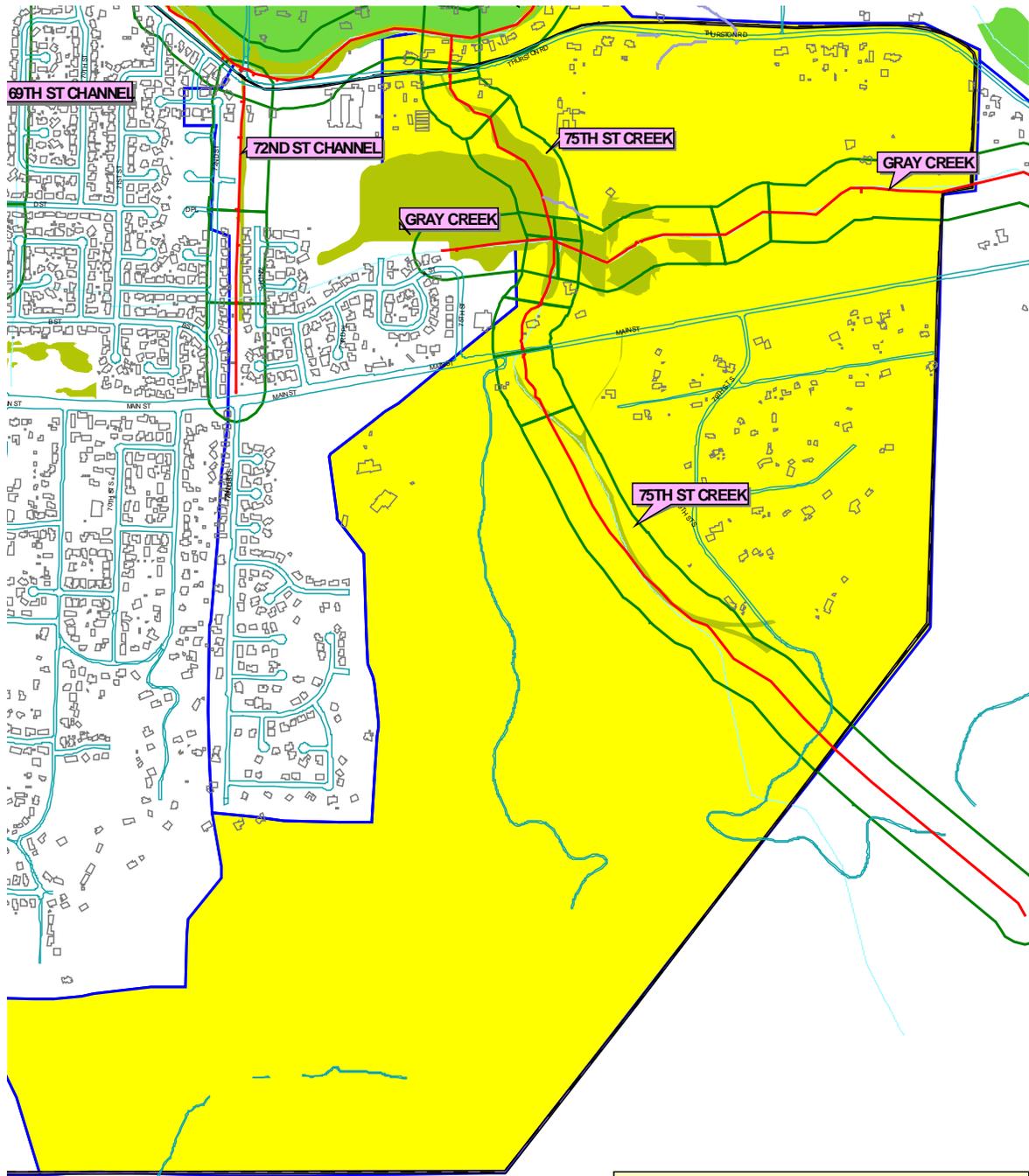
In-general

- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.
- This system flows in and out of the City limits and through a lot of private property. Identifying project opportunities may be limited.



75th St Creek





May 2004

75th St Creek 0.47 miles
 Sub Basin: 88
 Major Basin: South Cedar Creek Basin
 Sub Basin Acres: 683.19
 Sub Basin Percent imperv.: 9.09%

Appendix G - Alton Baker Canoe Canal

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Alton Baker Canoe Canal starts south of the end of Walnut St in West Springfield. It receives flow from the Willamette River at the West D St boat ramp. It flows northwest under a bike path and the I-5 freeway to Eugene. It eventually flows back into the Willamette River at Alton Baker Park in Eugene.

This system is considered wetlands and is listed on the Local Wetlands Inventory. The Springfield portion of the Canal is approximately 0.35 miles long.



Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 7.1 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No sites were recorded for seed collection.

Photos:

- One photo of a plot site was taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 13th, 2002. Ambient air temperature was at 36.5°C (97.7° F), which dictates a rating of sunny & hot for weather condition.
- Land use consists of Public/Park on both sides.
- There is a partial impingement of the bike path on the southwest side.

Water/Bank Profile details

- Water pH was recorded at 7.3.
- Water temperature was recorded at 16.8°C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25°C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel was flowing at ¾ full.
- Algae presence was recorded as some present and brown/green in color.
- Channel profile is ponded. Slopes were recorded at 24%.
- Bed material consists primarily of silt/sand/clay.
- Bridge abutments from the bike path bridge and a wastewater conduit were recorded as in-channel structures.

Riparian Profile details

- Plant community is mixed.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Hedera helix* (English Ivy).
- Invasive plant species listed as present: *Phalaris arundinacea* (Reed Canary-grass).
- Others invasive plant species observed in the system: *Solanum dulcamara* (Nightshade) and *Cytisus scoparius* (Scotch Broom).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- Wildlife observed were Mallard ducks, although this system is known to have Great Blue Herons with nests in the trees. Herons are seen frequently from West D St. Park.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	7.0
Water Appearance	10
Nutrient Enrichment	9.0
Bank Stability	9.0
Canopy Density/Cover	5.0
Invasive Damage – P	2.0
Invasive Damage – A/A	10.0
Waste Presence	5.0
Barriers to Fish (SBW)	3.0
Insect/Invert Habitat (SBW)	10.0
In-stream Fish Cover (SBW)	8.0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
7.1 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that damage by invasive plants (2.0) and barriers to fish (3.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Damage by invasive plants (2.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.

Barriers to fish (3.0)

- The siphon at West D St boat ramp and the concrete drop structure under the I-5 freeway appear to be barriers to fish. This system is listed as a WQLW; these structures should be evaluated to determine if they are in fact barriers, and what improvements are appropriate (they may or may not be good candidates for upgrades).
- Develop a training and awareness program with Willamalane Park staff on identifying invasive plant species and eradication methods for reaches that fall within City limits; use “City of Springfield Invasive Plants List” as a guide.

In-general

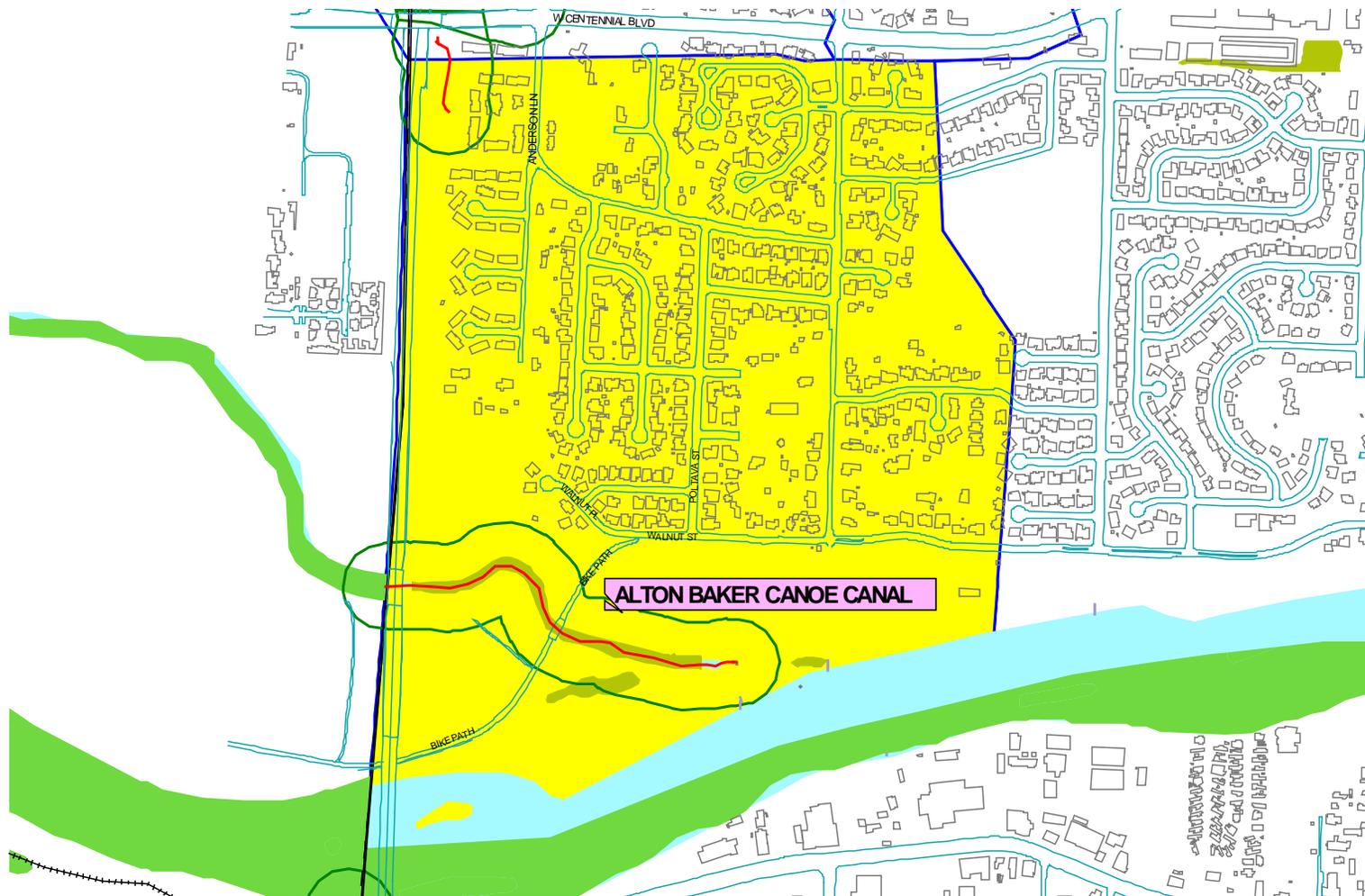
- Continue to perform maintenance activity for invasive species eradication for reaches that fall within the City limits; use *City of Springfield Invasive Plants List* as a guide. Concentrate more effort on blackberry eradication that can promote native plant growth.
- A stormwater collection ditch is shown on City maps as discharging into the canal from the north but it was not able to be physically located. Further field work should be done to determine if this collector ditch has been filled or blocked.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



- | | | |
|------------------------|------------------------|----------------------|
| Waypoints | | 10ft_riparian_buffer |
| • Plot | • Seed Collection Site | 200ft_landuse_buffer |
| • In Channel Structure | | tax lots |

Alton Baker Canoe Canal





Alton Baker Canoe Canal: 0.35 miles
 Sub Basin: 47
 Major Basin: Willamette River Basin
 Sub Basin Acres: 201.05
 Sub Basin Percent imperv.: 33.17%

Appendix H - Aster Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterway*". Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Aster Channel starts south of Main St. and west of South 63rd St. It flows southwest to a piped system east of South 58th St.

It receives flow from stormwater runoff and is fed by wetlands. This system is a broad, shallow chain of wetlands and wetland conditions and is listed on the Local Wetlands Inventory. Portions of the channel itself do not sustain flow year-round. The channel is approximately 0.34 miles long.



Findings/Conclusions

Data outcome:

- Consists of five (5) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The average overall health rating for this system is 7.2 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- *Camassia quamash* (Common Camas), *Epilobium densiflorum* (Dense Spike-Primrose), *Eryngium petiolatum* (Rush-leaf Coyote thistle), and *Juncus patens* (Spreading Rush) were recorded for seed collection.

Photos:

- Five photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 23rd, & 24th, 2002. Ambient air temperature was between 20.4°C & 31.9°C (68.7° F & 89.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of mix of Residential and Un-developed on both sides.
- There are partial impingements by fences on both sides.

Water/Bank Profile details

- System was dry at the time of assessment, no Water pH, or temperature.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is mostly ponded with one U-shaped reach. Bank slopes are between 6% and 52% with an average of 19.5%.
- Bed material consists primarily of silt/sand/clay.
- Culverts and fences were recorded as in-channel structures.

Riparian Profile details

- Plant community of hardwoods and one reach that is grass/field.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- No co-dominant invasive plant species was recorded.
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Rubus laciniatus* (Evergreen Blackberry), and *Convolvulus sp.* (Morning Glory/Bindweed).
- Others invasive plant species observed in the system: *Phalaris arundinacea* (Reed Canary-grass), *Hedera helix* (English Ivy), *Phalaris aquatica* (Harding grass), *Parentucellia viscosa* (Parentucellia), *Buddleia davidii* (Butterfly bush), and *Mentha pulegium* (Penny royal).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- *Camassia quamash* (Common Camas), *Epilobium densiflorum* (Dense Spike-Primrose), *Eryngium petiolatum* (Rush-leaf Coyote thistle), and *Juncus patens* (Spreading Rush) were recorded for seed collection.
- Neighborhood education and riparian buffer enhancement were recorded for project opportunities.
- A chicken house, and a property owner driving a tractor through the channel was noted in the comments section.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.2
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	9.2
Canopy Density/Cover	5.6
Invasive Damage – P	6.2
Invasive Damage – A/A	10.0
Waste Presence	8.8
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
7.2 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.2) rated below mid-scale. Reach 4 and 5 rated the lowest for channel condition. Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two reaches.

Channel condition (3.2)

- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing to problems noted under the comments field; a chicken house, and a property owner driving a tractor through the channel.

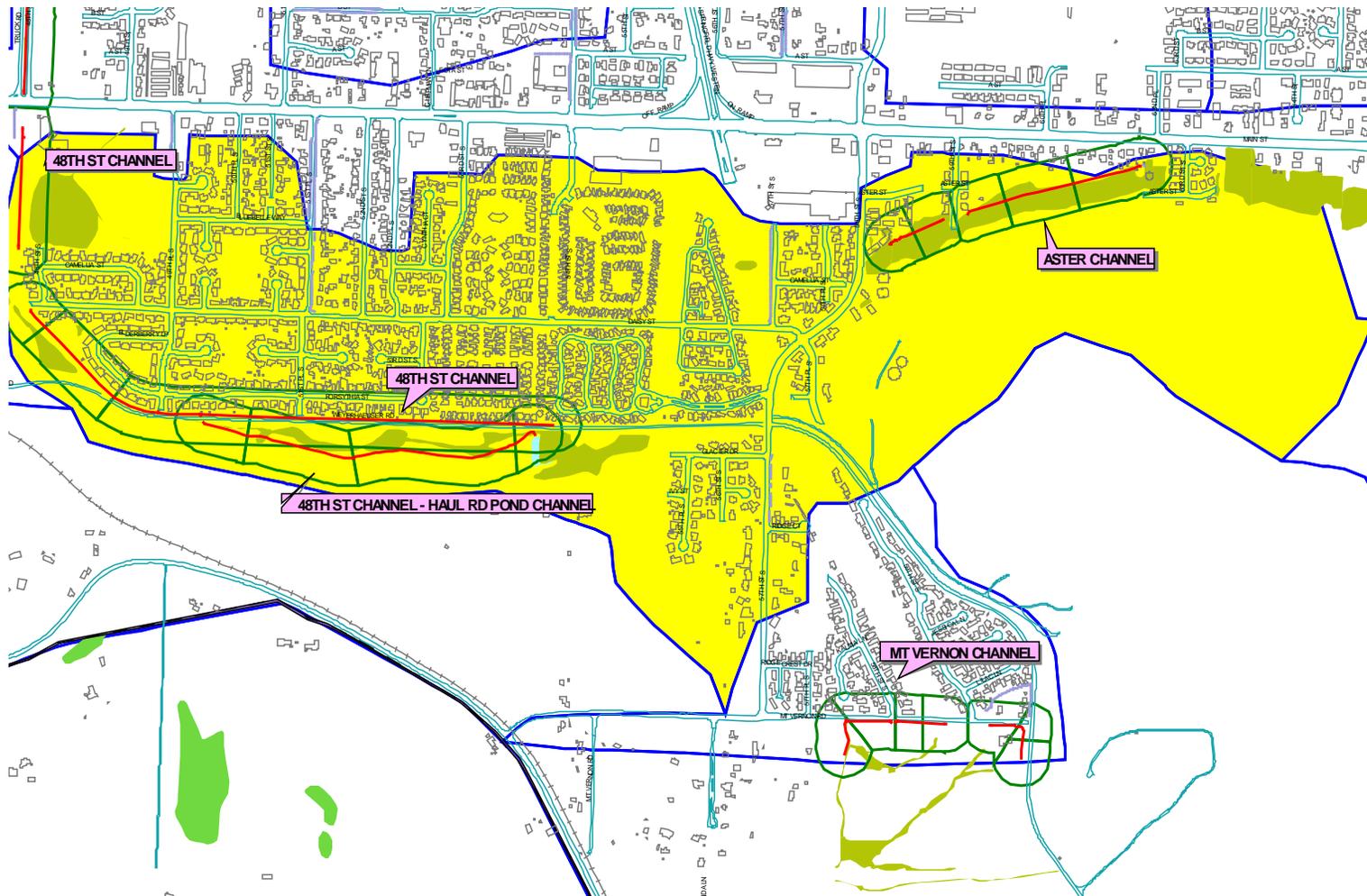
In-general

- Develop and perform maintenance activity for invasive species eradication; use *City of Springfield Invasive Plants List* as a guide.
- Add to the mowing and other maintenance activities list. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Aster Channel






 May 2004

Aster Channel: 0.34 miles
 Sub Basin: 07
 Major Basin: Weyerhaeuser Outfall Basin
 Sub Basin Acres: 482.13
 Sub Basin Percent imperv.: 28.12%

Appendix I - Channel 6 - Lochaven Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 3 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Channel 6 – Lochaven Channel is a tributary to Channel 6. It starts west of Clearvue Lane, south of Channel 6 and north of Lochaven Ave. It flows northwest to intersect with Channel 6, behind Guy Lee School.

It receives flow from stormwater runoff and flows through a wetland. This system is considered wetlands and is listed on the Local Wetlands Inventory. The channel is approximately 0.14 miles long.



Findings/Conclusions

Data outcome:

- Consists of three (3) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 6.4 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Three photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 16th, & 17th, 2002. Ambient air temperature was between 15.4°C & 21.9°C (59.7° F & 71.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Residential on the southwest side and Public/Park on the northeast side. The Public/Park is a school.
- There are no impingements on either side.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is mostly ponded with one U-shaped reach. Bank slopes are between 30% and 62% with an average of 39.7%.
- Bed material consists primarily of silt/sand/clay.
- A footbridge was recorded as an in-channel structure.

Riparian Profile details

- Plant community consisting of grass/field and one reach that is hardwoods.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass), *Rubus armeniacus* (Armenian Blackberry), and *Festuca arundinacea* (Tall Fescue).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Hedera helix* (English Ivy).
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry), *Solanum dulcamara* (Nightshade), and *Phalaris aquatica* (Harding grass).
- Others invasive plant species observed in the system: *Holcus lanatus* (Velvet Grass), and *Convolvulus sp.* (Morning Glory/Bindweed).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.7
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	9.3
Canopy Density/Cover	4.7
Invasive Damage – P	2.7
Invasive Damage – A/A	10.0
Waste Presence	8.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.4 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.7) and damage by invasive plants (2.7) rated below mid-scale. Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Channel condition (3.7)

Damage by invasive plants (2.7)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.

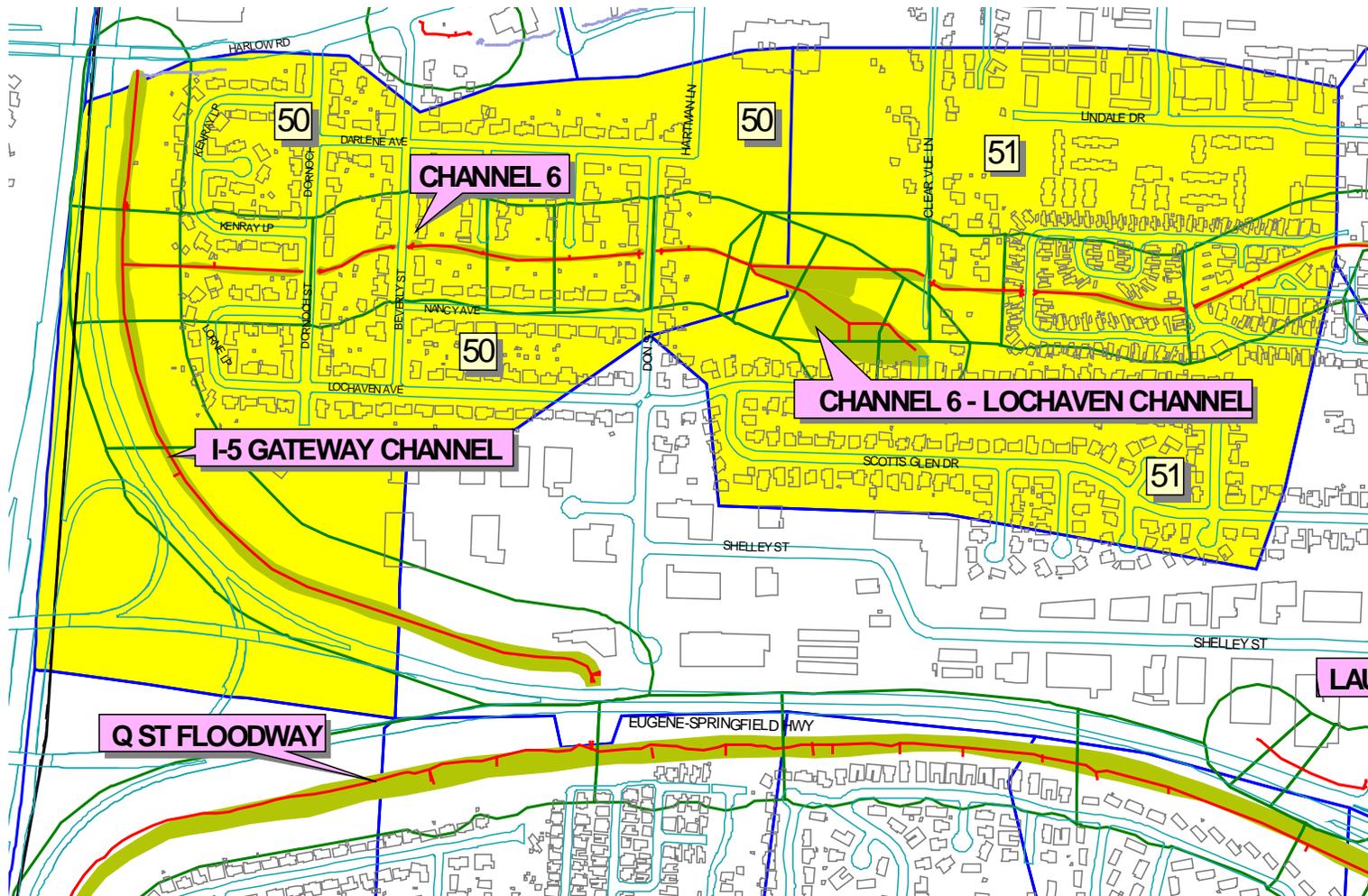
In-general

- Continue mowing and other maintenance activities.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Channel 6 - Lochaven Channel





May 2004

Channel 6 - Lochaven Channel: 0.14 miles
 Sub Basins: 50, 51
 Major Basins: West Springfield Q St. Basin
 Sub Basin 50 Acres: 105.83
 Sub Basin 51 Acres: 86.02
 Sub Basin 50 Percent imperv.: 50.78%
 Sub Basin 51 Percent imperv.: 38.75%

Appendix J - Channel 6 - PPW Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Channel 6 – PPW Channel is a tributary to Channel 6. It starts between Pioneer Parkway East and West, south of Channel 6 and south of Hayden Bridge Rd. It flows northwest to a piped system off Laura St, then into Channel 6.

It receives flow from stormwater runoff. The channel is approximately 0.14 miles long.



Findings/Conclusions

Data outcome:

- Consists of five (5) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 6.9 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Seven photos of plot sites and in-channel structures were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 1st, 2nd and 3rd, 2002. Ambient air temperature was between 24.5°C & 28.9°C (76.1° F & 81° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of mostly Residential and Public/Park on both sides. The Public/Park is the Parkway bike path area.
- Impingements on the north and east sides are a gravel road, asphalt road and concrete garden blocks. They are partially to fully impinging the channel. Impingements on the south and west side are fences.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped to V-shaped with ponded in-between. Bank slopes are between 4% and 73% with an average of 33.4%.
- Bed material consists primarily of silt/sand/clay with some cobble.
- A culvert, fences, and concrete garden blocks were recorded as in-channel structures.

Riparian Profile details

- Plant community consisting of grass/field and one reach that is dominated by invasive species.
- Dominant invasive plant species: *Convolvulus sp.* (Morning Glory/Bindweed).
- No co-dominant invasive plant species was listed.
- Invasive plant species listed as present: *Convolvulus sp.* (Morning Glory/Bindweed), *Rubus armeniacus* (Armenian Blackberry), and *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Phalaris arundinacea* (Reed Canary-grass), *Phalaris aquatica* (Harding grass), and *Dipsacus fullonum* (Teasel).
- No invasive animals/amphibian was observed.
- No damage by invasive animals/amphibian was recorded.
- A Garter snake was noted as wildlife observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement and neighborhood education were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.8
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	9.6
Canopy Density/Cover	2.2
Invasive Damage – P	8.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.9 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.8) and canopy density/cover (2.2) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Channel condition (1.8)

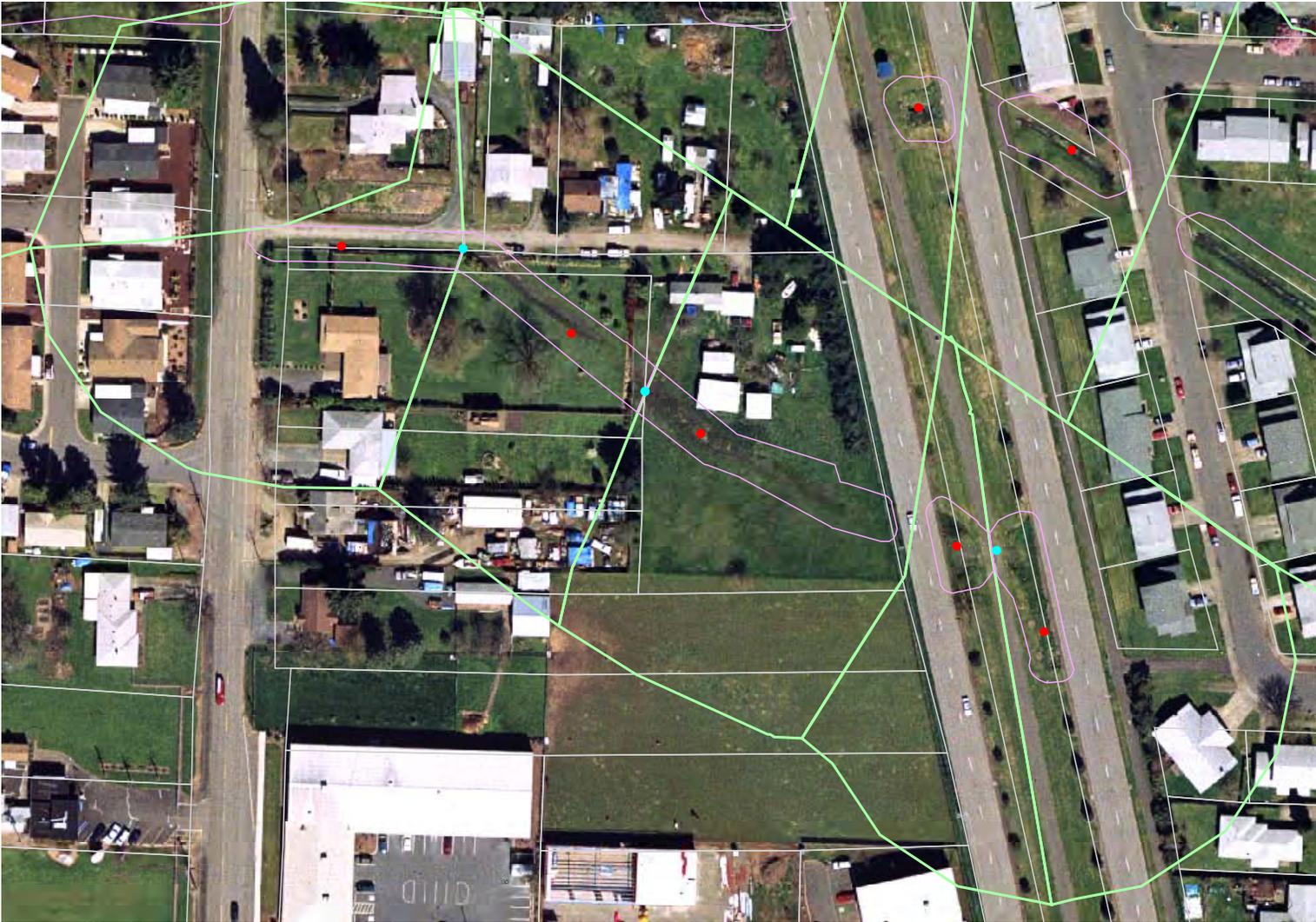
- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Canopy density/cover (2.2)

- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent

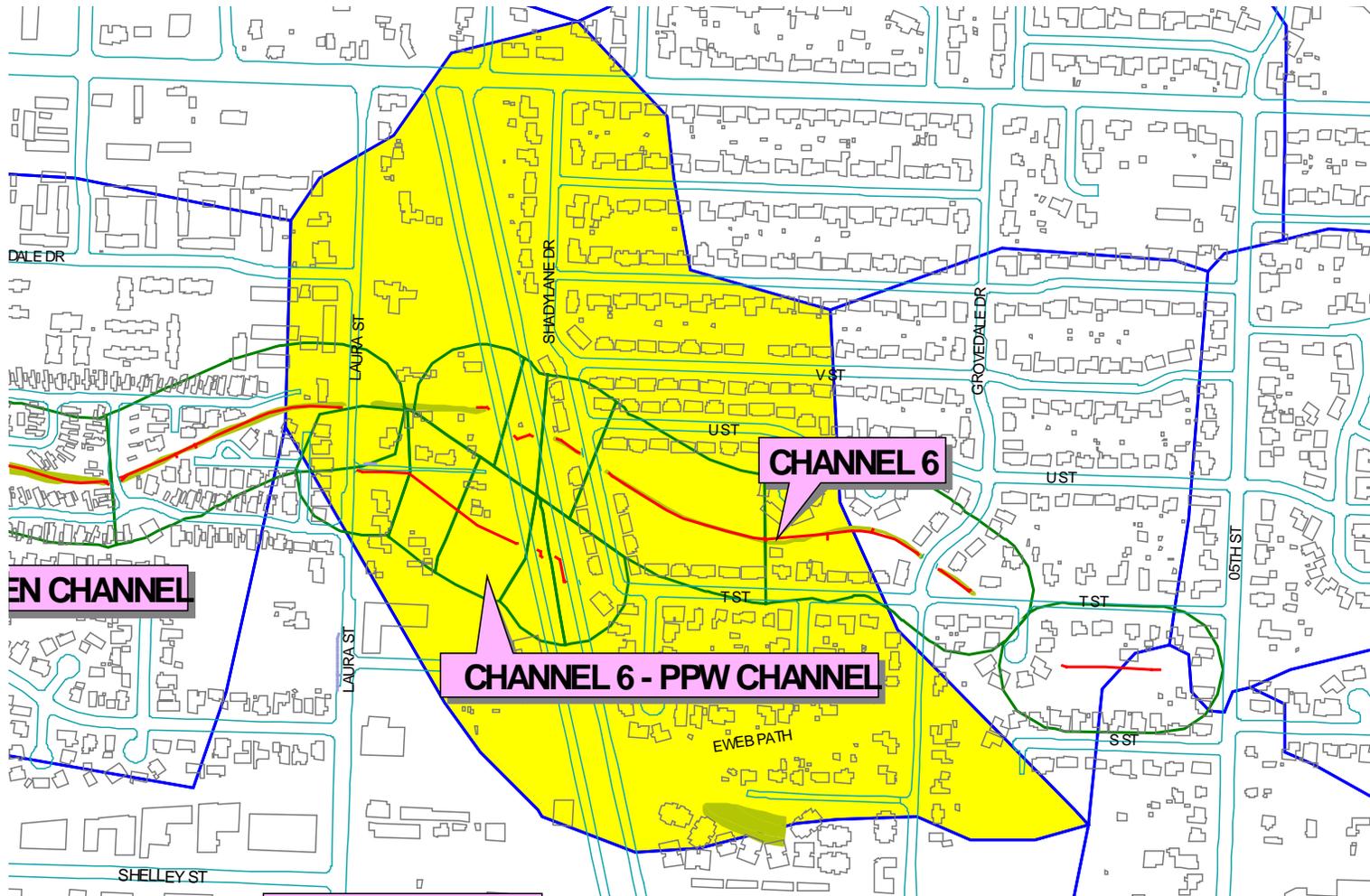
In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste. Contact Willamalane about park maintenance activities involving herbicide and fertilizer use. Use BMPs for eradication and fertilizer use.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Channel 6 - PPW Channel





May 2004

Channel 6 - PPW Channel: 0.14 miles
 Sub Basin: 56
 Major Basin: West Springfield Q St. Basin
 Sub Basin Acres: 83.34
 Sub Basin Percent imperv.: 49.03%

Appendix K - Channel 6 - T St Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Channel 6 – T St Channel is a section of Channel 6. It is isolated from the rest of Channel 6 by a piped system. It starts west of 10th St, north of Q St. It flows west to a piped system at 8th St and daylights west of 5th St.

It receives flow from stormwater runoff. The channel is approximately 0.14 miles long.



Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.3 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- *Rorippa curisiliqua* (Curve- pod yellowcress) was recorded for seed collection on this system.

Photos:

- One photo of a plot site was taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 10th, 2002. Ambient air temperature was at 30.4°C (86.7° F), which dictates a rating of sunny & hot for weather condition.
- Land use consists of Undeveloped on both sides.
- There are no impingements.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped and bank slopes are between 44% and 59% with an average of 51.5%.
- Bed material consists primarily of silt/sand/clay.
- No in-channel structures were recorded.

Riparian Profile details

- Plant community consisting of grass/field.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass).
- No co-dominant invasive plant species was listed.
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry).
- No others invasive plant species listed.
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- *Rorippa curisiliqua* (Curve- pod yellowcress) was recorded for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	5.0
Canopy Density/Cover	1.0
Invasive Damage – P	3.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.3 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.0), canopy density/cover (1.0), and damage by invasive plants (3.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these three factors.

Channel condition (3.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Canopy density/cover (1.0)

Damage by invasive plants (3.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent

In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.

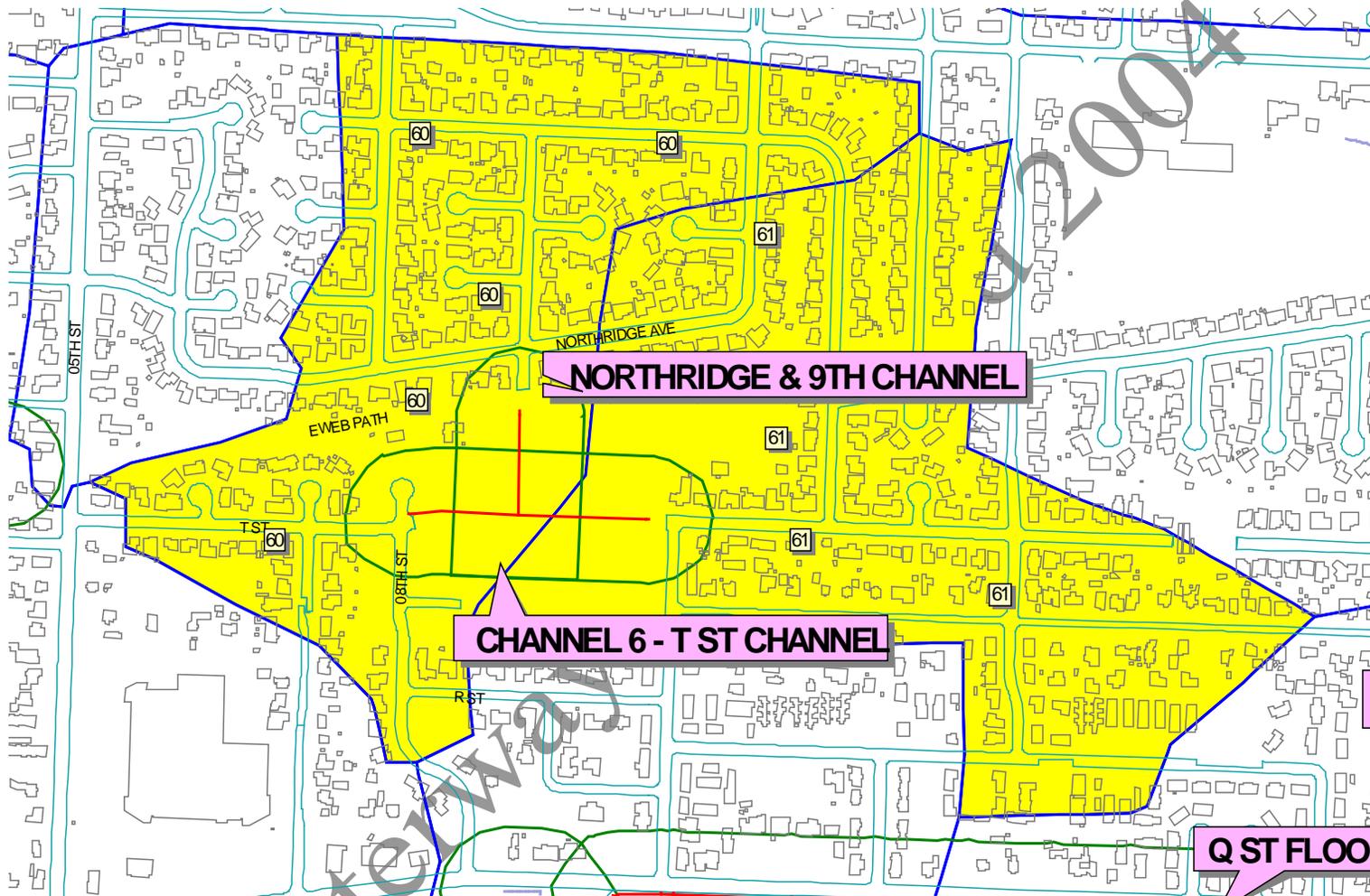
Waterway Removed 2004



Channel 6 - T St Channel



Waterway Removed 2004



May 2004

Channel 6 - T St Channel: 0.20 miles
 Sub Basins: 60, 61
 Major Basin: West Springfield Hayden Bridge Basin
 Sub Basin 60 Acres: 54.58
 Sub Basin 61 Acres: 61.28
 Sub Basin 60 Percent imperv.: 36.51%
 Sub Basin 61 Percent imperv.: 40.52%

Appendix L - Channel 6

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Channel 6 is a tributary to the I-5 Gateway Channel. It starts west of 5th St, south of T St. It flows northwest to intersect with the I-5 Gateway Channel east of interstate 5 and south of Kenray Loop.

It receives flow from stormwater runoff and flows from a wetland. This system is considered wetlands and is listed on the Local Wetlands Inventory. The channel is approximately 1.13 miles long.



Findings/Conclusions

Data outcome:

- Consists of fifteen (15) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.8 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- *Myosotis laxa* (small-flowered forget-me-nots), *Rorippa curisiliqua* (Curve-pod yellowcress) and *Sparganium emerum* (Simple-stem Bur-reed) were recorded for seed collection on this system.

Photos:

- Twenty photos of plots sites and in-channel structures were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed between June 11th and July 1st, 2002. Ambient air temperature was between 20.6°C & 39.1°C (69.1° F & 102.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Residential and Public/Park on both sides. The Public/Park is a school.
- Impingements encountered were fences, ball field, gravels roads, trailer-houses, and sidewalks.

Water/Bank Profile details

- Seven reaches were dry and one stagnant at the time of assessment. Water pH for the other reaches averaged 6.49 with a minimum of 6.0 and a maximum of 6.9.
- Water temperature: 7 reaches dry, one stagnant. Other reaches averaged 22.71° C with a minimum of 18° C and a maximum of 28.6° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to flowing full.
- Algae and algae color ranged from none to some present and brown/green in color.
- Channel profile is ponded to U-shaped with U-shaped and V-shaped intermittent. Bank slopes are between 19% and 81% with an average of 44.2%.
- Bed material consists primarily of silt/sand/clay with cobble.
- Fences, wastewater conduits, culverts, and footbridges were recorded as in-channel structures.

Riparian Profile details

- Plant communities of grass/field, then brush/shrub/scrub and dominated by invasive species were recorded most often. One each of hardwood, conifer, and non-vegetated were also recorded.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass), *Rubus armeniacus* (Armenian Blackberry), *Festuca arundinacea* (Tall Fescue), *Holcus lanatus* (Velvet Grass), and *Hypericum perforatum* (St. John's wort).
- Co-dominant invasive plant species: *Holcus lanatus* (Velvet Grass), *Phalaris arundinacea* (Reed Canary-grass), *Phalaris aquatica* (Harding grass), and *Hedera helix* (English Ivy).
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass), *Holcus lanatus* (Velvet Grass), *Phalaris aquatica* (Harding grass), *Iris pseudacorus* (Yellow flag iris), *Solanum dulcamara* (Nightshade), and *Convolvulus sp.* (Morning Glory/Bindweed).

- Others invasive plant species observed in the system: *Dipsacus fullonum* (Teasel), *Buddleia davidii* (Butterfly bush), and many unidentified ornamentals.
- Bullfrogs and nutria were listed as invasive animals/amphibian observed.
- Burrowing, undercutting of banks, tunneling and eating of vegetation to the point of bare banks were recorded as damage by invasive animals/amphibian.
- A Pacific green tree-frog, small fish, ducks, and Belted Kingfishers were recorded for wildlife observed.
- Nutria scat was recorded as wildlife evidence.
- *Myosotis laxa* (small-flowered forget-me-nots), *Rorippa curisiliqua* (Curve-pod yellowcress) and *Sparganium emerum* (Simple-stem Bur-reed) were recorded for seed collection.
- Riparian buffer enhancement and neighborhood education were recorded most often for project opportunities. Bank stability was also recorded.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.9
Water Appearance	5.8
Nutrient Enrichment	6.4
Bank Stability	7.5
Canopy Density/Cover	2.0
Invasive Damage – P	5.3
Invasive Damage – A/A	7.9
Waste Presence	9.8
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.8 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Health Rating definitions)

Actions

The scoring averages reveal that channel condition (1.9) and canopy density/cover (2.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Channel condition (1.9)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

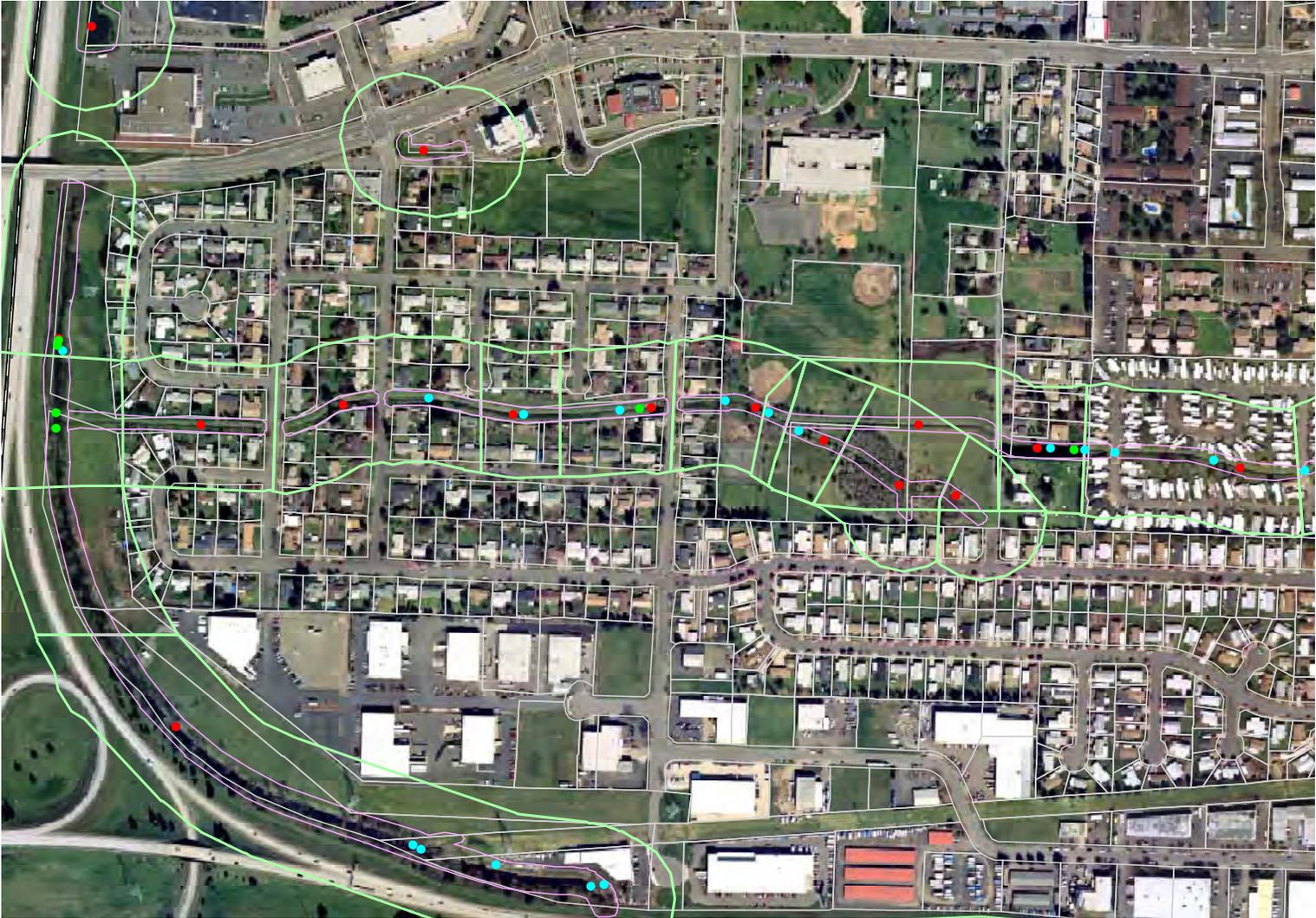
Canopy density/cover (2.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.

- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent

In-general

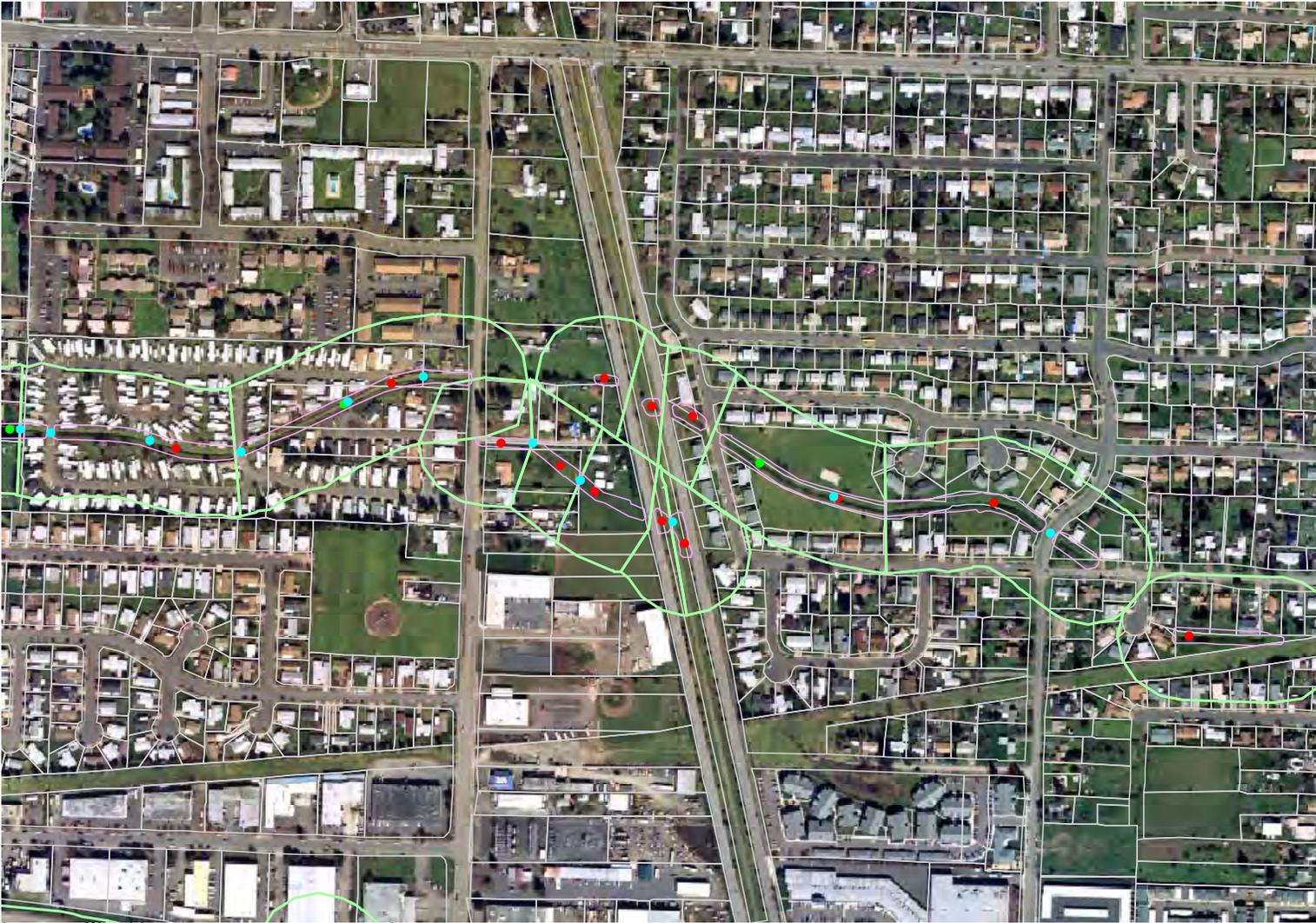
- Horses are present on the south side of reach 1. An evaluation should be done to determine if they are affecting water quality conditions.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Develop a program for nutria control/removal from the system.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.
- Continue to perform maintenance activity for invasive species eradication; use “City of Springfield Invasive Plants List” as a guide.



Waypoints	
●	Plot
●	Seed Collection Site
●	In Channel Structure
	10ft_riparian_buffer
	200ft_landuse_buffer
	tax lots

Channel 6 - Western Section

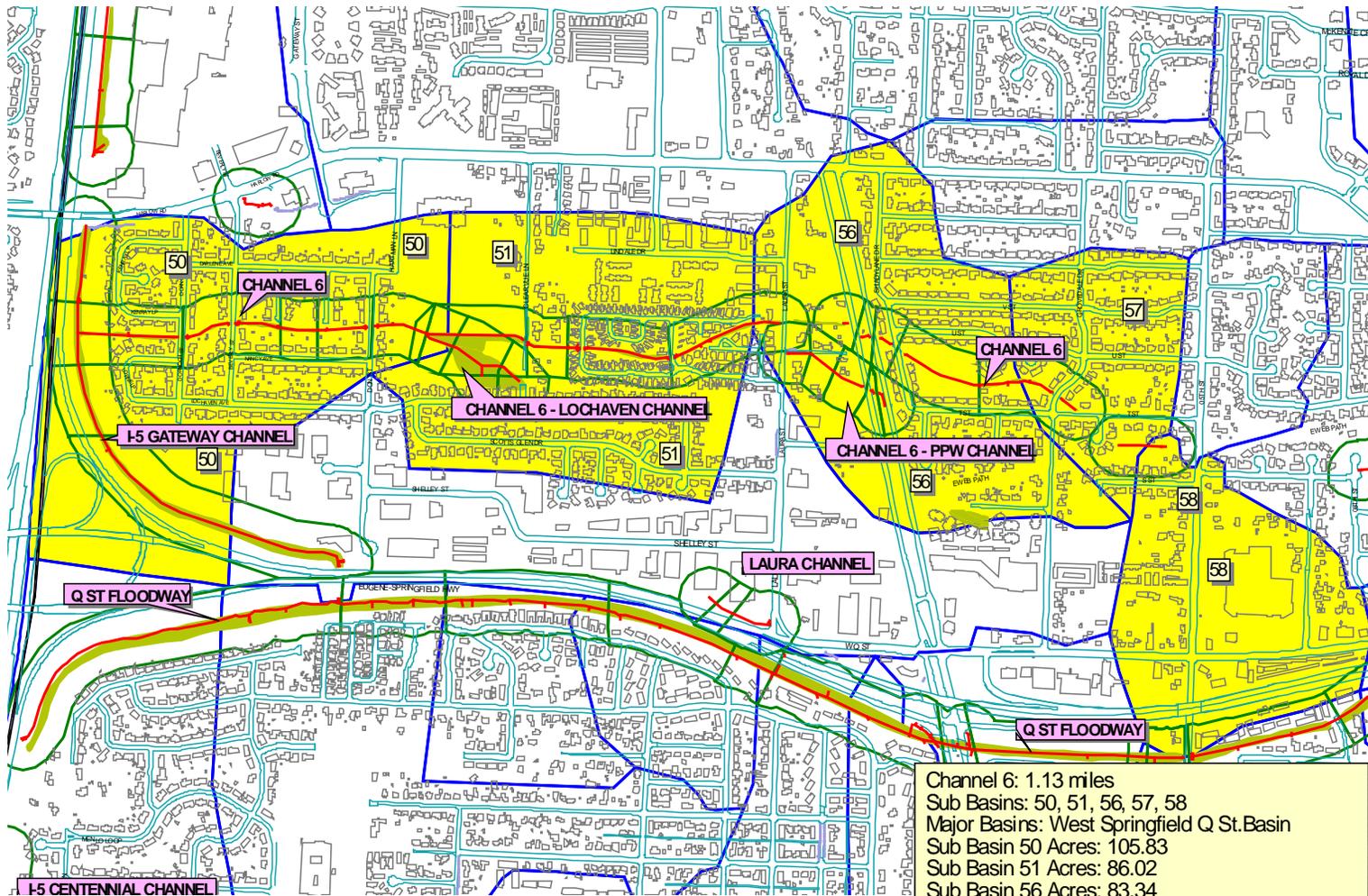




Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Channel 6 - Eastern Section






 May 2004

Channel 6:	1.13 miles
Sub Basins:	50, 51, 56, 57, 58
Major Basins:	West Springfield Q St.Basin
Sub Basin 50 Acres:	105.83
Sub Basin 51 Acres:	86.02
Sub Basin 56 Acres:	83.34
Sub Basin 57 Acres:	34.04
Sub Basin 58 Acres:	56.97
Sub Basin 50 Percent imperv.:	50.78%
Sub Basin 51 Percent imperv.:	38.75%
Sub Basin 56 Percent imperv.:	49.03%
Sub Basin 57 Percent imperv.:	43.27%
Sub Basin 58 Percent imperv.:	49.25%

Appendix M - Dorris Creek

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Dorris creek is a tributary to the Willamette River. The section that has been mapped starts east of South 2nd St and north of Dorris St. It flows southwest to the Willamette River.

It receives flow from stormwater runoff, ground water and springs. Sections of this system are wetlands and are listed on the Local Wetlands Inventory. Approximately 0.36 miles of the creek has been mapped.



Findings/Conclusions

Data outcome:

- Consists of five (5) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 7.3 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- *Juncus patens* (Spreading rush) was recorded for seed collection.

Photos:

- Five photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 5th & 6th, 2002. Ambient air temperature was between 17.9°C & 21.6°C (64.2° F & 70.1° F), which dictates a rating of mild & dry to sunny & mild for weather conditions.
- Land uses consist of Residential and Undeveloped on both sides.
- Partial impingements of fences are on the north side and partial to full impingements of fences and houses on the south side.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped with bank slopes between 16% and 76% with an average of 41.7%.
- Bed material consists primarily of silt/sand/clay.
- Footbridges and fences were recorded as in-channel structures.

Riparian Profile details

- Plant community of mixed and one reach that is hardwood.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Phalaris arundinacea* (Reed Canary-grass).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Phalaris arundinacea* (Reed Canary-grass).
- Invasive plant species listed as present: *Hedera helix* (English Ivy), *Rubus armeniacus* (Armenian Blackberry), and *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Solanum dulcamara* (Nightshade), *Conium maculatum* (Poison hemlock), and *Dipsacus fullonum* (Teasel).
- No invasive animals/amphibian was observed.
- No damage by invasive animals/amphibian was recorded.
- A deer was recorded as wildlife observed.
- Deer scat was recorded as wildlife evidence observed.
- *Juncus patens* (Spreading rush) was recorded for seed collection.
- Neighborhood education and riparian buffer enhancement were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	7.8
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	6.6
Canopy Density/Cover	8.0
Invasive Damage – P	3.8
Invasive Damage – A/A	9.4
Waste Presence	7.6
Barriers to Fish (SBW)	9.2
Insect/Invert Habitat (SBW)	8.8
In-stream Fish Cover (SBW)	4.0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
7.3 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that damage by invasive plants (3.8) and in-stream fish cover (4.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors. This creek falls outside of the City limits but inside the UGB, limiting project opportunities.

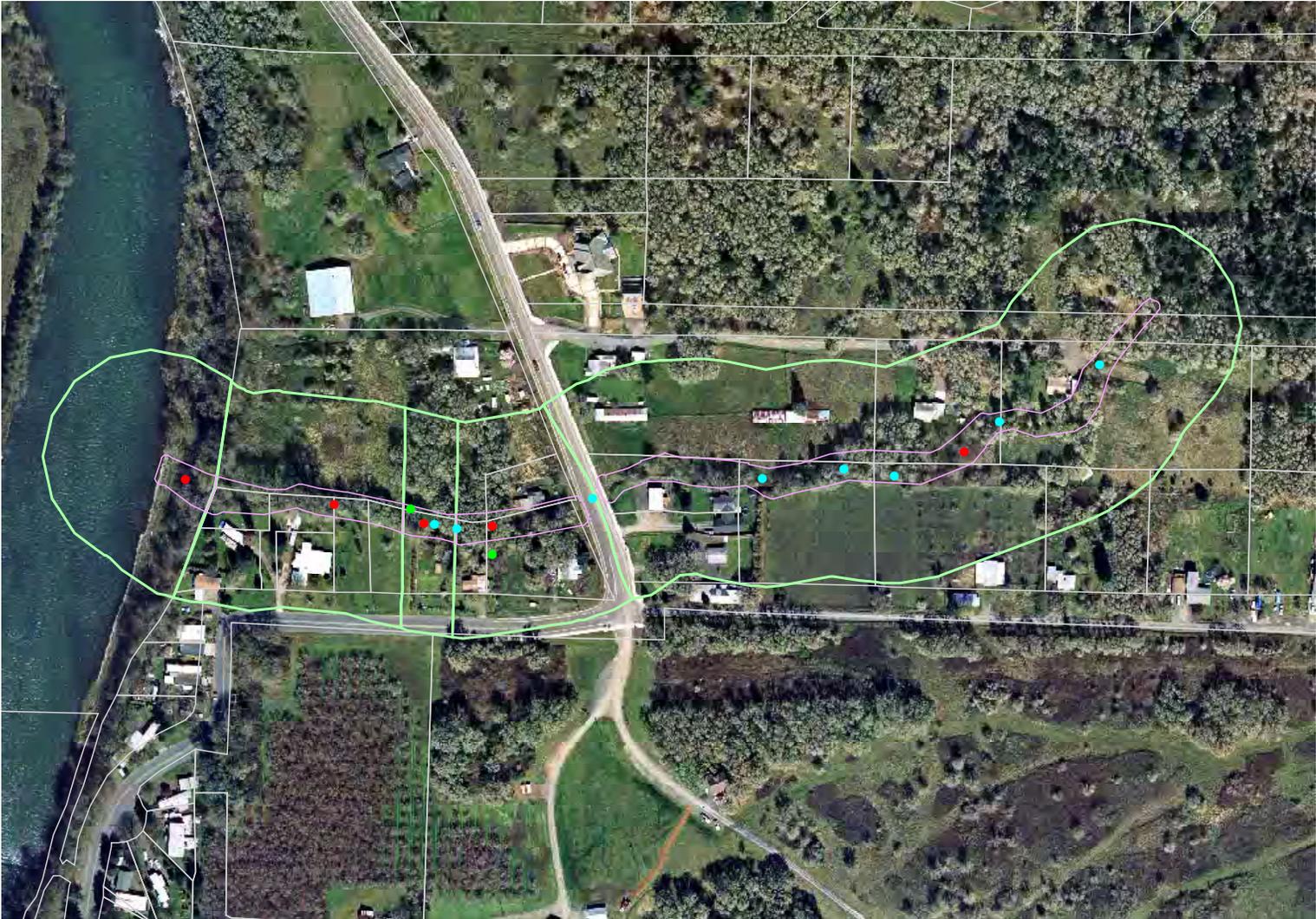
Damage by invasive plants (3.8)
In-stream fish cover (4.0)

This system has not been managed by City of Springfield as of this writing. If the City is to maintain this system:

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.

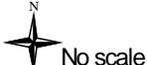
In-general

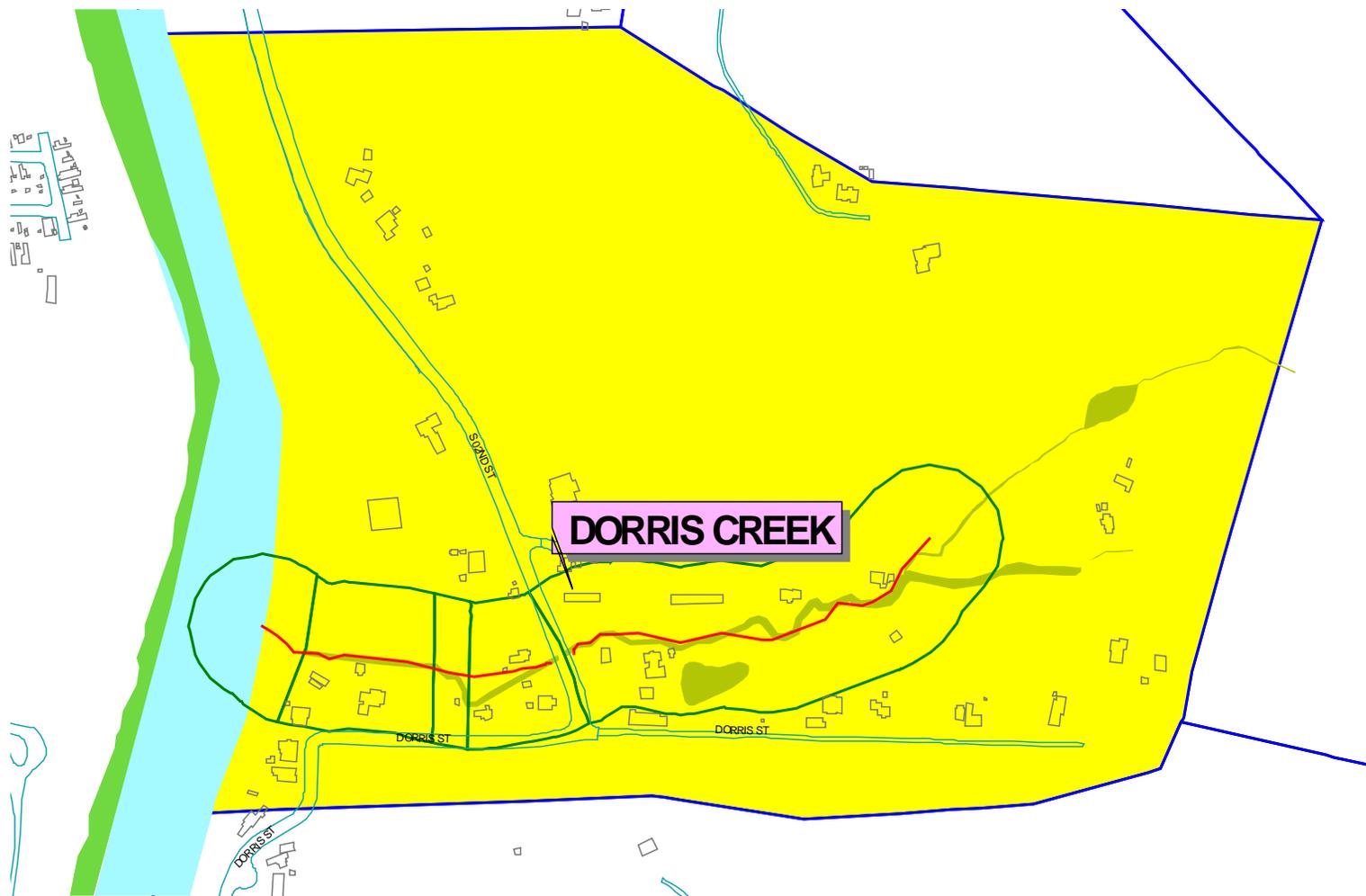
- Horses are on present in reach 5. An impact assessment should be done to determine if they are affecting water quality conditions.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Dorris Creek





- | | |
|--|--|
|  Channel Assessed |  Storm Basin |
|  UGB line |  200ft landuse buffer |
| |  Local Wetland |
| |  National Wetlands |


 May 2004

Dorris Creek: 0.36 miles Sub Basin: 76 Major Basin: Dorris Ranch Basin Sub Basin Acres: 122.91 Sub Basin Percent imperv.: 22.91%
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Appendix N - E 19th Ave Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

East 19th Ave Channel is oriented west of Old Franklin Blvd at the railroad bridge that goes over Old Franklin Blvd. The system is broken into two sections by railroad dikes and E 19th Ave. Heavy brush all along this system makes access to this system extremely difficult, and therefore the location of pipes and outfalls is uncertain. The eastern section appears to flow west towards the dike formed by the railroad bed but a piped system under this dike has never been located. Therefore the system either absorbs into the ground at the dike and road crossing or it flows to the west under Old Franklin Blvd. then to the Willamette River. This system will need to be surveyed when there is flowing water in the channel to determine direction and discharge. The western section flows to the west and into the Glenwood Slough.

This system receives flow from stormwater runoff. The channel is approximately 0.42 miles long.



Findings/Conclusions

Data outcome:

- Consists of three (3) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 3.7 which is a rating of Poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Three photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed Sept. 18th, & Dec. 12th, 2003. Ambient air temperature was between 13.4°C & 15.0°C (59° F & 56.12° F) and cloudy, which dictates a rating of overcast & mild for weather condition.
- Land uses consist of Transportation corridor on the north side and Undeveloped on the south side.
- Partial and full impingements on the north side consisting of railroad tracks and fences. The south side is mostly non-impinged, except one reach is partially impinged by railroad tracks.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped and Ponded. Bank slopes are between 22% and 133% with an average of 69.8%.
- Bed material consists primarily of silt/sand/clay.
- Natural Gas pipes and train bridge abutments were recorded as in-channel structures.

Riparian Profile details

- Plant community consisting of brush\shrub\scrub.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Dipsacus fullonum* (Teasel), and *Hedera helix* (English Ivy).
- Invasive plant species listed as present: *Cytisus scoparius* (Scotch Broom) and *Hedera helix* (English Ivy).
- No other invasive plant species observed in the system.
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No pant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.3
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	5.0
Canopy Density/Cover	3.3
Invasive Damage – P	2.0
Invasive Damage – A/A	7.0
Waste Presence	2.7
Barriers to Fish (SBW)	4.0
Insect/Invert Habitat (SBW)	2.7
In-stream Fish Cover (SBW)	3.0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
3.7 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.3), canopy density/cover (3.3), damage by invasive plants (2.0), waste presence (2.7), insect/invertebrate habitat (2.7) and in-stream fish cover (3.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these six factors.

Channel condition (3.3)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

Damage by invasive plants (2.0)

Canopy density/cover (3.3)

Insect/invertebrate habitat (2.7)

In-stream fish cover (3.0)

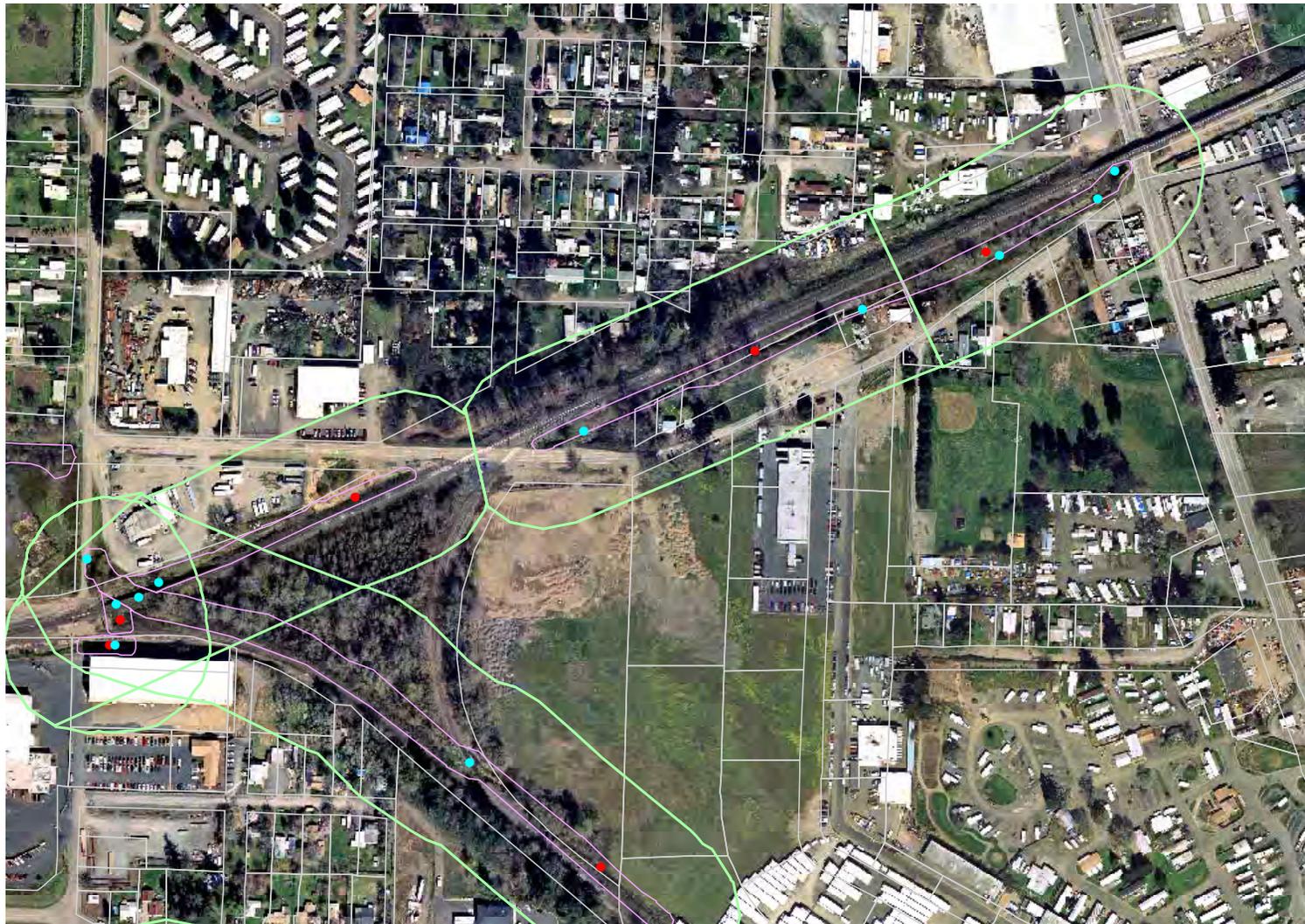
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. This may not be possible because of private land ownership and maintenance of the channel.

Waste presence (2.7)

- The area appears to have been used as a dumping ground for residential trash and transient campsite trash. Clean up the area, review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.

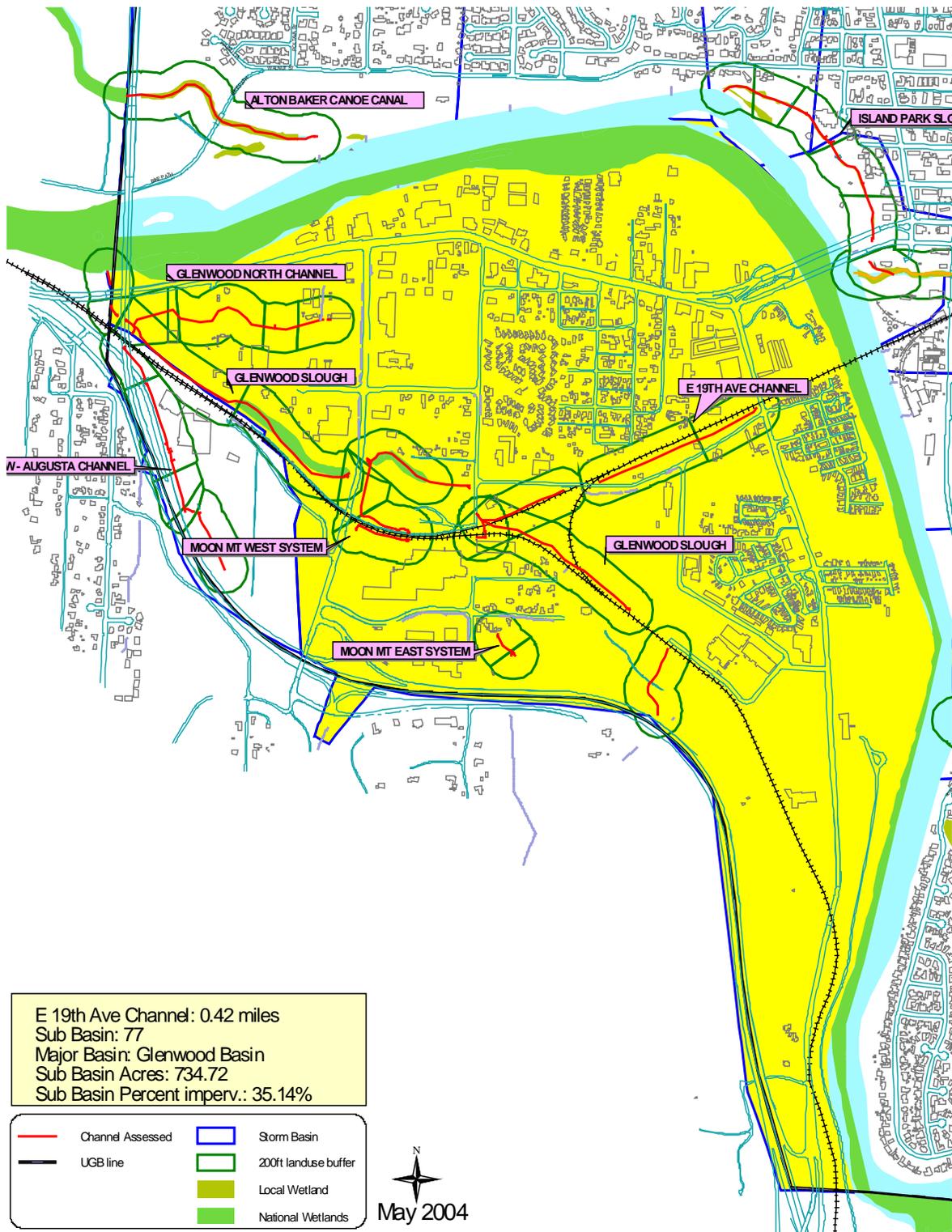
In-general

- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Determine flow directions. The eastern section of this system has not been verified as to which way the system flows, evaluate and field truth flow directions.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



E 19th Ave Channel





Appendix O - Game Farm International Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Game Farm International Channel starts south of International Way and south of Sports Way. It flows northwest to a piped section then into the northern section of the Sports Way Channel which in turn flows to Maple Island Slough. This system is typically absorbed into the ground before it flows to Maple Island Slough, except in very high water conditions.

It receives flow from stormwater runoff and industry. The channel is approximately 0.13 miles long.



Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.5 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- One photo of a plot site was taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 10th, 2002. Ambient air temperature at 14.3°C (57.7° F), which dictates a rating of sunny & mild for weather condition.
- Land uses consist of Commercial and Undeveloped.
- There are no impingements on either side.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped. Bank slopes are between 35% and 41% with an average of 38%.
- Bed material consists primarily of silt/sand/clay.
- No in-channel structure was recorded.

Riparian Profile details

- Plant community is dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Invasive plant species listed as present: *Cytisus scoparius* (Scotch Broom).
- Others invasive plant species observed in the system: *Convolvulus sp.* (Morning Glory/Bindweed) and *Conium maculatum* (Poison hemlock).
- Nutria was recorded as an invasive animal/amphibian observed.
- No damage by invasive animals/amphibian was recorded.
- No wildlife other than nutria was observed.
- Nutria scat was recorded as wildlife evidence observed.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages On a Scale of 1 to 10
Channel Condition	2.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	9.0
Canopy Density/Cover	1.0
Invasive Damage – P	1.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.5 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (2.0), canopy density/cover (1.0) and damage by invasive plants (1.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these three factors.

Channel condition (2.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

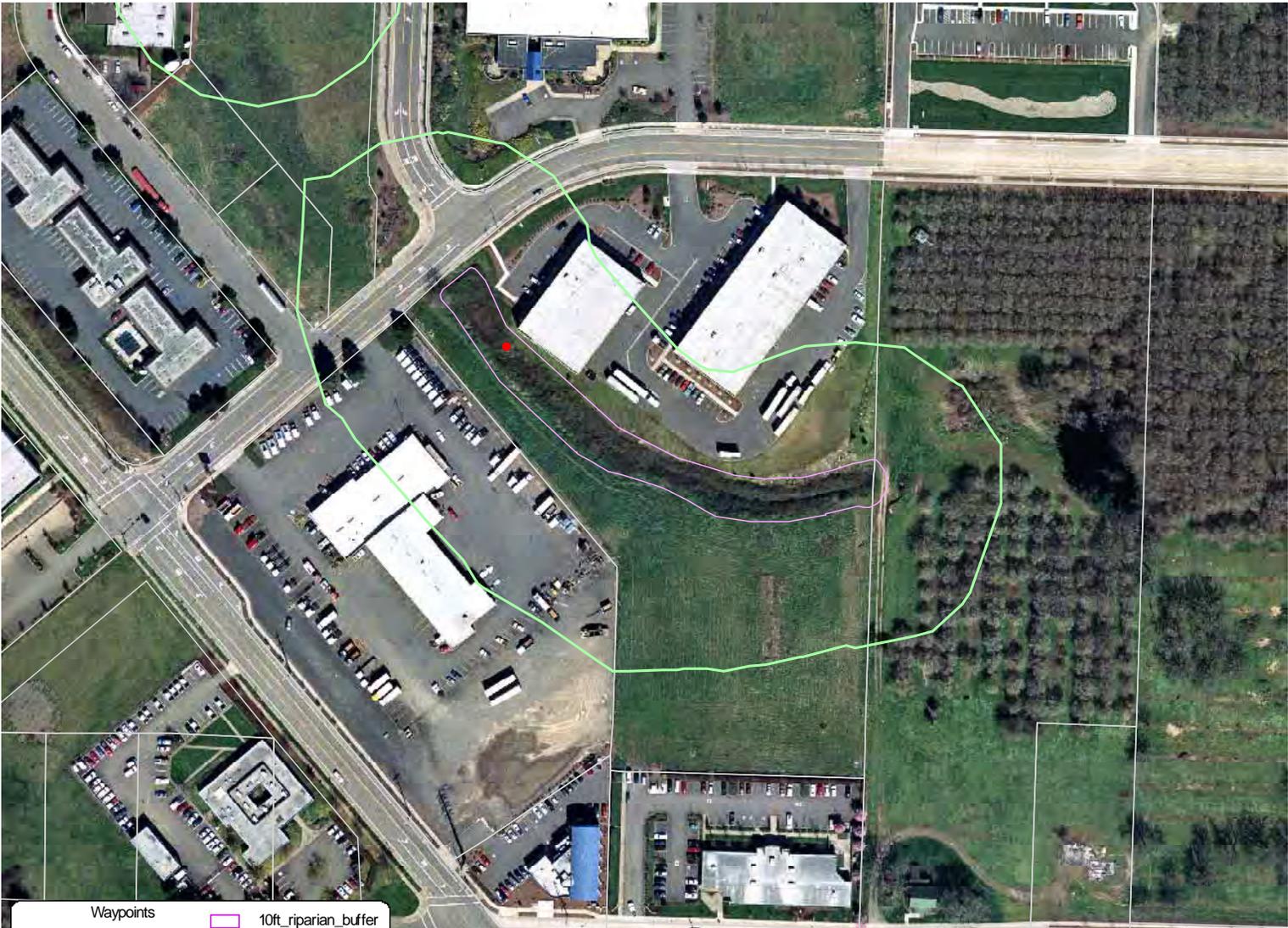
Canopy density/cover (1.0)

Damage by invasive plants (1.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This may not be possible because of private land ownership and maintenance of the channel.

In-general

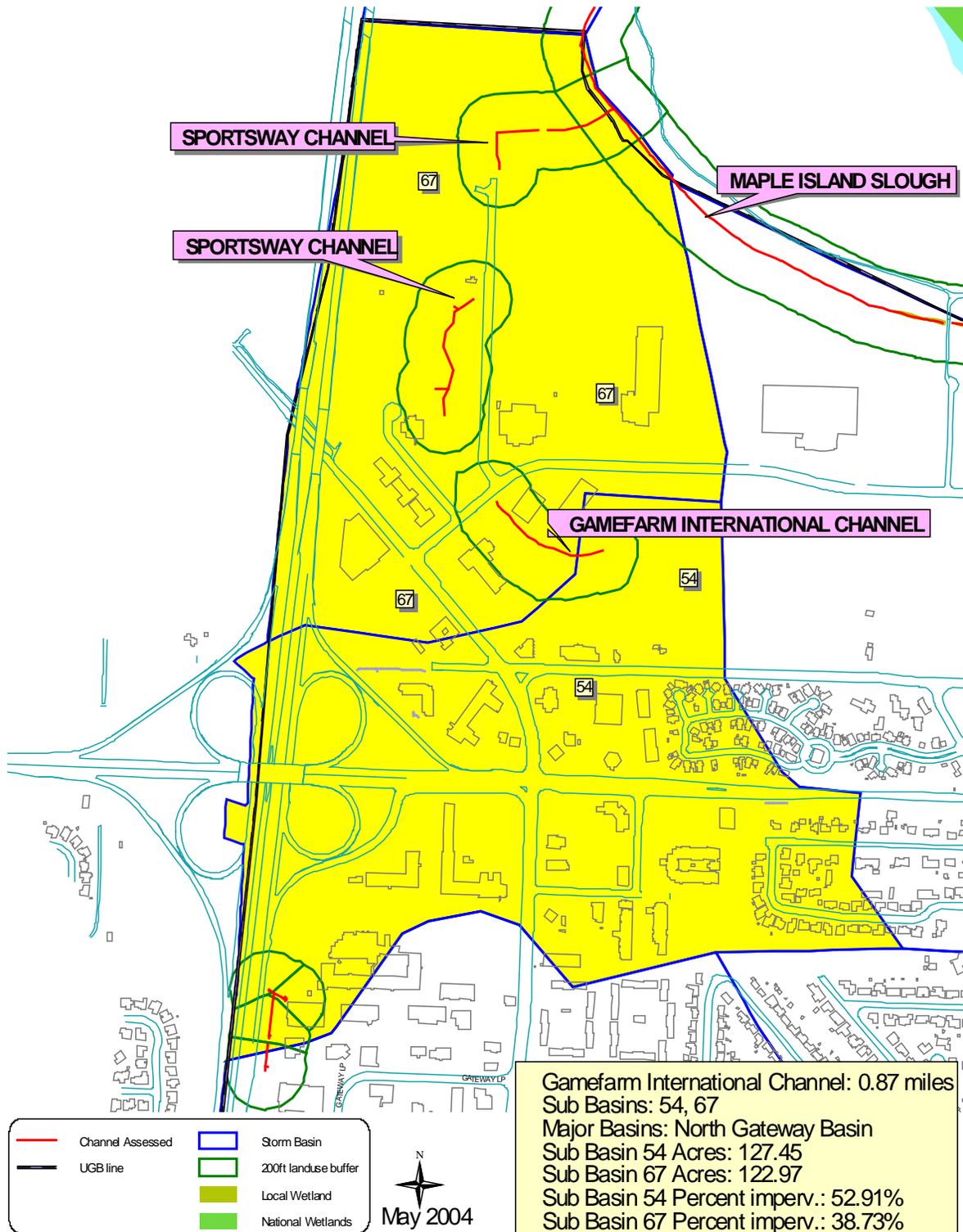
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



- | Waypoints | |
|------------------------|----------------------|
| ● Plot | 10ft_riparian_buffer |
| ● Seed Collection Site | 200ft_landuse_buffer |
| ● In Channel Structure | tax lots |

Game Farm International Channel





Appendix P - Glenwood North Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Glenwood North Channel starts west of Glenwood Blvd. at the north Sanipac office parking area. It flows west to the Glenwood Slough.

It receives flow from stormwater runoff, industrial and commercial runoff. The channel is approximately 0.29 miles long.



Findings/Conclusions

Data outcome:

- Consists of five (5) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 5.5 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Five photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 2nd, 2003. Ambient air temperature was between 21.8°C & 23°C (71.2° F & 73.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Transportation corridor and Commercial on the north side and Commercial and Undeveloped on the south side.
- Mostly Non-impinged with one full impingement on the north side consisting of a fence. The south side is mostly non-impinged; one reach is partially impinged by a fence and one reach is fully impinged by asphalt parking lots.

Water/Bank Profile details

- System was dry or stagnant at the time of assessment, no water pH, or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped with intermittent ponding. Bank slopes are between 18% and 100% with an average of 41%.
- Bed material consists primarily of silt/sand/clay.
- A fence and culvert were recorded as in-channel structures.

Riparian Profile details

- Plant community consisting mostly of hardwoods with some brush/shrub/scrub.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass), and *Hedera helix* (English Ivy).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass).
- Invasive plant species listed as present: *Phalaris aquatica* (Harding grass), *Convolvulus sp.* (Morning Glory/Bindweed), *Phalaris arundinacea* (Reed Canary-grass), and *Rubus armeniacus* (Armenian Blackberry).
- Others invasive plant species observed in the system: *Dipsacus fullonum* (Teasel) and *Conium maculatum* (Poison hemlock).
- No invasive animals/amphibian was observed.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- Nutria scat was recorded as wildlife evidence.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	4.0
Water Appearance	2.0
Nutrient Enrichment	2.0
Bank Stability	5.4
Canopy Density/Cover	9.8
Invasive Damage – P	2.0
Invasive Damage – A/A	8.2
Waste Presence	2.0
Barriers to Fish (SBW)	8.0
Insect/Invert Habitat (SBW)	7.2
In-stream Fish Cover (SBW)	5.2

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.5 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (4.0), water appearance (2.0), nutrient enrichment (2.0), damage by invasive plants (2.0), and waste presence (2.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these five factors.

Channel condition (4.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

Water appearance (2.0)

Nutrient enrichment (2.0)

- Sections of this system have overgrown and clogged the channel impeding year round continuous flows. This system has not been managed by City of Springfield as of this writing. Starting routine maintenance which includes channel cleaning and invasive vegetation removal will improve water quality by allowing flows to move through the system and not become stagnant.

Damage by invasive plants (2.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.

Waste presence (2.0)

- Waste present in this area is due to high levels of transient activity and homeless camps in to the area. Adding this system to the routine maintenance activity lists may address this problem.

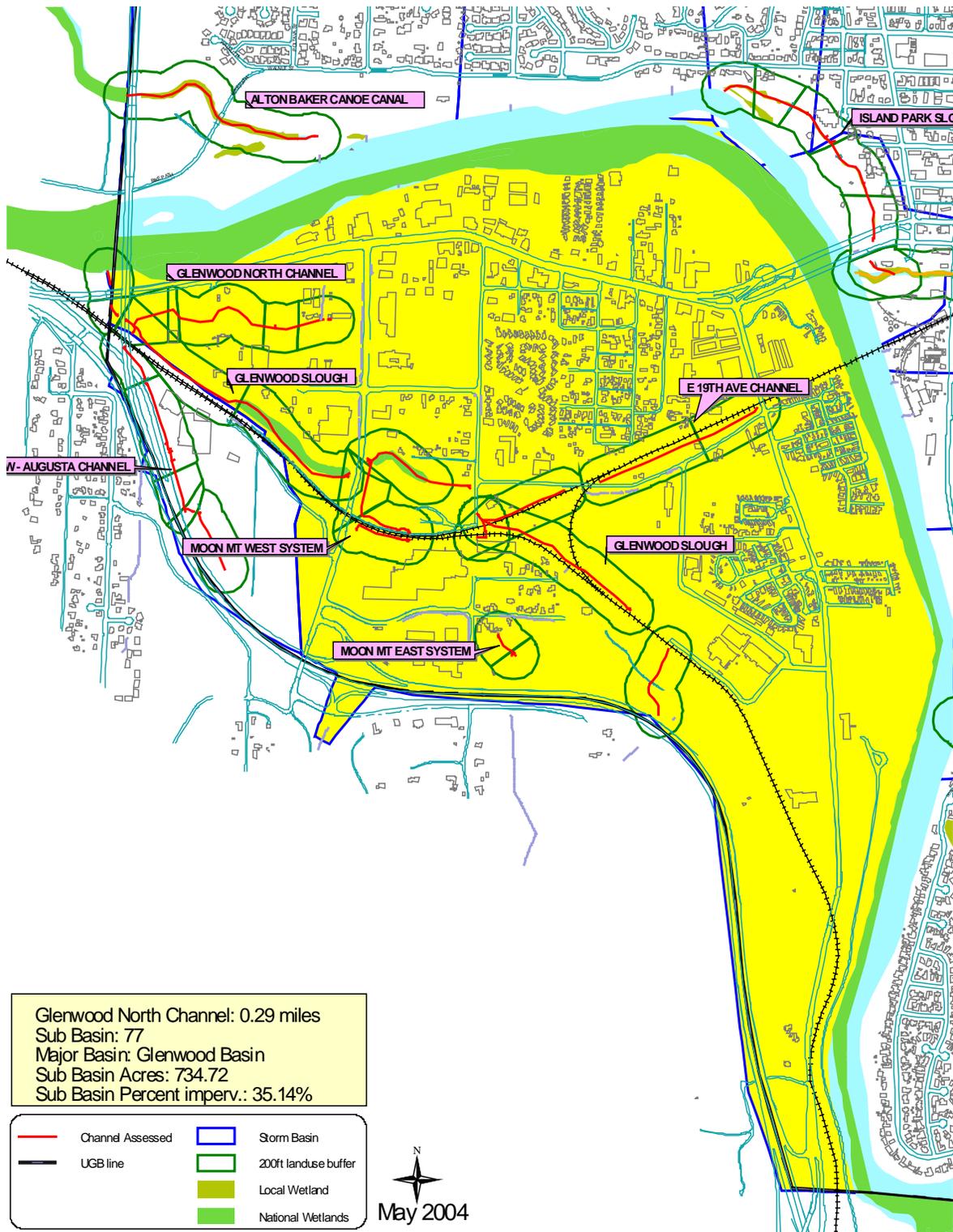
In-general

- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Glenwood North Channel





Appendix Q - Glenwood Slough

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Glenwood Slough is a tributary to the Willamette River. It is believed that the system starts in Eugene and flows through a culvert under I-5 and into Glenwood. The box culvert had not been located at the time of this assessment and the waterways starting point has not been identified, due to extremely heavy brush and blackberries in the area and a lack of accurate records. The clearest point that can be assumed as a starting point is located on the north side of the railroad tracks southwest of Nugget Way next to the site currently occupied by PW Pipe on Wildish land. It flows northwest going under a series of railroad tracks and through culverts until it gets to the Willamette River under Franklin Blvd. Parts of this system are wetlands and are recorded on the local wetland inventory.

It receives flow from industrial and commercial stormwater runoff and is a wetland. It is also fed by runoff from Eugene. The channel is approximately 1.19 miles long.



Findings/Conclusions

Data outcome:

- Consists of six (6) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 5.3 which is a rating of poor (<6.0 = Poor).

Seed Collection outcome:

- No sites were recorded for seed collection.

Photos:

- Six photos of plot sites taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed September 10th and 11th, 2003. Ambient air temperature was between 19.9°C & 28°C (67.8° F & 82.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Commercial and Transportation corridor with an Undeveloped reach on the west and south sides; Commercial and Undeveloped with section of Residential and Transportation corridor on the east and north sides.
- Partially impinged on the west side with railroad tracks and asphalt bike bikes. On the north side a partially impinged reach by a chain link fence.

Water/Bank Profile details

- Water pH: 3 reaches averaged 7.5 with a minimum of 7.01 and maximum of 8.3. Two were dry and one stagnant.
- Water temperature: 3 reaches averaged 18.6° C with a minimum of 17° C and a maximum of 21.7° C. Two were dry and one stagnant.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to < 1/4 flowing.
- Brown algae were recorded for the system.
- Channel profile is ponded to U-shaped with ponding intermittent. Bank slopes are between 40% and 750% with an average of 210%.
- Bed material consists primarily of silt/sand/clay.
- Multiple culverts and utility towers along with sanitary manholes and train bridge abutments were recorded as in-channel structures.

Riparian Profile details

- Plant community mainly consisted of hardwood and brush/shrub/scrub. There was a reach of mixed conifer/hardwood and one reach dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Phalaris arundinacea* (Reed Canary-grass).
- Co-dominant invasive plant species: *Solanum dulcamara* (Nightshade) and *Rubus armeniacus* (Armenian Blackberry).
- Invasive plant species listed as present: *Phalaris arundinacea* (Reed Canary-grass), *Phalaris aquatica* (Harding grass) and *Solanum dulcamara* (Nightshade),

- Other invasive plant species observed in the system: *Cytisus scoparius* (Scotch Broom) and *Dipsacus fullonum* (Teasel).
- Bullfrogs were recorded as invasive animals/amphibian observed.
- No damage by invasive animals/amphibian was recorded.
- No wildlife, other than the invasive bullfrogs were observed.
- No wildlife evidence was recorded.
- No seed collection was recorded for this system.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.2
Water Appearance	6.0
Nutrient Enrichment	3.0
Bank Stability	5.8
Canopy Density/Cover	7.2
Invasive Damage – P	3.2
Invasive Damage – A/A	9.7
Waste Presence	5.3
Barriers to Fish (SBW)	5.7
Insect/Invert Habitat (SBW)	5.5
In-stream Fish Cover (SBW)	4.7

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.3 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Health Rating definitions)

Actions

The scoring averages reveal that channel condition (3.2), nutrient enrichment (3.0), damage by invasive plants (3.2) and in-stream fish cover (SBW) (4.7) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (3.2)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

Nutrient enrichment (3.0)

Damage by invasive plants (3.2)

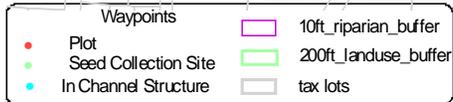
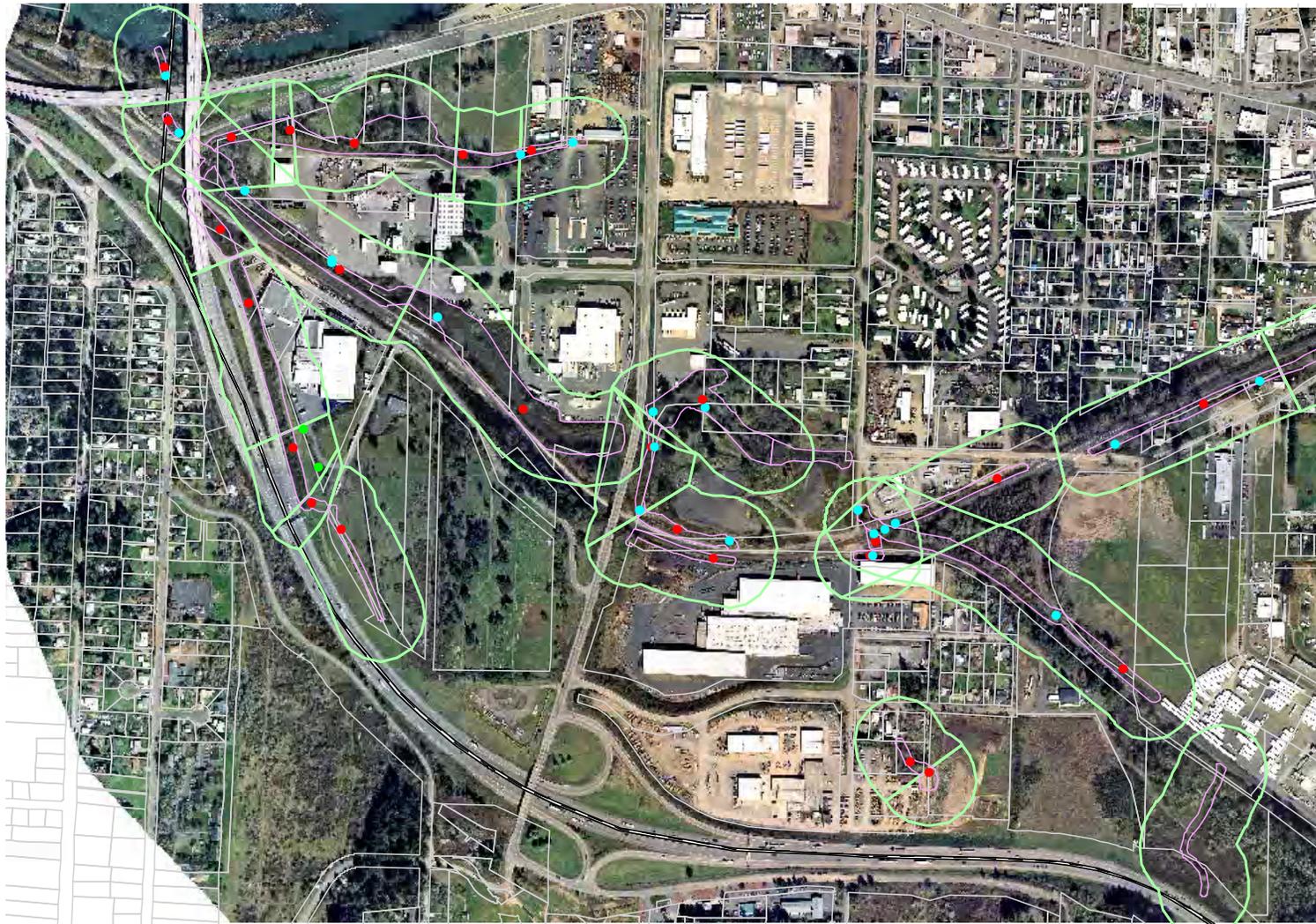
In-stream fish cover (SBW) (4.7)

- Sections of this system have overgrown and clogged the channel impeding year round continuous flows. Starting routine maintenance which includes channel cleaning and invasive vegetation removal will improve water quality by allowing flows to move through the system and not become stagnant.

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.

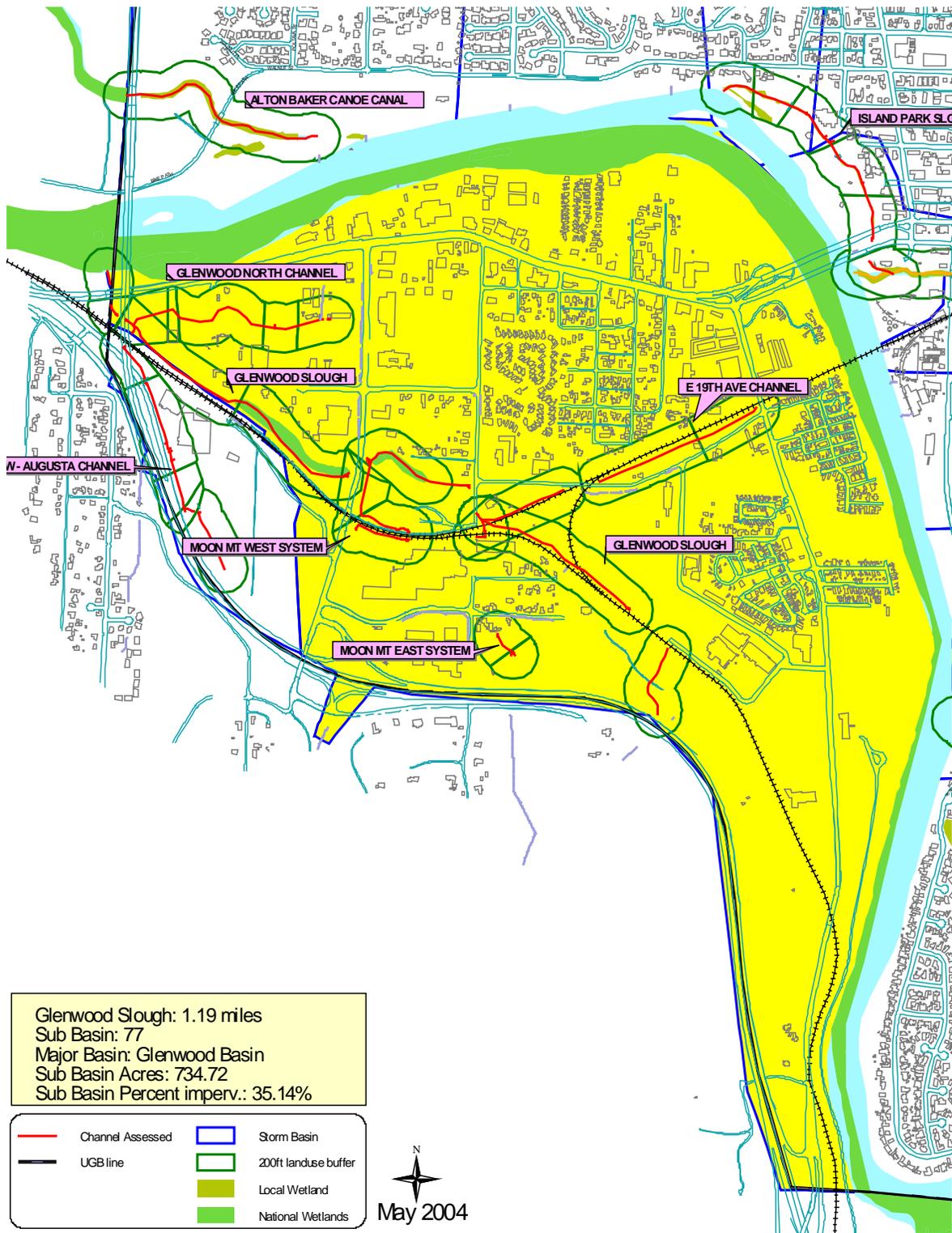
In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Glenwood Slough





Appendix R - Gray Creek

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

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Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Gray Creek has been mapped from just west (inside) of the UGB. It starts by receiving small side creek flows from Cedar Creek. It flows west to intersect with 75th St Creek where some flow goes north into 75th St Creek and the rest of the flow continues west to a piped system that drains to 72nd St Channel.

It receives flow from stormwater runoff, groundwater and wetlands. The mapped section of the channel is approximately 1mile long.



Findings/Conclusions

Data outcome:

- Consists of four (4) reaches.
- Listed as a SBW system. Has been removed from the City's WQLW list.
- The averaged overall health rating for this system is 6.5 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Four photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 12th, 2002. Ambient air temperature was between 18.4°C & 29.9°C (65.1° F & 85.8° F), which dictates a rating of sunny & mild to sunny & hot for weather conditions.
- Land uses consist of Undeveloped, Public/Park and Agriculture on the north side. The south side consists of Undeveloped land.
- Fences were recorded as impingements on both sides.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped. Bank slopes are between 27% and 57% with an average of 39.75%.
- Bed material consists primarily of silt/sand/clay.
- Culverts, fences and a footbridge were recorded as in-channel structures.

Riparian Profile details

- Plant community of mixed and one reach that is hardwood.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Mentha pulegium* (Penny Royal), and *Lysimachia nummularia* (Moneywort).
- Others invasive plant species observed in the system: *Phalaris arundinacea* (Reed Canary-grass), *Solanum dulcamara* (Nightshade), and *Dipsacus fullonum* (Teasel).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement and bank stabilization were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	6.3
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	6.0
Canopy Density/Cover	5.5
Invasive Damage – P	3.0
Invasive Damage – A/A	10.0
Waste Presence	8.8
Barriers to Fish (SBW)	9.0
Insect/Invert Habitat (SBW)	6.8
In-stream Fish Cover (SBW)	3.0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.5 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that damage by invasive plants (3.0) and in-stream fish cover (3.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Damage by invasive plants (3.0)

In-stream fish cover (3.0)

- This system has not been managed by City of Springfield as of this writing.
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth. This may be limited by private land ownership and maintenance of the channel.

In-general

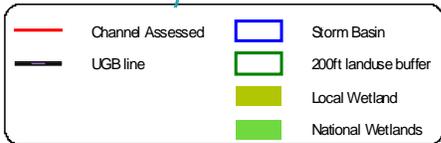
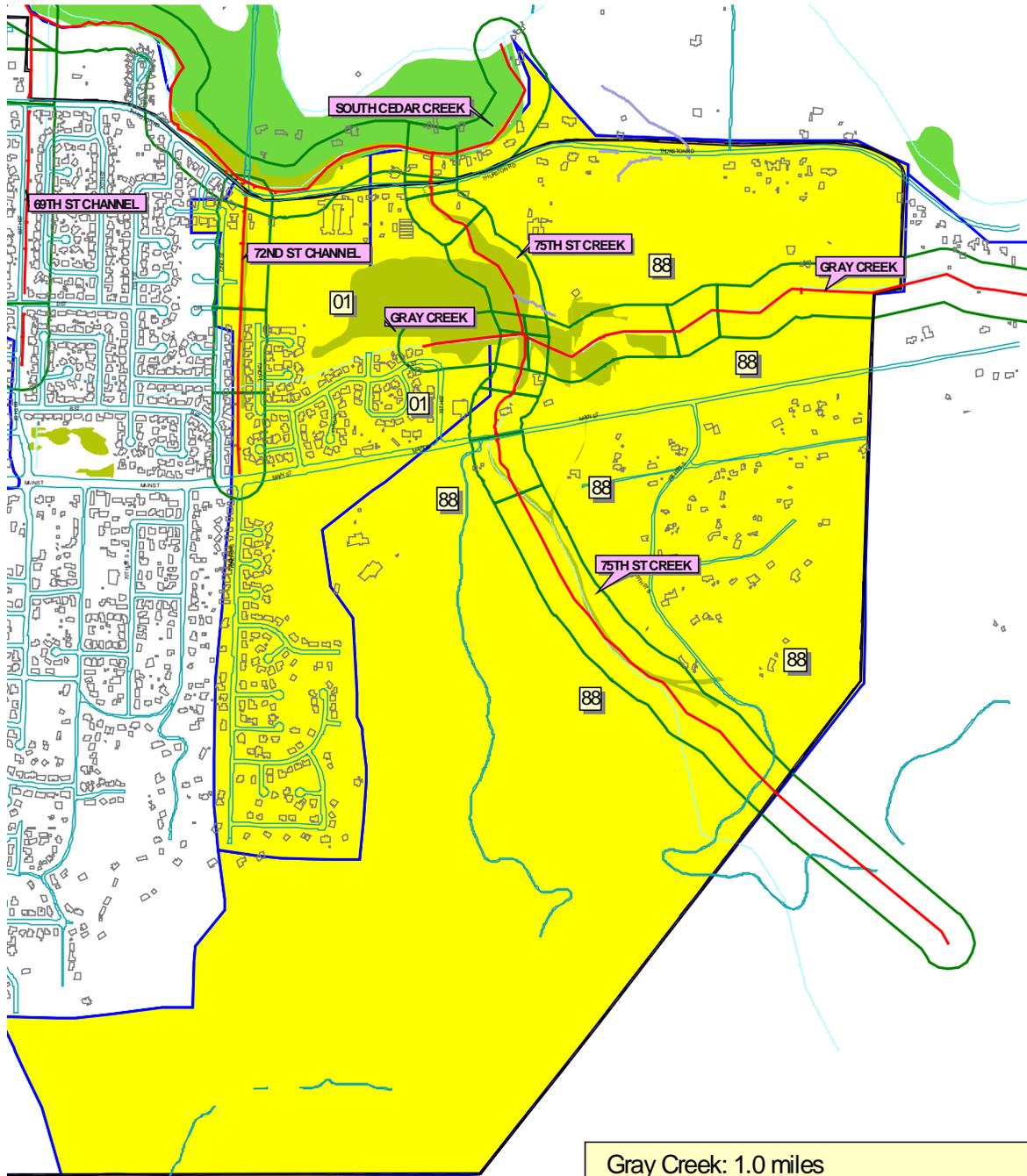
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Gray Creek





N
 May 2004

Gray Creek: 1.0 miles
 Sub Basins: 01, 88
 Major Basins: South Cedar Creek Basin
 Sub Basin 01 Acres: 157.51
 Sub Basin 88 Acres: 683.19
 Sub Basin 01 Percent imperv.: 31.64%
 Sub Basin 88 Percent imperv.: 9.09%

Appendix S - Harlow - Beverly Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Harlow – Beverly Channel is southeast of the Harlow Rd. – Beverly St. intersection. It starts east of Beverly St. and flows northwest into a piped system. It has been redesigned as a series of swales.

It receives flow from stormwater runoff. The channel is approximately 0.04 miles long.



Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.4 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- One photo of a plot site was taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 11th, 2002. Ambient air temperature at 19.9°C (67.8° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Commercial on the north and Residential on the south.
- Fully impinged on the north by a parking lot and fully impinged on the south by a road.

Water/Bank Profile details

- System was stagnant at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped. Bank slopes are between 14% and 46% with an average of 30.7%.
- Bed material consists primarily of silt/sand/clay.
- No in-channel structures were recorded.

Riparian Profile details

- Plant community of grass/field.
- Dominant invasive plant species: *Iris pseudacorus* (Yellow flag Iris).
- No co-dominant invasive plant species was recorded.
- No invasive plant species listed as present was recorded.
- No other invasive plant species observed in the system.
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.0
Water Appearance	1.0
Nutrient Enrichment	0 stag
Bank Stability	9.0
Canopy Density/Cover	1.0
Invasive Damage – P	4.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.4 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.0), water appearance (1.0), canopy density/cover (1.0) and damage by invasive plants (4.0) received the lowest rating (below mid-scale). At the time of this writing it is unclear as to whether this system is a public or private system. If this is a public system, perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (3.0)

- If this is a public system, develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

Water appearance (1.0)

- Water in this system was stagnant and/or dry and caused this attribute to score low.

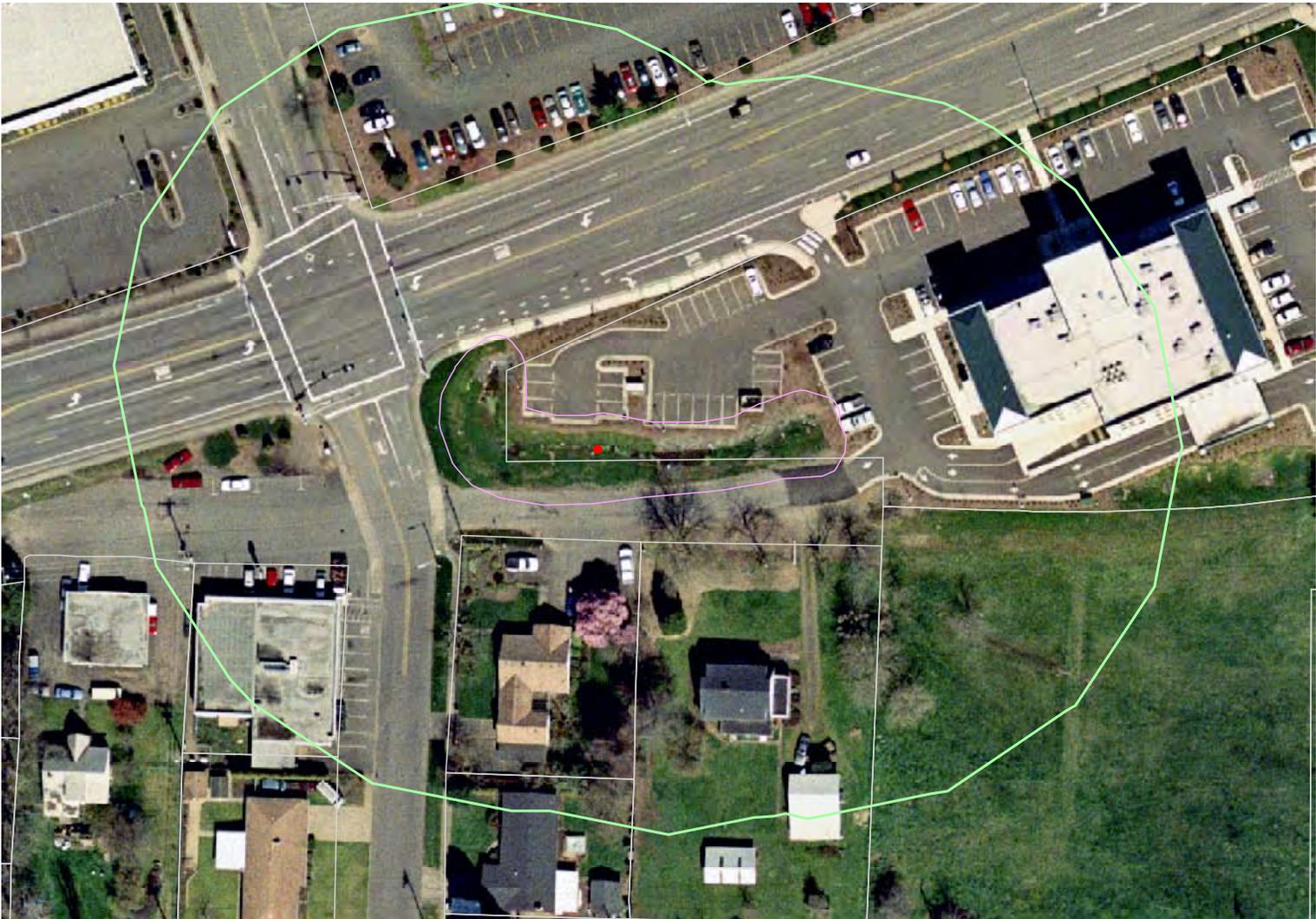
Canopy density/cover (1.0)

Damage by invasive plants (4.0)

- If this is a public system, develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed, if this is a public system, use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.

In-general

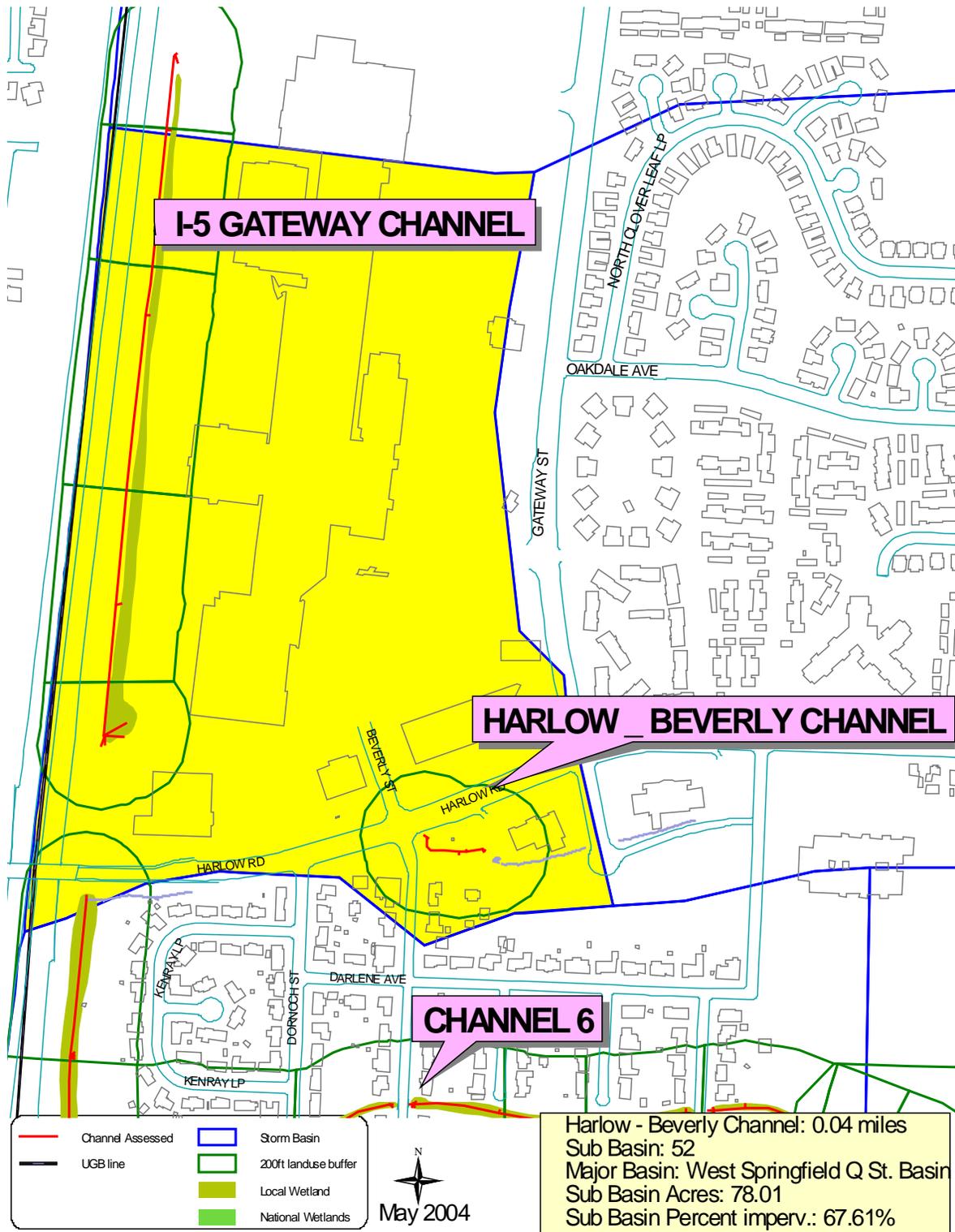
- If this is a public system, add to the mowing and other maintenance activities. Concentrate more effort on yellow flag iris eradication that can promote native plant growth.
- If this is a public system, perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- If this is a public system, incorporate impact assessments to obtain a complete unified stream assessment.
- This system has been reconfigured to be a series of swales. Evaluate and re-class as such if necessary.
- Determine if this system is public or private.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Harlow - Beverly Channel





Appendix T - I-105 - 55th St Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

I-105 – 55th St Channel is a tributary to the 48th St Channel. It starts west of I-105 (also known as Hwy 126 east bound), north of Main St, and west of 55th St. The channel parallels the freeway along the west and south side to the 52nd St exit. It flows northwest to a culvert, then into the 48th St Channel.

It receives flow from stormwater runoff. The channel is approximately 0.58 miles long.



Findings/Conclusions

Data outcome:

- Consists of seven (7) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.8 which is a rating poor. (<6.0 = Poor).

Seed Collection outcome:

- A rare *Sidalcea* (Mallow) was recorded for seed collection in reach 1 and 2.

Photos:

- Seven photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 12th, & 16th, 2002. Ambient air temperature was between 28.1°C & 37°C (82.6° F & 98.6° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Transportation corridor and Undeveloped on the north and east sides. Land uses for the south and west sides consist of Residential, Undeveloped and Agricultural.
- Impingements on the south and west side are fences. Non-impinged on the north and east.

Water/Bank Profile details

- System was dry and/or stagnant at the time of assessment, no water pH or temperature was recorded.
- System was dry; and/or stagnant no water level/movement in relation to active channel was recorded.
- System was dry; and/or stagnant no algae or algae color recorded.
- Channel profile is U-shaped reach and V-shaped. Bank slopes are between 29% and 88% with an average of 52.79%.
- Bed material consists primarily of silt/sand/clay ending with cobble.
- No in-channel structures were recorded.

Riparian Profile details

- Plant community consisting of grass/field and one reach that is mixed.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Holcus lanatus* (Velvet Grass).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Dipsacus fullonum* (Teasel).
- Invasive plant species listed as present: *Hedera helix* (English Ivy), *Dipsacus fullonum* (Teasel), *Holcus lanatus* (Velvet Grass), and *Cytisus scoparius* (Scotch Broom).
- Others invasive plant species observed in the system: *Rubus laciniatus* (Evergreen Blackberry) and *Festuca arundinacea* (Tall Fescue).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- Wildlife evidence of animal paths and deer scat were recorded.
- *Sidalcea* (Mallow) was recorded for seed collection in reach 1 and 2.
- Riparian buffer enhancement and one bank stabilization were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.9
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	7.6
Canopy Density/Cover	3.7
Invasive Damage – P	2.6
Invasive Damage – A/A	9.3
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.8 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.9), canopy density/cover (3.7) and damage by invasive plants (2.6) received the lowest rating (below mid scale). Perform an evaluation to assess what may be done to improve these three factors.

Channel condition (1.9)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Canopy density/cover (3.7)

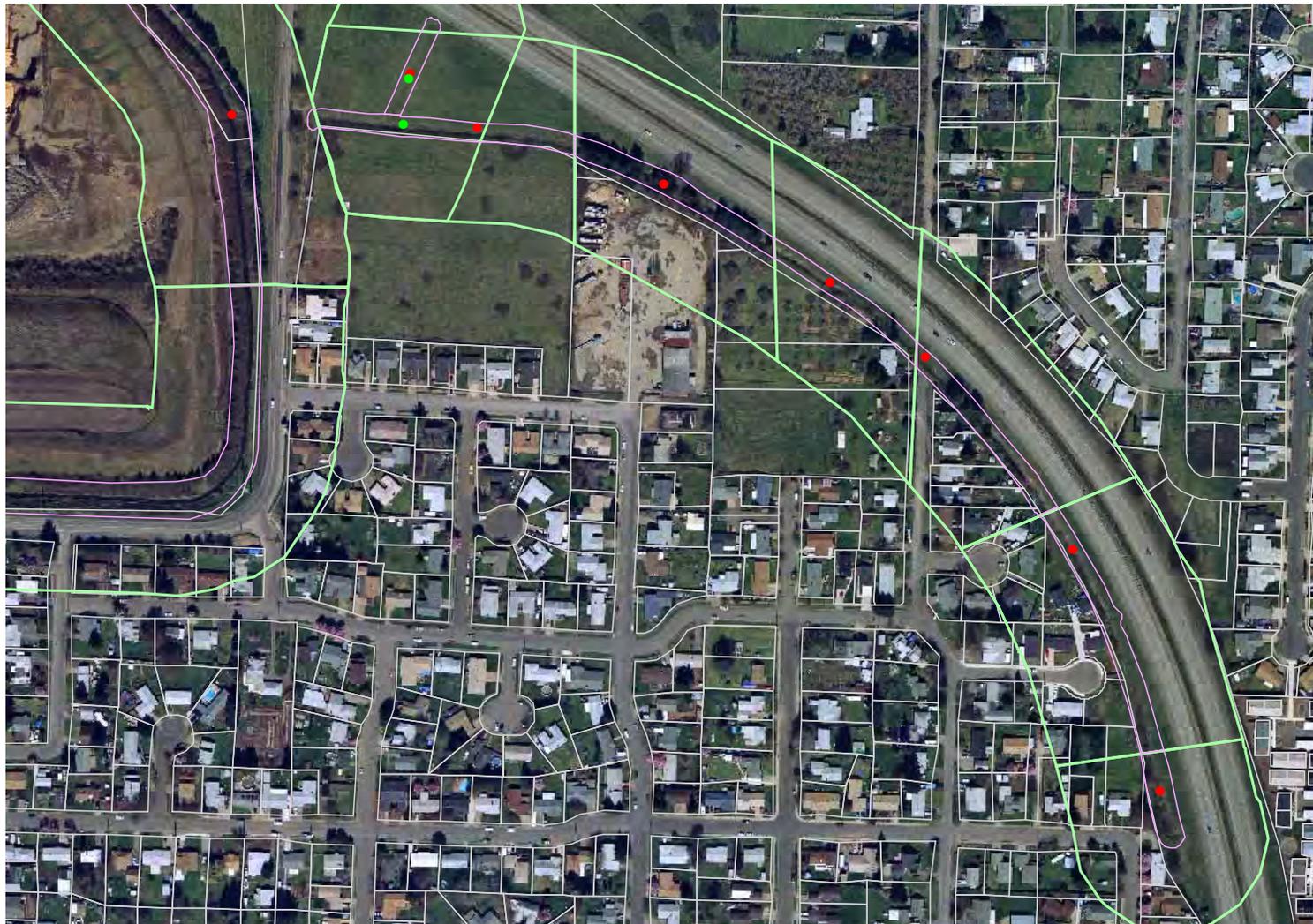
Damage by invasive plants (2.6)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This may not be possible because of private land ownership and maintenance of the channel.

In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth. Some mowing and maintenance activities may be done by the State right now.

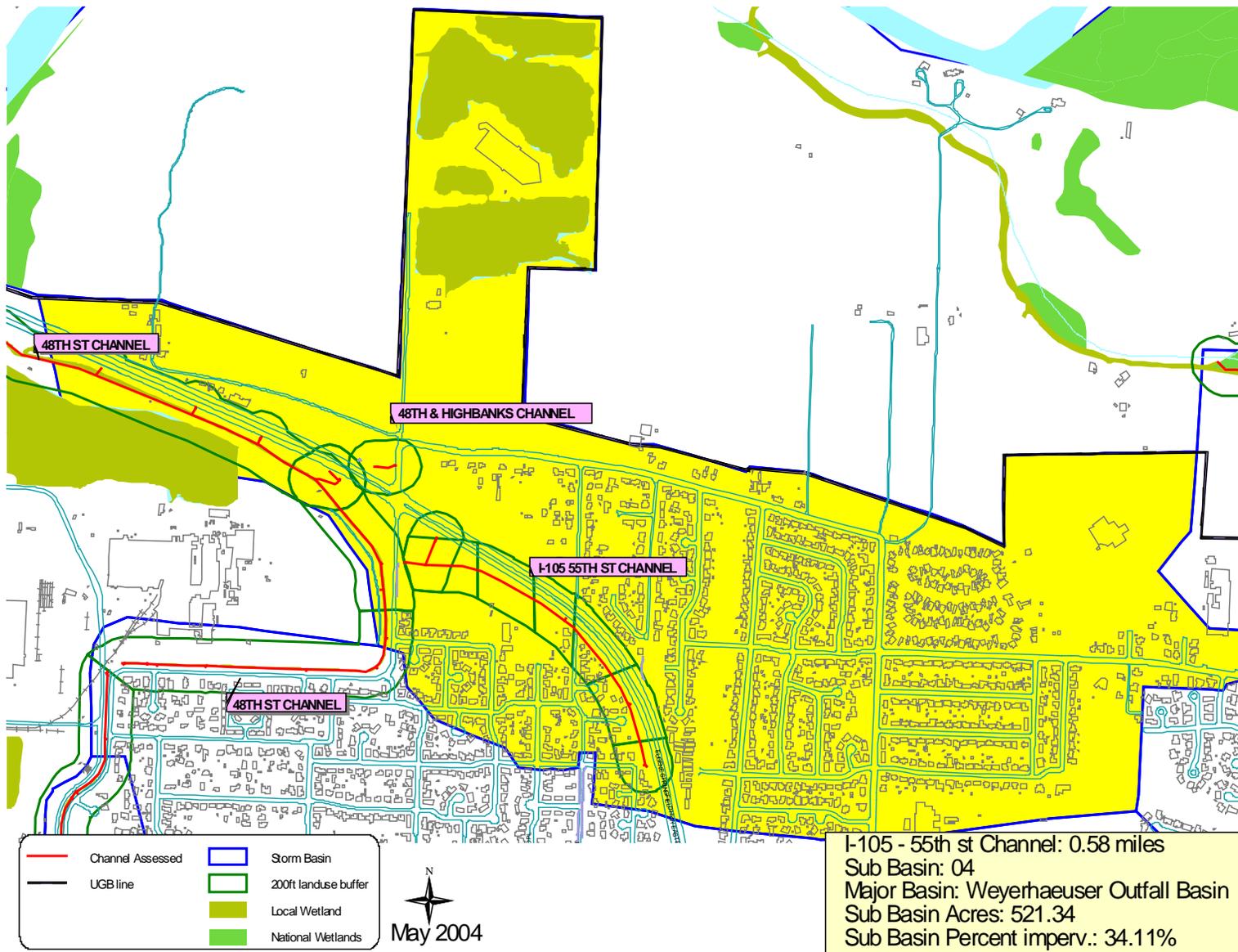
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.
- Review which reaches require neighborhood education and target those areas for door hangers addressing yard debris and herbicide use. Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

I-105 - 55th St Channel





Appendix U - I-5 Centennial Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

I-5 Centennial Channel starts west of Anderson Ln. One section is south of West Centennial and the other is north of West Centennial. Both sections flow to a piped system that flows to Eugene, west of Interstate 5.

It receives flow from stormwater runoff. The channel is approximately 0.29 miles long.



Findings/Conclusions

Data outcome:

- Consists of three (3) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall rating for this system is 6.1 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Three photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 26th, 2002. Ambient air temperature was between 28.4°C & 30.4°C (83.1° F & 86.7° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Commercial and Residential on the north and east sides. On the west and south sides, land uses consist of Transportation corridors and Residential.
- Reaches are either partially or fully impinged on both sides by fences, gravel lots, guard-rails, and an asphalt road.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is mostly U-shaped with one V-shaped reach. Bank slopes are between 4% and 68% with an average of 26%.
- Bed material consists primarily of silt/sand/clay.
- A utility tower, fences, metal conduits, and check dams were recorded as in-channel structures.

Riparian Profile details

- Plant community is dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Hedera helix* (English Ivy).
- Co-dominant invasive plant species: *Dipsacus fullonum* (Teasel).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), and *Convolvulus sp.* (Morning Glory/Bindweed).
- No other invasive plant species observed in the system.
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.7
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	8.0
Canopy Density/Cover	7.0
Invasive Damage – P	1.0
Invasive Damage – A/A	10.0
Waste Presence	9.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.1 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.7) and damage by invasive plants (1.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Channel condition (1.7)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

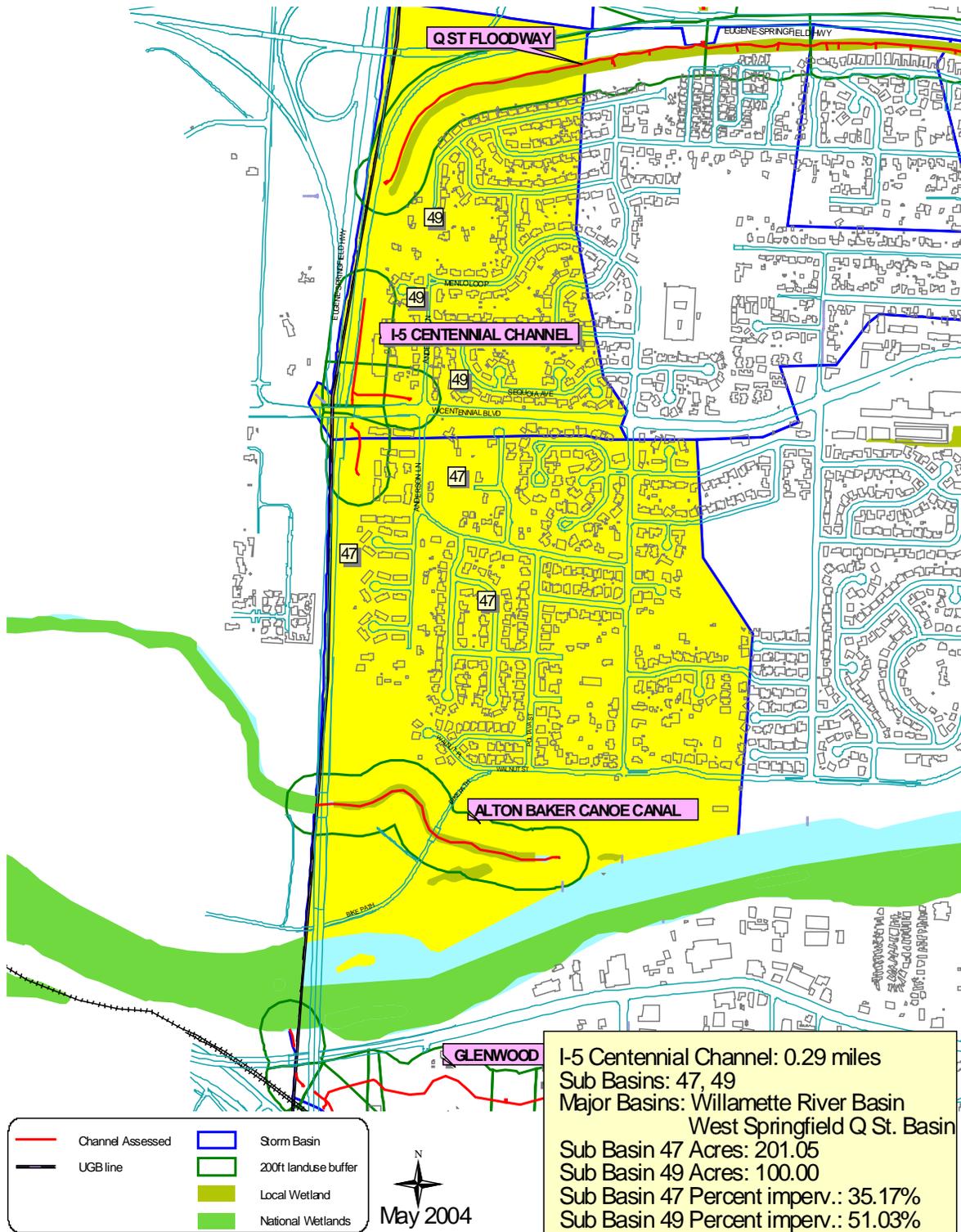
Damage by invasive plants (1.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.

In-general

- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.





Appendix V - I-5 Gateway Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

I-5 Gateway Channel is a tributary to the Q St Floodway. It starts northwest of the Gateway Mall and east of I-5. It flows south, and turns east to intersect with the Q St Floodway at I-105.

It receives flow from stormwater runoff, Channel 6, commercial and industrial stormwater runoff. This system is considered wetlands and is listed on the Local Wetlands Inventory. The channel is approximately 1.14 miles long.



Findings/Conclusions

Data outcome:

- Consists of seven (7) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.1 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- *Myosotis laxa* (Small-flowered forget-me-not), and *Sparganium emersum* (Simple-stem bur-reed) were recorded for seed collection.

Photos:

- Seven photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 27th, August 1st & 2nd, 2002. Ambient air temperature was between 15.3°C & 27.1°C (59.5° F & 80.8° F), which dictates a rating of sunny & mild to sunny & hot for weather condition.
- Land uses consist mostly of Transportation corridor on the south and west sides, and Commercial on the north and east sides.
- Impingements on the south and west sides are fences and an asphalt road. On the north and east sides they are asphalt parking lots and a fence.

Water/Bank Profile details

- Water pH: 4 reaches were dry - 3 reaches averaged 8.47 with a minimum of 7 and a maximum of 9.6.
- Water temperature: 4 reaches were dry. 3 reaches averaged 18.9° C with a minimum of 14.5° C and a maximum of 25.7° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to flowing ¾ full.
- Algae and algae color ranged from none to some present and green/brown in color.
- Channel profile is U-shaped to V-shaped with ponded intermittent. Bank slopes are between 27% and 56% with an average of 41.7%.
- Bed material consists primarily of silt/sand/clay.
- Beaver dams, EWEB water pipes, fences, culverts, weirs and splash pads were recorded as in-channel structures.

Riparian Profile details

- Plant community is mostly mixed with one hardwood, one grass/field and one dominated by invasive species.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass) and *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass), and *Holcus lanatus* (Velvet Grass).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass), *Solanum dulcamara* (Nightshade), *Dipsacus fullonum* (Teasel), and *Mentha pulegium* (Penny Royal).
- Others invasive plant species observed in the system: *Cytisus scoparius* (Scotch Broom), *Phalaris aquatica* (Harding grass), and *Iris pseudacorus* (Yellow flag Iris).

- Nutria was recorded as invasive animals/amphibian observed.
- Tunneling, eating and stripping of vegetation, and undercutting of banks are the types of damage by invasive animals/amphibian recorded.
- Wildlife observed was nutria, Great Blue Herons, Mallards, Killdeer, and a Green Heron.
- Nutria scat, animal paths and animal tracks were recorded as wildlife evidence observed.
- *Myosotis laxa* (Small-flowered forget-me-not), and *Sparganium emersum* (Simple-stem bur-reed) were recorded for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.7
Water Appearance	2.3
Nutrient Enrichment	2.0
Bank Stability	8.0
Canopy Density/Cover	2.9
Invasive Damage – P	5.0
Invasive Damage – A/A	7.6
Waste Presence	7.9
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.1 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Health Rating definitions)

Actions

The scoring averages reveal that channel condition (1.7), water appearance (2.3), nutrient enrichment (2.0) and canopy density/cover (2.9) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (1.7)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Water appearance (2.3)

Nutrient enrichment (2.0)

- The turbidity in this system is most likely kept high due to the nutria activity. The water is very cloudy, floating algae mats that are brown, and the water appears scummy. Develop a program for nutria control/removal from the system.

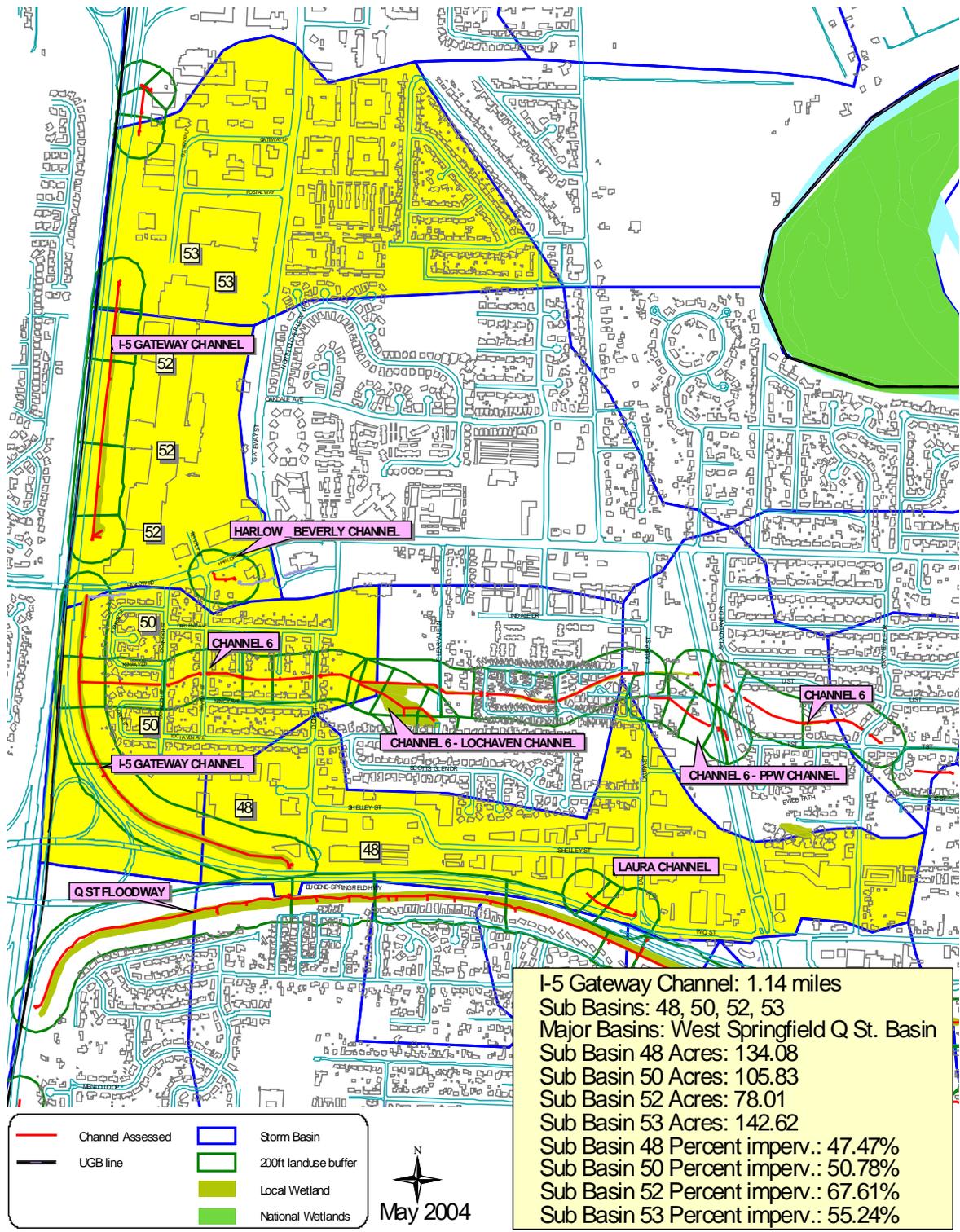
Canopy density/cover (2.9)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. Investigate outreach to private land owners to accomplish plantings, because of private land ownership and maintenance of the channel.

In-general

- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.





Appendix W - Irving Slough

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Irving Slough starts west of 42nd St just north of Weyerhaeuser Co. It flows northwest to V St where it splits to feed the Pierce Channel to the west and the rest of Irving Slough to the north. The channel becomes piped at 28th St south of Viewmount Ave.

It receives flow from stormwater runoff, Keizer Slough, industry, and flows through a wetland. This system is considered wetlands and is listed on the Local Wetlands Inventory. The channel is approximately 2 miles long.



Findings/Conclusions

Data outcome:

- Consists of twenty one (21) reaches.
- Was listed as a Springfield's WQLW system when assessment took place. No longer listed.
- The averaged overall health rating for this system is 5.9 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Twenty one photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 20th, 21st, 22nd, 23rd, & 26th, 2002. Ambient air temperature was between 16.3°C & 30.4°C (61.3° F & 86.7° F), which dictates a rating of mild & dry to sunny & hot for weather condition.
- Land uses consist of Residential, Undeveloped and Industrial on both sides.
- Impingements of fences, asphalt road, barricades, guardrails, and a house were recorded for both sides.

Water/Bank Profile details

- Water pH: 1 dry - 20 reaches averaged 6.74, with a minimum of 6.0 and maximum of 7.7.
- Water temperature: 1 reaches dry. 20 reaches averaged 20.82° C, with a minimum of 14° C and a maximum of 31.8° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to flowing full, average was 3/4 full.
- Algae and algae color ranged from none to some present, brown and brown/green in color.
- Channel profile is mostly ponded to ponded with U-shape and ponded intermittent. Bank slopes are between 4% and 93% with an average of 29.6%.
- Bed material consists primarily of silt/sand/clay.
- Access ladder/steps, beaver dam, culverts, fences, a footbridge, a train bridge abutment, conduits, and splash pads were recorded as in-channel structures.

Riparian Profile details

- Plant community of mostly hardwoods, then dominated by invasive species and grass/field.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Solanum dulcamara* (Nightshade).
- Co-dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass), *Rubus armeniacus* (Armenian Blackberry), *Solanum dulcamara* (Nightshade), and *Hedera helix* (English Ivy).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Dipsacus fullonum* (Teasel), *Solanum dulcamara* (Nightshade), *Hedera helix* (English Ivy), and *Phalaris arundinacea* (Reed Canary-grass).
- Others invasive plant species observed in the system: *Mentha pulegium* (Penny Royal), *Phalaris aquatica* (Harding grass), *Convolvulus sp.* (Morning Glory/Bindweed), and *Buddleia davidii* (Butterfly Bush).
- Nutria and bullfrogs were recorded as invasive animals/amphibian.

- Tunneling, undercutting of banks and stripping of vegetation were recorded as damage by invasive animals/amphibian.
- Minnows, carp, ducks, geese, Blue Heron and Bluegill were recorded as other wildlife observed.
- Deer scat was recorded for wildlife evidence.
- No plant species were identified for seed collection.
- Riparian buffer enhancement, neighborhood education and bank stabilization were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.4
Water Appearance	7.6
Nutrient Enrichment	7.5
Bank Stability	6.0
Canopy Density/Cover	4.0
Invasive Damage – P	2.9
Invasive Damage – A/A	8.8
Waste Presence	9.2
Barriers to Fish (SBW)	7.4
Insect/Invert Habitat (SBW)	5.6
In-stream Fish Cover (SBW)	3.5

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.9 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Health Rating definitions)

Actions

The scoring averages reveal that channel condition (3.4), damage by invasive plants (2.9), in-stream fish cover (3.5) and canopy density/cover (4.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (3.4)

- Channel conditions problems are due to over-channelization, producing steep banks, and close location to roadway. Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Damage by invasive plants (2.9)

In-stream fish cover (3.5)

Canopy density/cover (4.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.

- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. Investigate outreach to private land owners to accomplish plantings, because of private land ownership and maintenance of the channel.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.

In-general

- Develop a program for nutria control/removal from the system.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



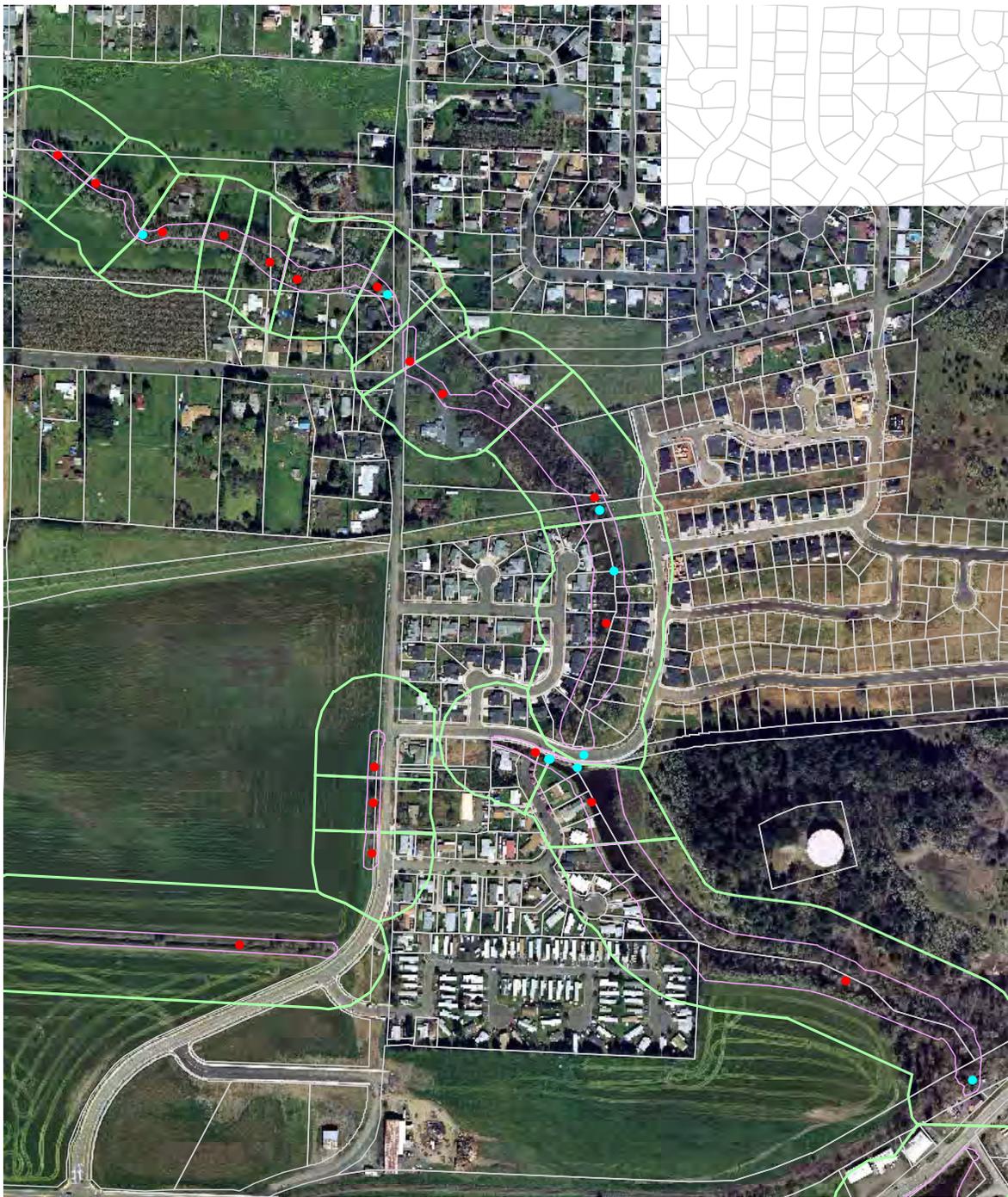
Waypoints	10ft_riparian_buffer
● Plot	200ft_landuse_buffer
● Seed Collection Site	tax lots
● In Channel Structure	

Irving Slough - Weyco. to Freeway  No scale



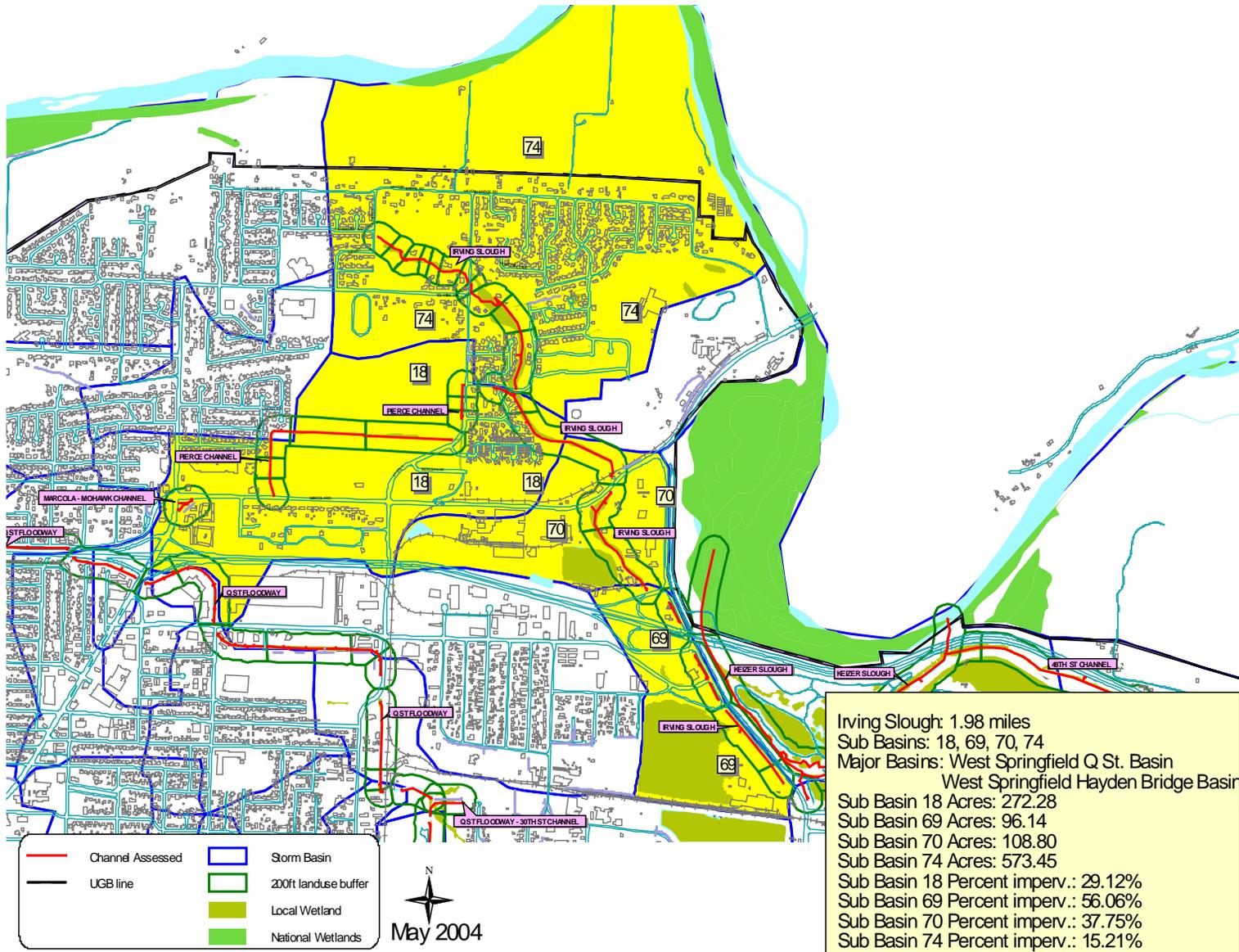
Waypoints	
●	Plot
●	In Channel Structure
	200ft Landuse Buffer
	10ft Riparian Buffer
	tax lots

Irving Slough - Freeway to Marcola No scale



Irving Slough - Marcola North





Appendix X - Island Park Slough

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City’s waterways as a whole (a composite view of all the City’s waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Island Park Slough is a tributary to the Willamette River. It starts south of South A St from the Mill Race. It flows northwest through Island Park to the Willamette River south of D St and Riverview.

It receives flow from the Mill Race and stormwater runoff. This system is considered wetlands and is listed on the Local Wetlands Inventory. The channel is approximately 0.46 miles long.



Findings/Conclusions

Data outcome:

- Consists of six (6) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 6.0 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Six photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 26th, 29th, & 30th, 2002. Ambient air temperature was between 20.9°C & 29.4°C (69.6° F & 84.9° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Public/Park on the west and south sides. On the east and north sides land use consists of Residential and Commercial.
- The west and south side are mostly non-impinged and the east and north side are partially to fully impinged with asphalt roads, asphalt parking lots and fences.

Water/Bank Profile details

- Water pH averaged 7.42, with a minimum of 7.1 and maximum of 8.0
- Water temperature averaged 22.4° C, with a minimum of 20.9° C and a maximum of 23.5° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel is mostly flowing full.
- Algae and algae color ranged from present to moderately abundant, brown and brown/green in color.
- Channel profile is ponded to U-shaped with U-shaped in-between. Bank slopes are between 10% and 59% with an average of 29.2%.
- Bed material consists primarily of silt/sand/clay ending in cobble.
- An outfall pipe, bike path bridge abutment, weir, and a culvert were recorded as in-channel structures.

Riparian Profile details

- Plant community consisting of hardwood and mixed.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass), and *Convolvulus sp.* (Morning Glory/Bindweed).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Phalaris arundinacea* (Reed Canary-grass), *Hedera helix* (English Ivy), and *Convolvulus sp.* (Morning Glory/Bindweed).
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry), *Convolvulus sp.* (Morning Glory/Bindweed), *Solanum dulcamara* (Nightshade), and *Hypericum perforatum* (St John's Wort).
- Others invasive plant species seen in the system: *Holcus lanatus* (Velvet Grass), *Dipsacus fullonum* (Teasel), and *Parentucellia viscosa* (Parentucellia).
- Although nutria and beaver both have been seen numerous times in this system there were no invasive animals/amphibian recorded.
- No damage by invasive animals/amphibian was recorded.

- Osprey, Green Heron, Kingfisher, Double Crested Cormorant, Common Yellow-Throat and Mallard ducks were listed as wildlife observed.
- Although nutria, beaver, geese and ducks all have been seen numerous times in this system no wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Bank stabilization, neighborhood education and riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	7.2
Water Appearance	3.5
Nutrient Enrichment	5.4
Bank Stability	7.7
Canopy Density/Cover	3.3
Invasive Damage – P	3.0
Invasive Damage – A/A	10.0
Waste Presence	7.2
Barriers to Fish (SBW)	8.3
Insect/Invert Habitat (SBW)	7.0
In-stream Fish Cover (SBW)	4.3

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.0 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that water appearance (3.5), canopy density/cover (3.3), damage by invasive plants (3.0) and in-stream fish cover (4.3) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

This system flows through Island Park, which is owned by the Willamalane Park and Recreation District. Much of the routine maintenance of this waterway is performed by Willamalane.

Water appearance (3.5)

- This system has a high amount of turbidity from nutria, geese, and ducks. The water appearance is usually cloudy with floating mats and scummy. This system becomes stagnant in the summer months due to the Mill Race having low flows and English ivy, bindweed and berries clogging the channel. Removal of the invasive plants from the active channel as well as receiving a steady flow of water from the Mill Race will increase the flow through this system and improve the clarity of the water.

Canopy density/cover (3.3)

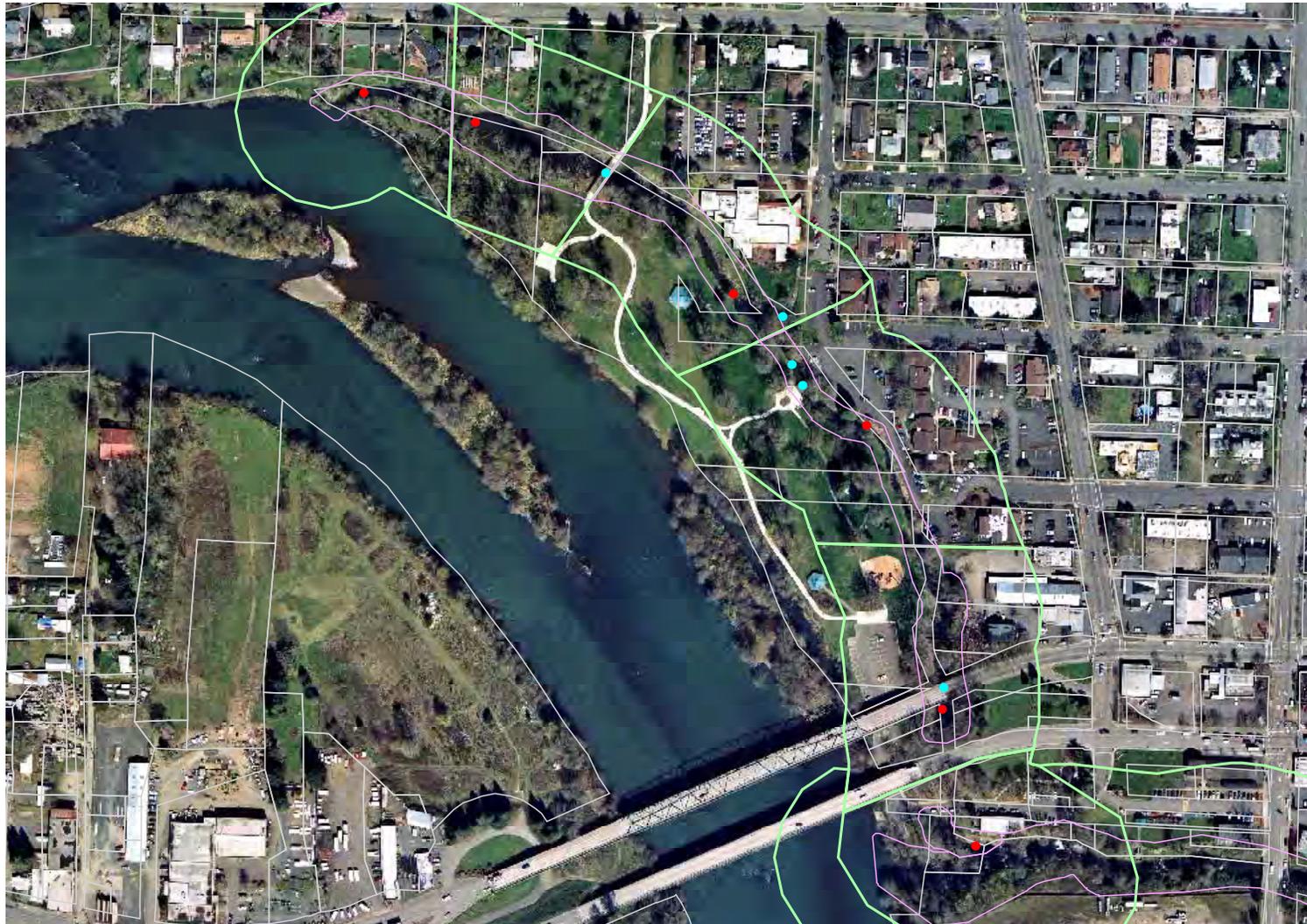
Damage by invasive plants (3.0)

In-stream fish cover (4.3)

- Develop a training and awareness program with maintenance and Willamalane Park staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species. Ensure that Willamalane Park District staff know that this system is a wetland so it will be maintained properly.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. Investigate outreach to private land owners to accomplish plantings, because of private land ownership and maintenance of the channel.

In-general

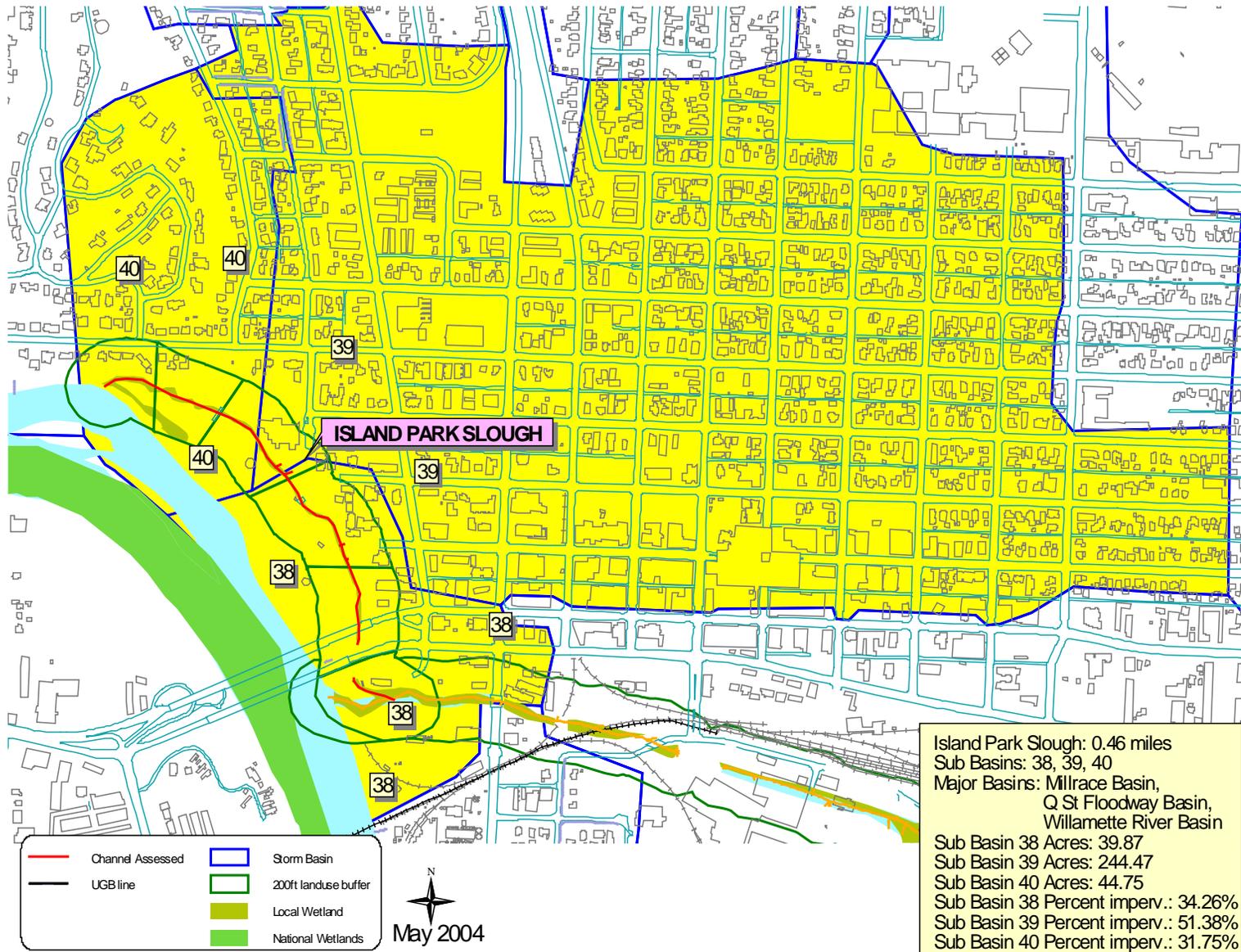
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Continue joint mowing and other maintenance activities with Willamalane Park District. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
●	Plot
●	Seed Collection Site
●	In Channel Structure
	10ft_riparian_buffer
	200ft_Janduse_buffer
	tax lots

Island Park Slough





Appendix Y - Jasper Slough

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Jasper Slough is a tributary to the Mill Race. The original headwaters of this system have been filled in over the years by upstream landowners. The section accessed starts south of south 42nd St, and south of Jasper Road. It flows southwest then northwest to intersect with the Mill Race south of Jasper Rd at South 32nd St.

It receives flow from stormwater runoff and from a wetland overflow pipe. Sections of this system are wetlands and are listed on the Local Wetlands Inventory. The channel is approximately 1.12 miles long.



Findings/Conclusions

Data outcome:

- Consists of ten (10) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 5.8 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- *Myostis laxa* (Small-flowered forget-me-not) were recorded for seed collection.

Photos:

- Seven photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 14th-16th, & 19th, 2002. Ambient air temperature was between 18.6°C & 33.9°C (65.5° F & 93° F), which dictates a rating of cold & dry to sunny & hot for weather condition.
- Land uses consist of mostly Residential on the north and east sides. Agriculture and Undeveloped were recorded for the south and west sides.
- Partial impingements on the north and east side of fences, and a building. Full and partial impingements of fences, gravel roads, gravel parking lots and driveways on the south and west sides.

Water/Bank Profile details

- Water pH: 3 dry - 1 stagnant - 6 reaches averaged 6.48 with a minimum of 6.2 and maximum of 7.5.
- Water temperature: 3 reaches dry - 1 stagnant - 6 reaches averaged 20.48° C with a minimum of 16.9° C and a maximum of 23.4° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to flowing full, average is dry to 3/4 flowing.
- Algae and algae color ranged from none to abundant, brown and brown/green in color.
- Channel profile is mostly ponded with U-shaped and V-shaped intermittent. Bank slopes are between 14% and 63% with an average of 32.56%.
- Bed material consists primarily of silt/sand/clay with some gravel.
- A footbridge, culverts and an earth dam were recorded as in-channel structures.

Riparian Profile details

- Plant community of hardwoods and one reach that is dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Phalaris arundinacea* (Reed Canary-grass).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Iris pseudacorus* (Yellow Flag Iris), *Phalaris arundinacea* (Reed Canary-grass), and *Convolvulus sp.* (Morning Glory/Bindweed).
- Invasive plant species listed as present: *Iris pseudacorus* (Yellow Flag Iris), *Phalaris arundinacea* (Reed Canary-grass), *Holcus lanatus* (Velvet Grass), *Rubus armeniacus* (Armenian Blackberry), *Solanum dulcamara* (Nightshade), *Phalaris aquatica* (Harding grass), *Convolvulus sp.* (Morning Glory/Bindweed), and *Dipsacus fullonum* (Teasel).
- Others invasive plant species observed in the system: *Buddleia davidii* (Butterfly bush), *Polygonum sp.* (Knotweed), and *Mentha pulegium* (Penny Royal).

- Nutria and beaver were recorded as invasive animals/amphibian observed.
- Tunneling causing undercutting, loss of vegetation and beaver cutting were recorded as damage by invasive animals/amphibian.
- Wood Duck, Green Heron, Belted Kingfisher, Mallards, minnows, deer and Great Blue Heron were recorded as other wildlife observed.
- Nutria scat and deer scat were recorded for wildlife evidence.
- *Myostis laxa* (Small-flowered forget-me-not) were recorded for seed collection.
- Riparian buffer enhancement, neighborhood education and one culvert retrofit/replacement were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	6.6
Water Appearance	6.8
Nutrient Enrichment	4.5
Bank Stability	7.0
Canopy Density/Cover	3.3
Invasive Damage – P	2.0
Invasive Damage – A/A	8.5
Waste Presence	7.5
Barriers to Fish (SBW)	7.0
Insect/Invert Habitat (SBW)	6.4
In-stream Fish Cover (SBW)	3.9

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.8 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that nutrient enrichment (4.5), canopy density/cover (3.3), damage by invasive plants (2.0) and in-stream fish cover (SBW)(3.9) received the lowest (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors. Most of Jasper Slough is outside City limits and meanders in and out of the UGB, limiting what kind of projects maybe performed.

Nutrient enrichment (4.5)

- This system has a high amount of turbidity from the nutria, geese, and ducks. The water appearance is usually cloudy with floating mats and scummy. This system is cut off from year around flows caused by property owners filling in the channel which causes it to become stagnant in the summer months.

Canopy density/cover (3.3)

Damage by invasive plants (2.0)

In-stream fish cover (SBW)(3.9)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.

In-general

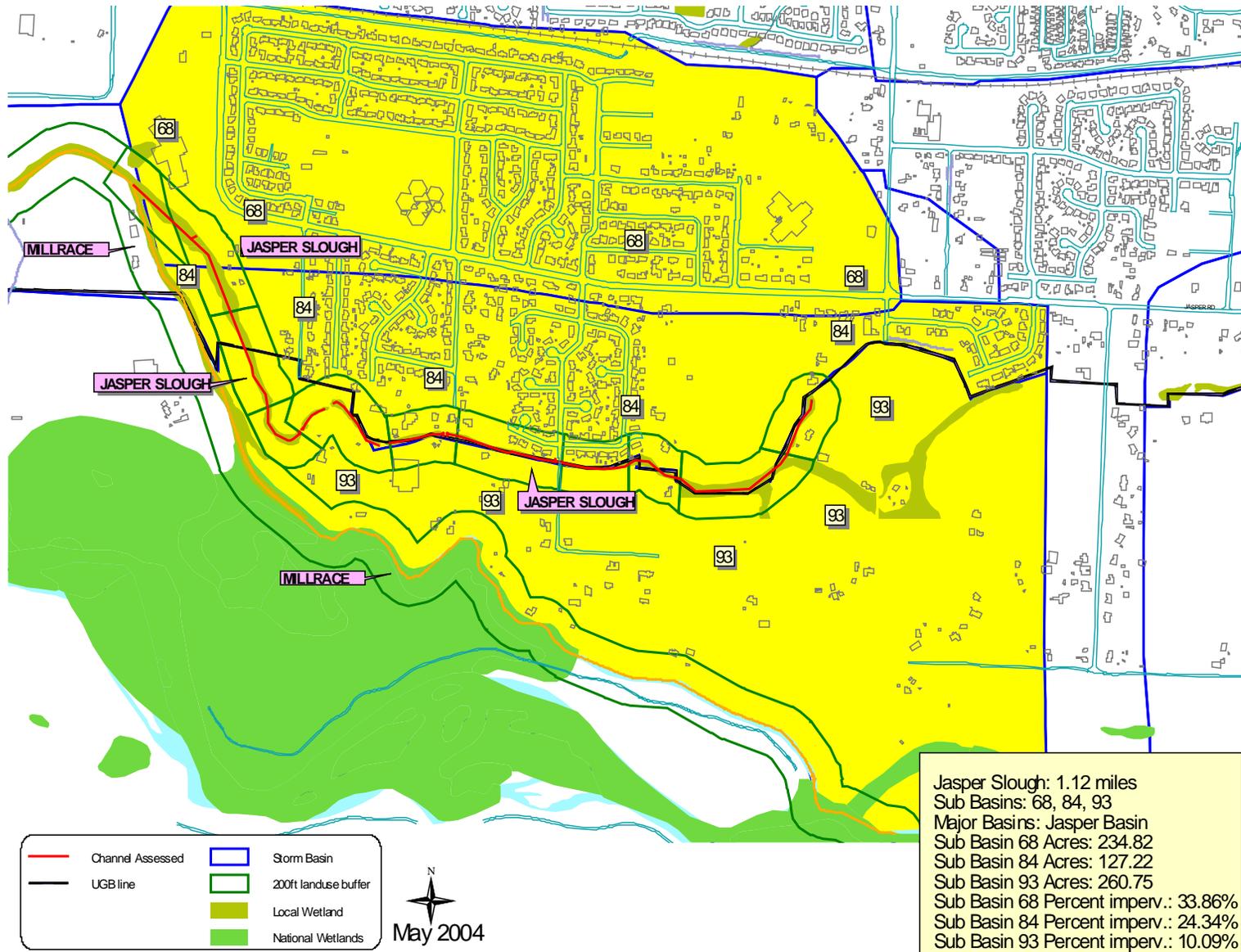
- Horses are present in reach 5 and sheep are present in reach 6. An impact evaluation should be done to determine if they are affecting water quality conditions.
- The sections that lay within the City Limits and are in the public right of way, should be added to the mowing and maintenance schedule. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Jasper Slough





Appendix Z - Laura Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Laura Channel starts west of Laura St where Q St becomes an "on ramp" for I-105 westbound. It flows northwest to a piped system.

It receives flow from stormwater runoff and commercial runoff. The channel is approximately 0.10 miles long.



Findings/Conclusions

Data outcome:

- Consists of three (3) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 6.2 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- *Juncus effuses* (Common rush) and *Myosotis laxa* (Small-flowered forget-me-not) were recorded for seed collection.

Photos:

- Three photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 3rd, & 5th, 2002. Ambient air temperature was between 20.5°C & 35.4°C (68.9° F & 95.7° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Commercial on the north side and Transportation corridor on the south side.
- Partial and full impingements on the north side consisting of fences, asphalt and gravel roads. The south side is mostly non-impinged, except one reach is fully impinged by a fence.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped. Bank slopes are between 23% and 51% with an average of 39%.
- Bed material consists primarily of silt/sand/clay.
- A fence was recorded as an in-channel structure.

Riparian Profile details

- Plant community consisting of grass/field.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass).
- No co-dominant invasive plant species were recorded.
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry) and *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Dipsacus fullonum* (Teasel) and *Mentha pulegium* (Penny Royal).
- No invasive animals/amphibian was observed.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- *Juncus effuses* (Common rush) and *Myosotis laxa* (Small-flowered forget-me-not) were recorded for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding the health ratings for all reaches together then dividing by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	9.0
Canopy Density/Cover	2.3
Invasive Damage – P	4.7
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.2 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.0), canopy density/cover (2.3) and damage by invasive plants (4.7) received the lowest rating (below mid scale). Perform an evaluation to assess what may be done to improve these three factors.

Channel condition (1.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not been managed by City of Springfield as of this writing.

Canopy density/cover (2.3)

Damage by invasive plants (4.7)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. Investigate outreach to private land owners to accomplish plantings, because of private land ownership and maintenance of the channel.

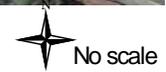
In-general

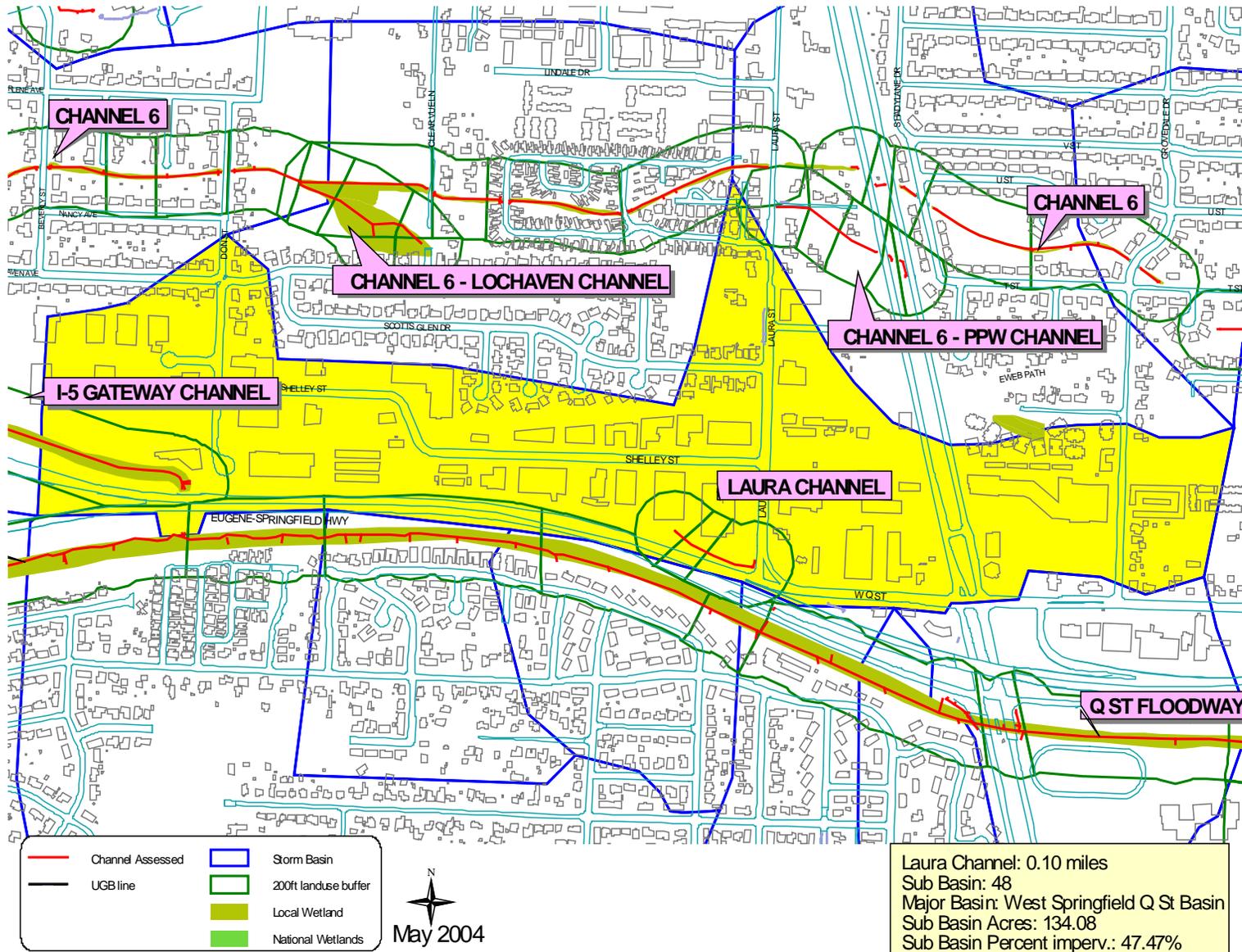
- Add mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
●	Plot
●	Seed Collection Site
●	In Channel Structure
	10ft_riparian_buffer
	200ft_landuse_buffer
	tax lots

Laura Channel





Appendix AA - Marcola - Mohawk Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Marcola - Mohawk Channel starts on the southeast side of the intersection of Marcola Rd and Mohawk Rd. It flows southwest to a piped system.

It receives flow from stormwater runoff. The channel is approximately 0.10 miles long.



Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.8 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- One photo of a plot site was taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 28th, 2002. Ambient air temperature was 23.9°C (75° F), which dictates a rating of sunny & overcast for weather condition.
- Land uses consist of Residential on the south side and Commercial on the north side.
- A sidewalk was recorded as a partial impingement on the north side.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped. Bank slopes are between 53% and 68% with an average of 60.5%.
- Bed material consists primarily of silt/sand/clay.
- No in-channel structures were recorded.

Riparian Profile details

- Plant community of grass/field.
- No dominant invasive plant species was recorded.
- No co-dominant invasive plant species was recorded.
- Invasive plant species listed as present: *Phalaris arundinacea* (Reed Canary-grass).
- Others invasive plant species observed in the system: *Phalaris aquatica* (Harding grass), *Dipsacus fullonum* (Teasel), *Holcus lanatus* (Velvet Grass), and *Rubus armeniacus* (Armenian Blackberry).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	9.0
Canopy Density/Cover	2.0
Invasive Damage – P	3.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.8 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.0), canopy density/cover (2.0), and damage by invasive plants (3.0) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these three factors.

Channel condition (1.0)

- Work with maintenance crews to broaden their understanding of channel condition and erosion concerns related to maintenance practices.

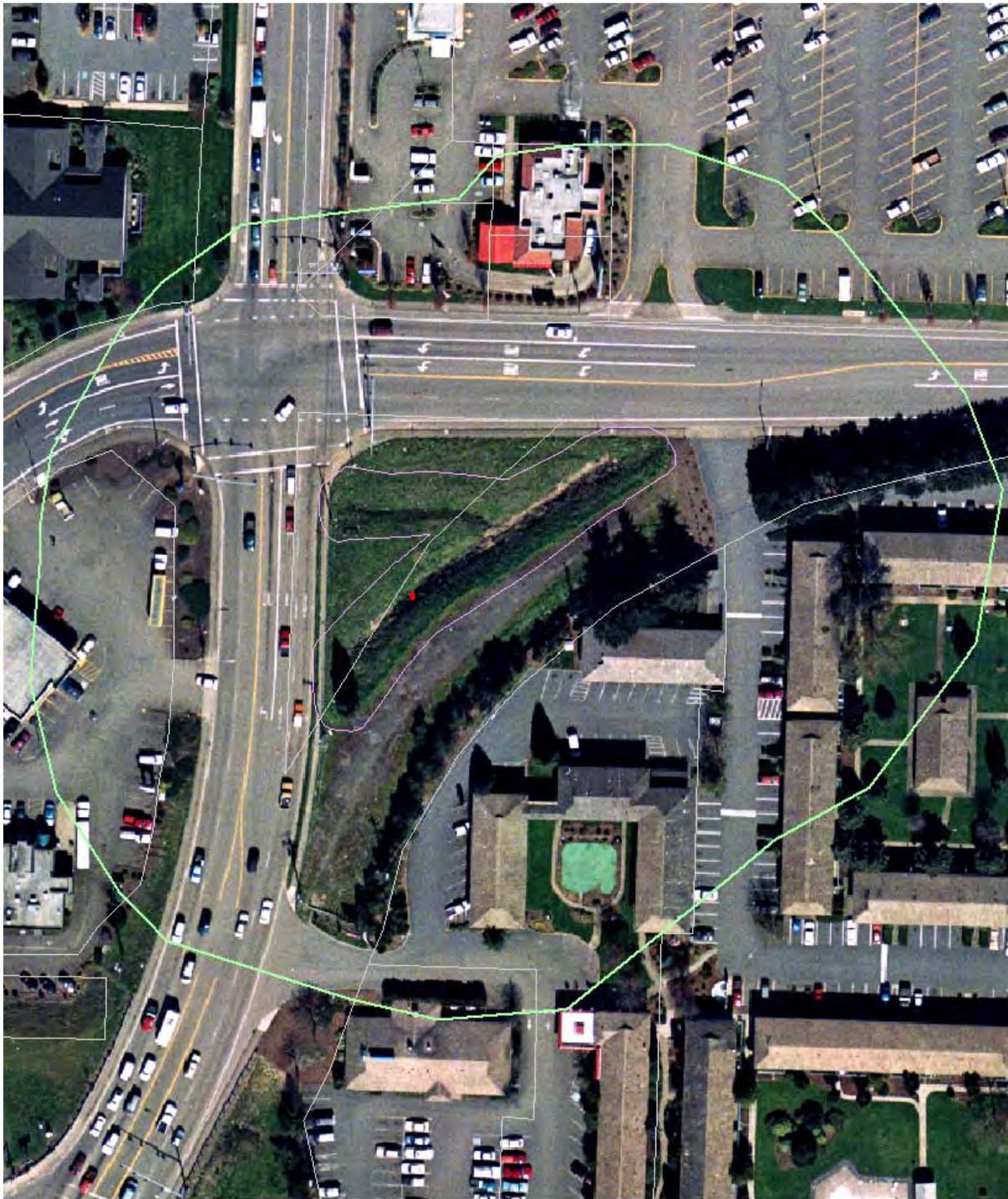
Canopy density/cover (2.0)

Damage by invasive plants (3.0)

- Work with maintenance crews on identifying invasive species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use the *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent.

In-general

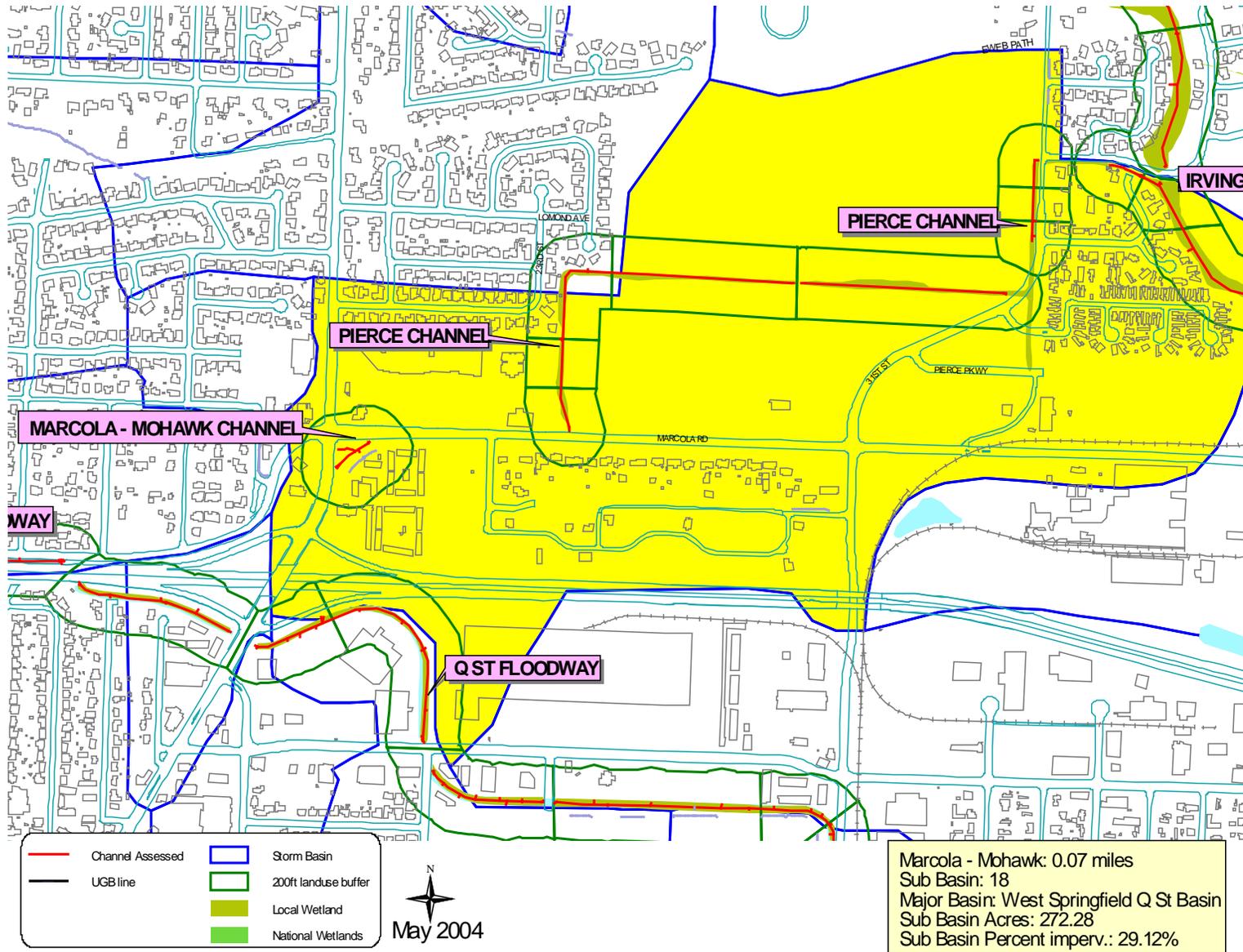
- Continue mowing and other maintenance activities. Concentrate more effort on invasive plant eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10 ft riparian buffer
● Seed Collection Site	200 ft land use buffer
● In Channel Structure	tax lots

Marcola Mohawk Channel





Appendix BB - Moon Mt. East System

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Moon Mt. East System is a tributary to the Glenwood Slough. Springfield's jurisdiction starts on the north side of I-5 east of Henderson Lane behind the current Pape Cat facility. It flows northwest to a piped section south of 22nd Ave. The system daylights again on the south side of the railroad tracks that split Henderson Lane. It flows east along the tracks then crosses north under the tracks and then north to intersect with the Glenwood Slough.

It receives flow from stormwater runoff, industrial runoff and is fed by runoff from Eugene. The Springfield side of the channel is approximately 0.31 miles long.



Findings/Conclusions

Data outcome:

- Consists of four (4) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.6 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Two photos of plot sites taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 3rd, 2003. Ambient air temperature was between 27.5°C & 32.3°C (81.5° F & 90.1 F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of a Commercial, Transportation corridor, and Undeveloped on the east and north sides. Undeveloped, Transportation corridor, Commercial, and Industrial on the west and south sides.
- There are impingements of railroad tracks on the east and north sides and railroad tracks, a fence, a building, and a water tower on the east and south sides.

Water/Bank Profile details

- Water pH: 3 reaches dry – 1 reach at 7.6.
- Water temperature: 3 reaches dry and 1 reach at 15.4° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to 1/4 flowing.
- No algae were recorded for three reaches and one was recorded as having isolated occurrences and the color of green.
- Channel profile is ponded to Pounded to V-shaped and U-shaped. Bank slopes are between 47% and 150% with an average of 82.3%.
- Bed material consists primarily of silt/sand/clay.
- A train bridge abutment and a fiber optic warning post were recorded as in-channel structures.

Riparian Profile details

- Plant community of brush/shrub/scrub, and one dominated by invasive plants.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass).
- Invasive plant species listed as present: *Dipsacus fullonum* (Teasel) and *Cytisus scoparius* (Scotch Broom).
- Other invasive plant species observed in the system. *Convolvulus sp.* (Morning Glory/Bindweed) and *Vinca Major* (Periwinkle).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No pant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.5
Water Appearance	7.0
Nutrient Enrichment	5.0
Bank Stability	6.0
Canopy Density/Cover	4.0
Invasive Damage – P	2.5
Invasive Damage – A/A	10.0
Waste Presence	6.8
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.6 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.5), canopy density/cover (4.0) and damage by invasive plants (2.5) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these three factors.

Channel condition (3.5)

- Work with maintenance crews to broaden their understanding of channel condition and erosion concerns related to maintenance practices. This system has not been managed by City of Springfield as of this writing.

Canopy density/cover (4.0)

Damage by invasive plants (2.5)

- Work with maintenance crews on identifying invasive species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use the *City of Springfield Invasive Plants List* as a guide.
- Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent.

In-general

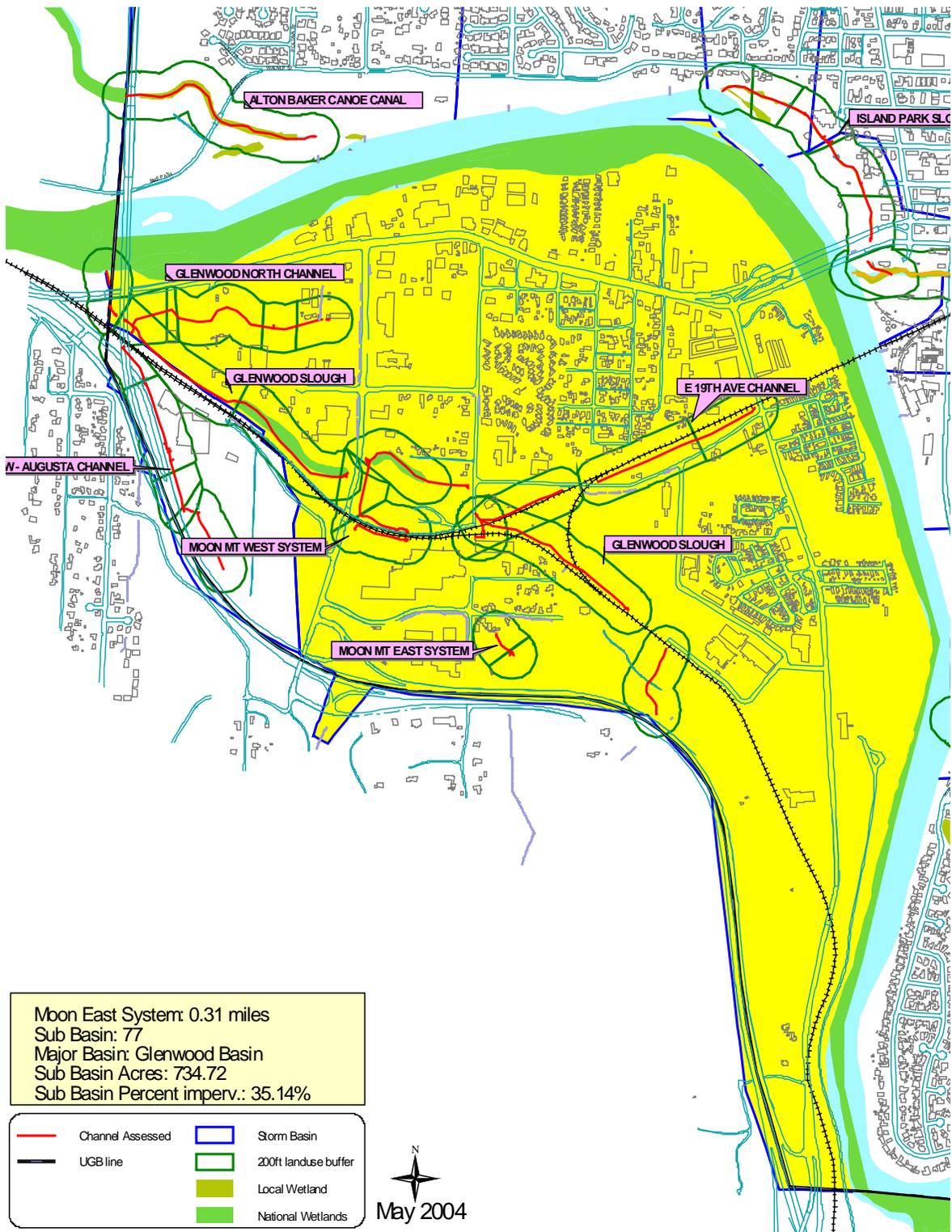
- This system is in Glenwood and flows through private properties. Investigate this waterway more to gather information on the water quality and quantity coming from the Eugene side of the system.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Moon Mt East System





Appendix CC - Moon Mt. West System

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Moon Mt. West System is a tributary to the Glenwood Slough. Springfield's jurisdiction starts on the east side of I-5 and the south side of the railroad tracks that are on the north side of Farwest Steel's property east of Henderson Lane in Glenwood. It flows east along side the railroad tracks, north under the tracks and then west and north to intersect with the Glenwood Slough.

It receives flow from stormwater runoff, industrial runoff and is fed by runoff from Eugene. The channel is approximately 0.30 miles long.



Findings/Conclusions

Data outcome:

- Consists of three (3) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 4.67 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Three photos of plot sites taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 18th, 2003. Ambient air temperature was between 31.4°C & 33.1°C (8.5° F & 90.3° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of a Transportation corridor and Industrial on the west and south sides, Commercial and Transportation corridor on the east and north sides.
- A chain link fence fully impinged in one reach on the south, and chain link fences and railroad tracks fully impinged the other two reaches on the north and east sides.

Water/Bank Profile details

- Water pH: 2 reaches dry – 1 reach recorded at 7.7.
- Water temperature: 2 reaches dry – 1 reach recorded at 17.3° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to -1/4 flowing.
- No algae were recorded for the system.
- Channel profile is V-shaped to Ponded and then U-shaped. Bank slopes are between 14% and 123% with an average of 58.3%.
- Bed material consists primarily of silt/sand/clay.
- A culvert under the tracks, and sanitary manholes were recorded as in-channel structures.

Riparian Profile details

- Plant community of brush/shrub/scrub.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass) and *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Cytisus scoparius* (Scotch Broom).
- Invasive plant species listed as present: *Solanum dulcamara* (Nightshade) and *Dipsacus fullonum* (Teasel).
- Other invasive plant species observed in the system: *Convolvulus sp.* (Morning Glory/Bindweed) and *Conium maculatum* (Poison hemlock).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	4.0
Water Appearance	9.0
Nutrient Enrichment	8.0
Bank Stability	5.0
Canopy Density/Cover	4.0
Invasive Damage – P	1.3
Invasive Damage – A/A	7.0
Waste Presence	4.7
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
4.67 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (4.0), canopy density/cover (4.0), damage by invasive plants (1.3) and waste presence (4.7) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (4.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels. This system has not been managed by City of Springfield as of this writing.

Canopy density/cover (4.0)

Damage by invasive plants (1.3)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Develop a priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Increase mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Evaluate planting small native trees or shrubs along top of bank to provide shade to waterway.

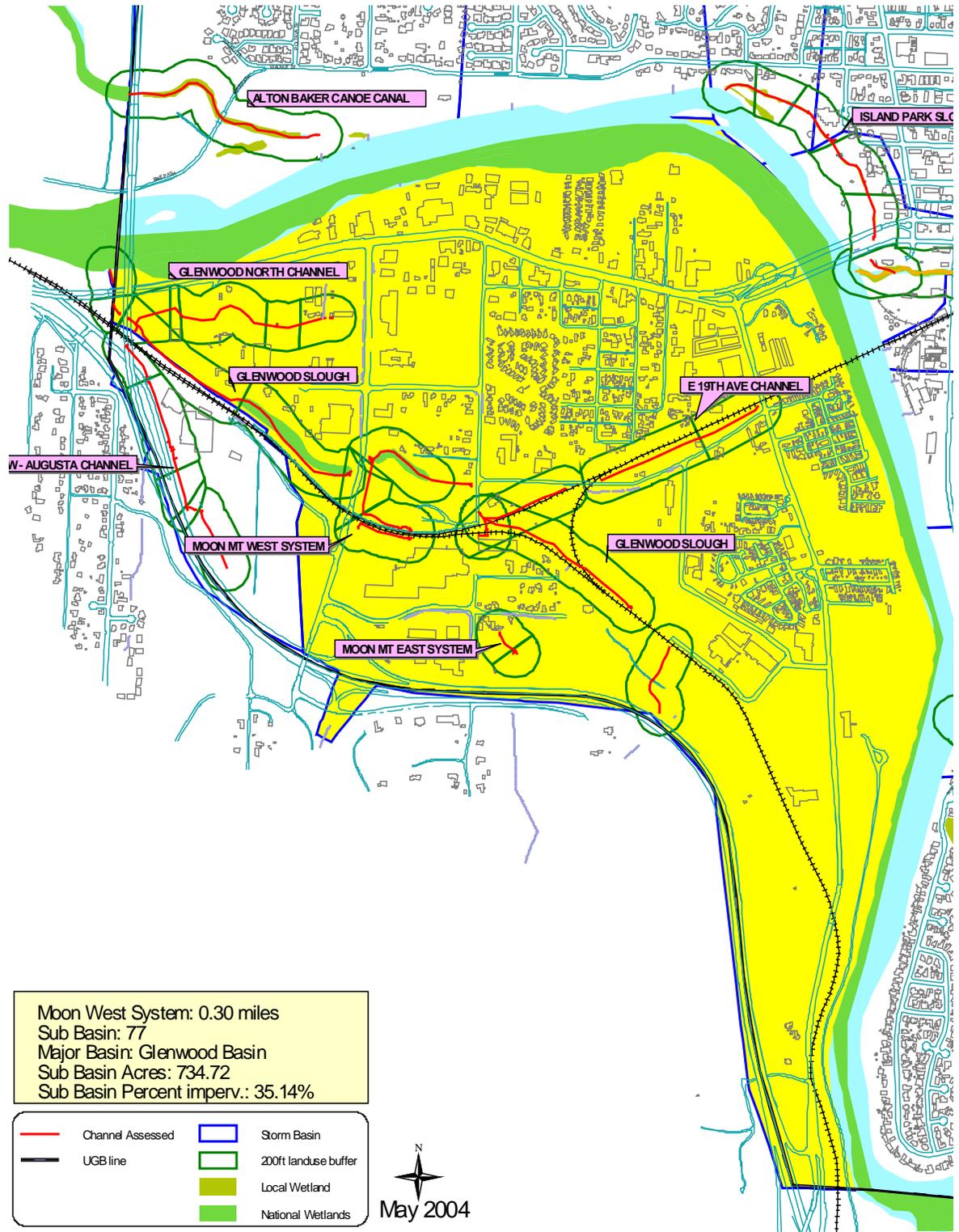
Waste presence (4.7)

- Waste presence in this area is due to the location of the railroad tracks and homeless camps in the area. Adding this system to the routine maintenance activity lists will help address this problem.

In-general

- This system is in Glenwood, and source waters include runoff from Eugene. Investigate this waterway more to gather information on the water quality and quantity coming from the Eugene side of the system.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.





Appendix DD - Mt. Vernon Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Mt. Vernon Channel starts east of South 59th St. and south of Mt. Vernon St. It flows north to Mt. Vernon St. then west to about South 57th Pl then south to wetlands.

It receives flow from stormwater runoff and flows through and to wetlands. Sections of this system are wetlands and are listed on the Local Wetlands Inventory. Not all of this system has been mapped. The mapped section of the channel is approximately 0.25 miles long. The area was under development at the time the assessment was performed.



Findings/Conclusions

Data outcome:

- Consists of seven (7) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 6.1 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- *Epilobium densiflorum* (Dense spike-primrose), *Juncus effuses* (Common Rush), and *Myosotis laxa* (Small-flowered forget-me-not) was recorded for seed collection.

Photos:

- Three photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 7th & 8th, 2002. Ambient air temperature was between 23.1°C & 36°C (73.6° F & 96.8°F), which dictates a rating of sunny & hot for weather condition.
- A development is currently being built on the south side of the system between the east and west reaches. Land uses at the time of the assessment consist of mostly Residential and Un-developed on the north and east sides. On the south and west sides they consist mostly of Un-developed and a Residential reach.
- No impingements on the south or west sides and half of the reaches in the north and east sides are fully impinged by fences.

Water/Bank Profile details

- Water pH: 3 dry - 4 reaches averaged 6.9 with a minimum of 6.7 and maximum of 7.1.
- Water temperature: 3 reaches dry. 4 reaches averaged 13.98° C with a minimum of 12.6° C and a maximum of 16.6° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to ¼ flowing.
- Algae and algae color ranged from none to some present. No color was recorded.
- Channel profile is U-shaped. Bank slopes are between 19% and 129% with an average of 56.93%.
- Bed material consists primarily of silt/sand/clay and ending in cobble.
- Culverts were recorded as in-channel structures.

Riparian Profile details

- Plant community of hardwoods and one reach of mixed.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Holcus lanatus* (Velvet Grass), and *Solanum dulcamara* (Nightshade).
- Co-dominant invasive plant species: *Holcus lanatus* (Velvet Grass), *Phalaris arundinacea* (Reed Canary-grass), *Rubus armeniacus* (Armenian Blackberry), and *Solanum dulcamara* (Nightshade).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Solanum dulcamara* (Nightshade), *Rubus armeniacus* (Armenian Blackberry), and *Dipsacus fullonum* (Teasel).
- Others invasive plant species observed in the system: *Mentha pulegium* (Penny royal) and *Rubus laciniatus* (Evergreen Blackberry).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.

- No wildlife evidence was recorded.
- *Epilobium densiflorum* (Dense spike-primrose), *Juncus effuses* (Common Rush), and *Myosotis laxa* (Small-flowered forget-me-not) was recorded for seed collection.
- Neighborhood education and riparian buffer enhancement were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.6
Water Appearance	7.8
Nutrient Enrichment	8.0
Bank Stability	4.9
Canopy Density/Cover	5.4
Invasive Damage – P	4.3
Invasive Damage – A/A	10.0
Waste Presence	8.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.1 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.6), bank stability (4.9) and damage by invasive plants (4.3) received the lowest rating (below mid-scale received the lowest rating (below mid scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these three factors.

Channel condition (1.6)

Bank stability (4.9)

- Bank stability problems are due to over-channelization, producing steep banks, and close location to roadway. Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Damage by invasive plants (4.3)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.

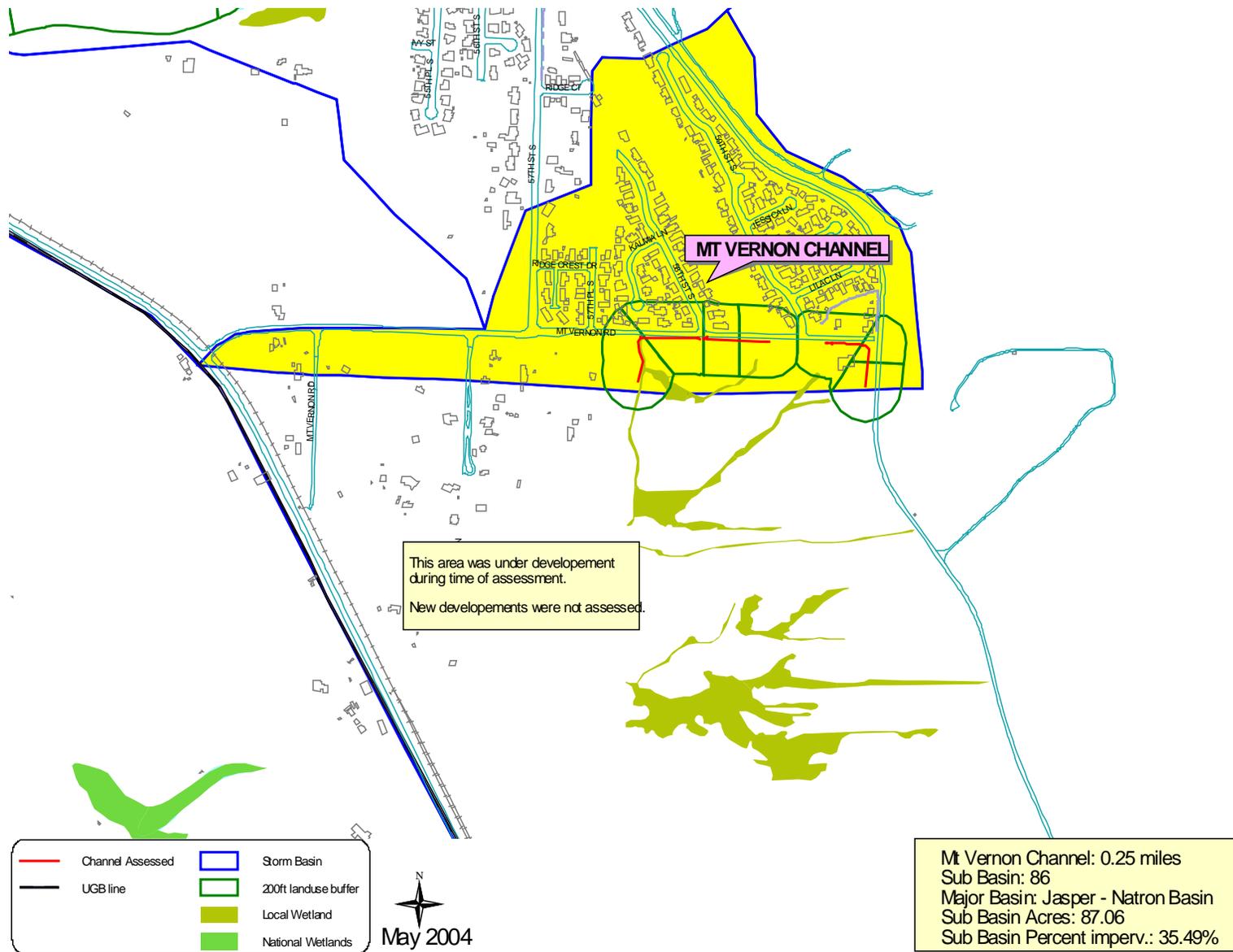
In-general

- This system and the area around it were under development during this assessment. Expand future assessment to include the newly developed areas.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Mt Vernon Channel

 No scale



Appendix EE - Northridge & 9th Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Northridge & 9th St. Channel is a tributary to Channel 6 – T St. Channel. It starts south of Northridge at 9th St. It flows south to intersect with the Channel 6 - T St. Channel.

It receives flow from stormwater runoff. The channel is approximately 0.06 miles long.

Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 5.3 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- No photos were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 10th, 2002. Ambient air temperature was 29.1°C (84.4° F), which dictates a rating of sunny & hot for weather condition.
- Land use consists of Undeveloped on both sides.
- There are no impingements on either side.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is U-shaped. Bank slopes are between 63% and 93% with an average of 78%.
- Bed material consists primarily of gravel.
- Two sanitary manholes were recorded as in-channel structures.

Riparian Profile details

- Plant community of grass/field.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass).
- No co-dominant invasive plant species recorded.
- Invasive plant species listed as present: *Rubus armeniacus* (Armenian Blackberry).
- No other invasive plant species were observed in the system.
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	3.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	5.0
Canopy Density/Cover	1.0
Invasive Damage – P	3.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.3 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (3.0), canopy density/cover (1.0), and damage by invasive plants (3.0) received the lowest rating (below mid-scale). Perform an evaluation to assess what may be done to improve these three factors.

Channel condition (3.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Canopy density/cover (1.0)

Damage by invasive plants (3.0)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent.

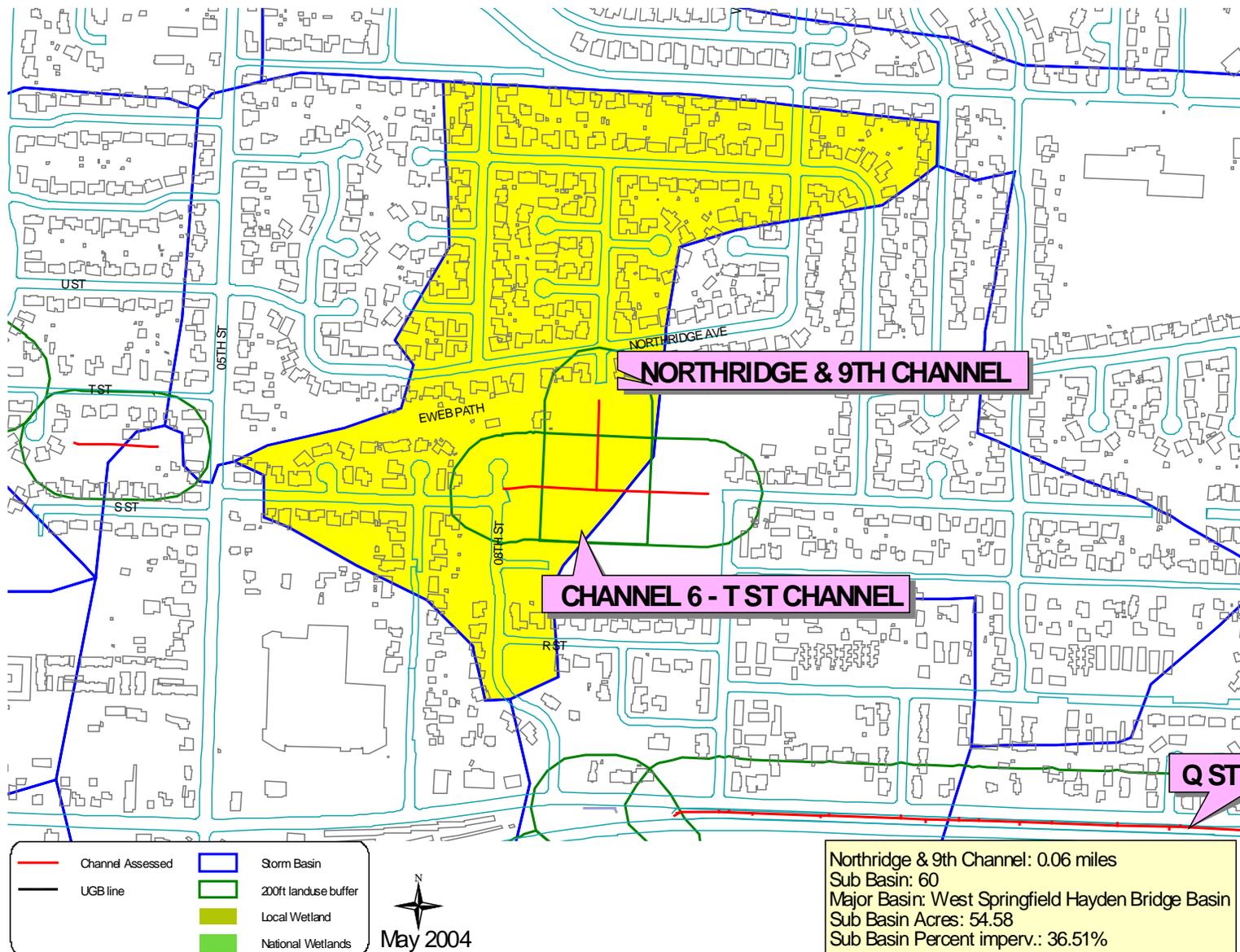
In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
●	Plot
●	Seed Collection Site
●	In Channel Structure
	10ft_riparian_buffer
	200ft_landuse_buffer
	tax lots

Northridge & 9th Channel No scale



Appendix FF – Over/Under Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Over/Under Channel is a tributary to the Q St Floodway. The section assessed starts west of 8th St and north of Centennial Blvd.

It receives flow from stormwater runoff and permitted, non-contact industrial discharge flows. The channel is approximately 0.53 miles long.



Findings/Conclusions

Data outcome:

- Consists of six (6) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 6.5 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Six photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 18th, 22nd, & 23rd, 2002. Ambient air temperature was between 22.1°C & 35.8°C (72° F & 96.4° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Residential and Public/Park on the south and west sides. The Public/Park land use is a school. East and north sides land uses are Residential.
- Partial and full impingements on the west and south side are fences, asphalt road/parking lot and a building. Partial and full impingements on the east and north sides are fences and a building.

Water/Bank Profile details

- Water pH: 5 reaches dry - 1 reach recorded at 7.5.
- Water temperature: 5 reaches dry. 1 reach recorded at 18.5° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel was mostly dry. The one reach that had water was flowing at ¼ full.
- Algae and algae color recorded at moderately abundant, brown/green in color.
- Channel profile is U-shaped to V-shaped. Bank slopes are between 27% and 129% with an average of 48.83%.
- Bed material consists primarily of silt/sand/clay starting with cobble.
- Conduits, fences and footbridges were recorded as in-channel structures.

Riparian Profile details

- Plant community of mostly hardwoods, one grass/field, one mixed and one reach that is dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Hedera helix* (English Ivy), and *Phalaris arundinacea* (Reed Canary-grass).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Dipsacus fullonum* (Teasel).
- Invasive plant species listed as present: *Dipsacus fullonum* (Teasel), *Convolvulus sp.* (Morning Glory/Bindweed), *Rubus armeniacus* (Armenian Blackberry), and *Hedera helix* (English Ivy).
- Others invasive plant species observed in the system: *Solanum dulcamara* (Nightshade).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- Minnows were recorded as wildlife observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.

- Neighborhood education and riparian buffer enhancement were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	2.0
Water Appearance	10.0
Nutrient Enrichment	7.0
Bank Stability	7.3
Canopy Density/Cover	5.0
Invasive Damage – P	4.5
Invasive Damage – A/A	9.8
Waste Presence	9.7
Barriers to Fish (SBW)	0
Insect/Invert Habitat (SBW)	0
In-stream Fish Cover (SBW)	0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.5 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (2.0) and damage by invasive plants (4.5) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Channel condition (2.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

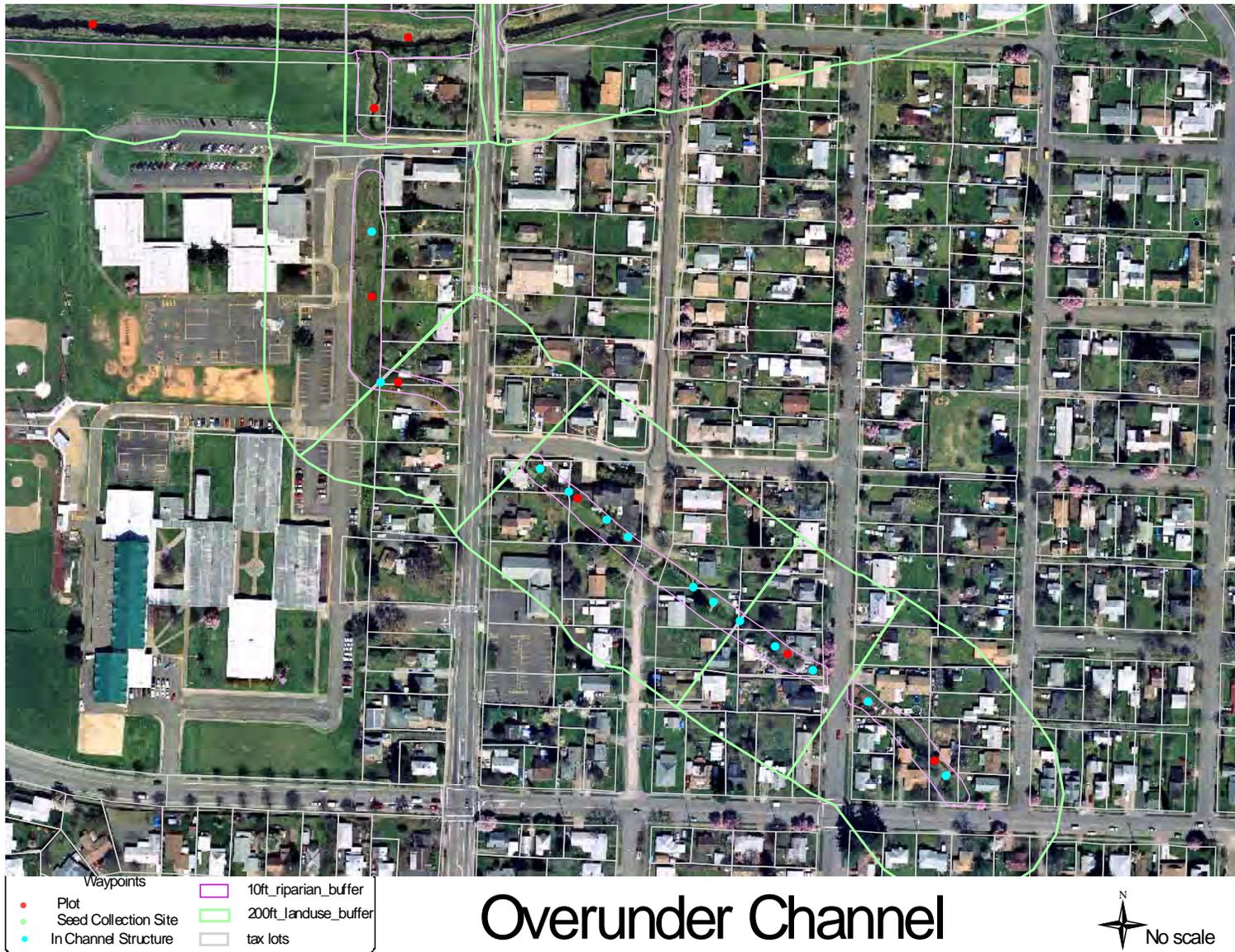
Damage by invasive plants (4.5)

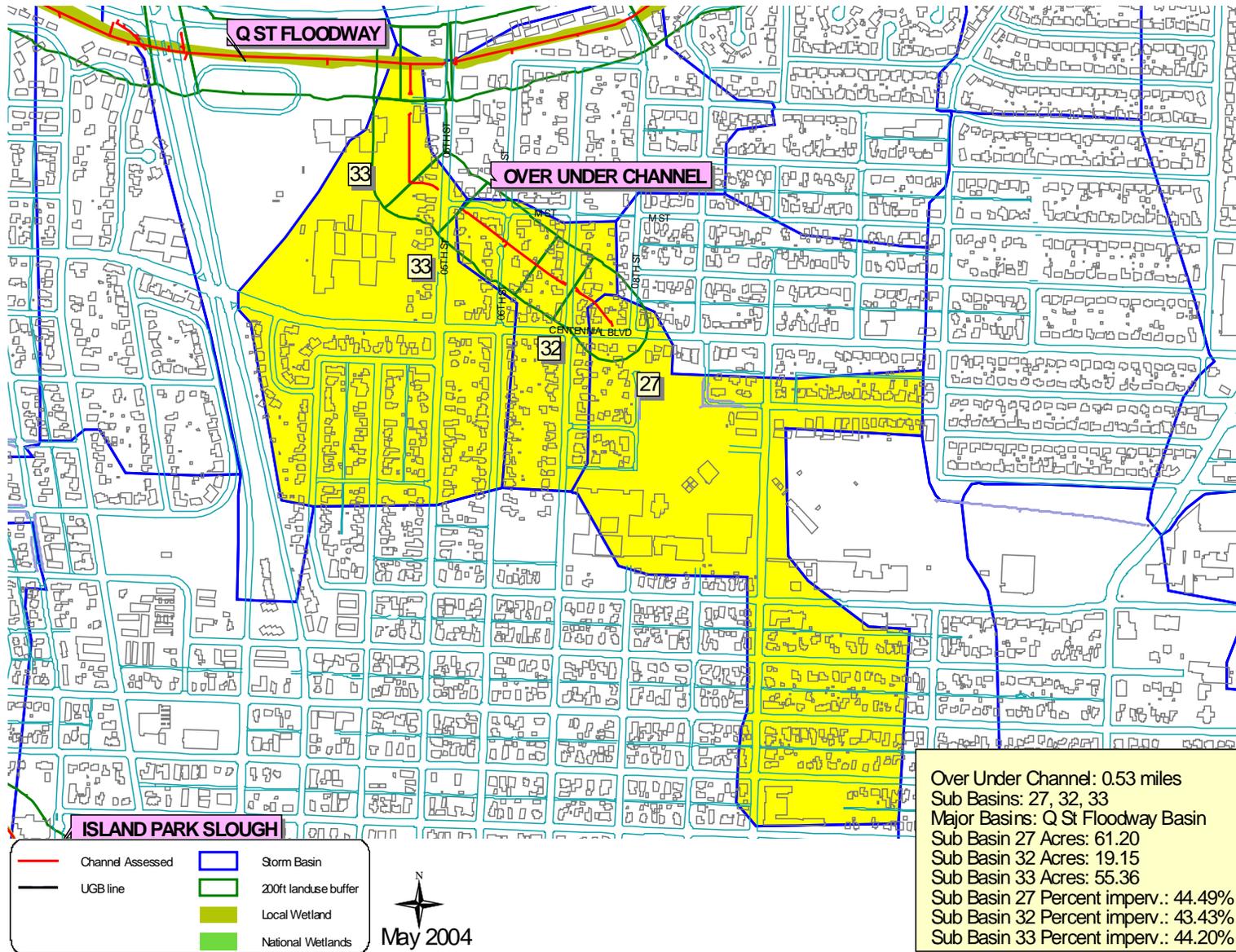
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.

In-general

- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Incorporate impact assessments to obtain a complete unified stream assessment. There are large decks, and footbridges on this system, use impact assessment to evaluate if they are affecting the system in a negative or adverse way.





Appendix GG - Pierce Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Pierce Channel starts on the west side of 31st St. south of V St. It flows south then west to 23rd St, then south to Marcola Rd where it flows into a piped system.

It receives flow from stormwater runoff and is fed by Irving Slough. This system is considered wetlands and is listed on the Local Wetlands Inventory. The channel is approximately 0.71 miles long.



Findings/Conclusions

Data outcome:

- Consists of eight (8) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 6.6 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Eight photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed June 28th and July 1st and July 16th, 2002. Ambient air temperature was between 21.4°C & 28.1°C (70.5° F & 82.6° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist mostly Un-developed and Commercial on the north and west sides. Un-developed and Residential on the south and east sides.
- One reach is fully impinged by a fence on the west side, and on the east side by a sidewalk, asphalt roads and a gravel road.

Water/Bank Profile details

- Water pH averaged 6.94 with a minimum of 6.4 and maximum of 7.5.
- Water temperature averaged 23.26° C with a minimum of 21.8° C and a maximum of 25.2° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from flowing full to flowing at ¾ full.
- Algae and algae color ranged from some present to isolated occurrences, brown and brown/green in color.
- Channel profile is U-shaped to V-shaped. Bank slopes are between 27% and 129% with an average of 48.83%.
- Bed material consists primarily of silt/sand/clay; the start of the system is cobble.
- Culverts were recorded as in-channel structures.

Riparian Profile details

- Plant community of grass/field and two reaches that are hardwoods.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass) and *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Invasive plant species listed as present: *Holcus lanatus* (Velvet Grass), *Rubus armeniacus* (Armenian Blackberry), and *Phalaris arundinacea* (Reed Canary-grass).
- Others invasive plant species observed in the system: *Dipsacus fullonum* (Teasel) and *Solanum dulcamara* (Nightshade).
- No invasive animals/amphibians were recorded.
- Nutria tunneling and undercutting of banks listed as damage by invasive animals/amphibian.
- Violet-green Swallow, 2" fish, American kestrel, minnows, Cliff Swallow, Savanna Sparrow and American Goldfinch were recorded as wildlife observed.

- No wildlife evidence other than nutria tunneling was recorded.
- No plant species were identified for seed collection.
- Riparian buffer enhancement and neighborhood education was recorded for project opportunities.
- Yard waste dumping was noted in the comment section.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.4
Water Appearance	8.3
Nutrient Enrichment	8.6
Bank Stability	7.1
Canopy Density/Cover	4.0
Invasive Damage – P	3.6
Invasive Damage – A/A	9.1
Waste Presence	10.0
Barriers to Fish (SBW)	10.0
Insect/Invert Habitat (SBW)	6.5
In-stream Fish Cover (SBW)	4.4

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.6 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

Suggestions for immediate actions (1 to 3 years)

The scoring averages reveal that that channel condition (1.4), canopy density/cover (4.0), in-stream fish cover (SBW) (4.4) and damage by invasive plants (3.6) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (1.4)

- Bank stability problems are due to over-channelization, producing steep banks; develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.

Canopy density/cover (4.0)

Damage by invasive plants (3.6)

In-stream fish cover (SBW) (4.4)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.

- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. This may not be possible because of private land ownership and maintenance of the channel.

In-general

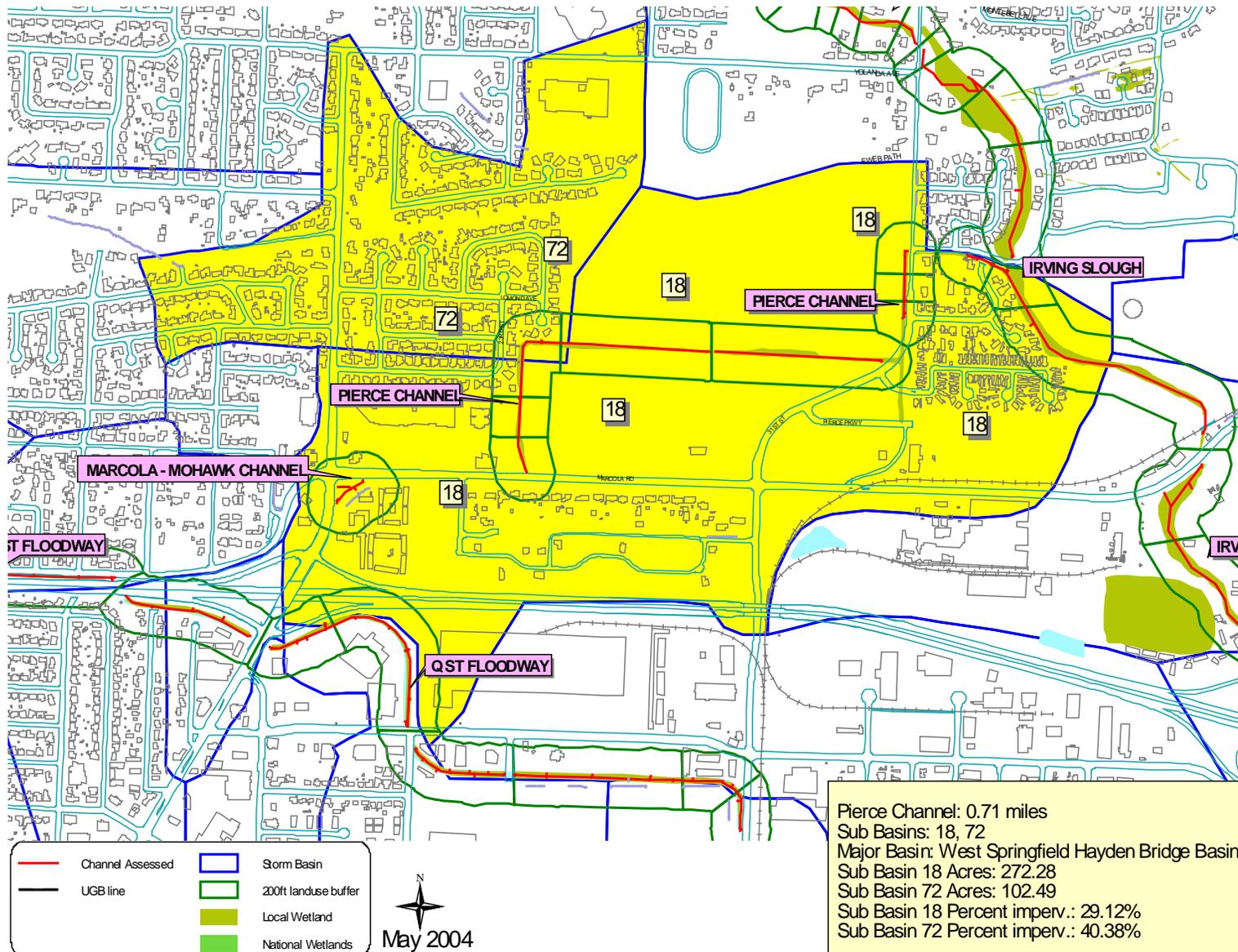
- Continue to perform maintenance activity for invasive species eradication; use *City of Springfield Invasive Plants List* as a guide.
- Review which reaches may benefit most from neighborhood education and target those areas for door hangers addressing yard debris being dumped into the waterway.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	
● Plot	10ft_riparian_buffer
● Seed Collection Site	200ft_landuse_buffer
● In Channel Structure	tax lots

Pierce Channel





Appendix HH - Q St Floodway

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10; see table 4 in the main document, representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The Q St Floodway starts north of Main St at 30th St. It flows north then west to I-5 then into Eugene.

The system receives flow from residential and commercial stormwater runoff and industrial non-contact process water and stormwater runoff. Parts of this system are wetlands and are listed on the Local Wetlands Inventory (LWI). Springfield's jurisdiction of the channel is approximately 4.4 miles long. This system is listed as a Tributary on Springfield's Water Quality Limited Waterways (WQLW) by the City.





Findings/Conclusions

Data outcome:

- Consists of twenty five (25) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 5.8 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- *Epilobium densiflorum* (Dense spike-primrose), *Juncus effuses* (Common rush), and *Myosotis laxa* (Small-flowered forget-me-not) were recorded for seed collection.

Photos:

- Forty two photos of plot sites and in-channel structures were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July, 5th, 8th thru 11th, 17th & 18th, 2002. Ambient air temperature was between 19.5°C & 36.6°C (67.1° F & 97.9° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Transportation corridor, Commercial, Residential, Un-developed and Public/Park on the north and east sides. Land uses consist of Residential, Commercial, Transportation corridor, Industrial, and Un-developed on the south and west sides.
- Mostly non-impinged then partial and full impingements by fences, asphalt roads, bridge abutments, barricades, guard rails, buildings and asphalt parking lots on the north and east sides. On the south and west side it is mostly fully impinged then partial to non-impinged by asphalt bike paths, bridge abutments, fences, asphalt roads, barricades, and a building.

Water/Bank Profile details

- Water pH averaged 7.96 with a minimum of 6.5 and maximum of 9.0.
- Water temperature averaged 26.51° C with a minimum of 16.8° C and a maximum of 42.1° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from ¼ to flowing full, average is ¾ flowing.
- Algae and algae color ranged from some present to abundant, mostly moderately abundant and green and brown/green in color.
- Channel profile is ponded to U-shaped with U-shaped and rectangle in-between. Bank slopes are between 17% and 91% with an average of 41.02%.
- Bed material consists primarily of cobble, gravel and silt/sand/clay. One reach is concrete.
- Culverts, weirs, concrete drops, concrete directional walls, fences, wastewater pipe conduit, footbridge and splash pads were recorded as in-channel structures.

Riparian Profile details

- Plant community of mostly grass/field then mixed and hardwood. One each that is conifer, dominated by invasive specie and brush/shrub/scrub.
- Dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass) and *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry) and *Dipsacus fullonum* (Teasel).

- Invasive plant species listed as present: *Dipsacus fullonum* (Teasel), *Solanum dulcamara* (Nightshade), *Phalaris arundinacea* (Reed Canary-grass), *Festuca arundinacea* (Tall Fescue), *Rubus armeniacus* (Armenian Blackberry), *Cytisus scoparius* (Scotch Broom), *Mentha pulegium* (Pennyroyal), and *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Convolvulus sp.* (Morning Glory/Bindweed), *Phalaris aquatica* (Harding grass), *Hedera helix* (English Ivy), and *Rubus laciniatus* (Evergreen Blackberry).
- Nutria and bullfrogs were recorded as invasive animals/amphibian observed.
- Excessive tunneling, undercutting of banks, eating of vegetation to the point of bare banks were recorded as damage by invasive animals/amphibian.
- Great blue heron, ducks, Belted Kingfisher, small minnows, Common Yellow Throat, Raccoons, Mallards and Lazuli Bunting were recorded as wildlife observed.
- Nutria scat and nutria burrows were recorded as wildlife evidence observed.
- *Epilobium densiflorum* (Dense spike-primrose), *Juncus effuses* (Common rush), and *Myosotis laxa* (Small-flowered forget-me-not) were recorded for seed collection.
- Riparian buffer enhancement, neighborhood education, and culvert retrofit/replacement were recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.7
Water Appearance	7.5
Nutrient Enrichment	5.8
Bank Stability	7.7
Canopy Density/Cover	2.6
Invasive Damage – P	3.8
Invasive Damage – A/A	7.3
Waste Presence	8.6
Barriers to Fish (SBW)	8.2
Insect/Invert Habitat (SBW)	7.3
In-stream Fish Cover (SBW)	3.3

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.8 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Health Rating definitions)

Actions

The scoring averages reveal that channel condition (1.7), canopy density/cover (2.6), damage by invasive plants (3.8) and in-stream fish cover (SBW) (3.3) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

Channel condition (1.7)

- Poor channel conditions are due to over-channelization, producing steep banks, and close location to roadway. Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- Another reason for a low rating is one reach that is made of concrete. Investigate options to remove the concrete and restore the channel to a more natural environment.

Canopy density/cover (2.6)

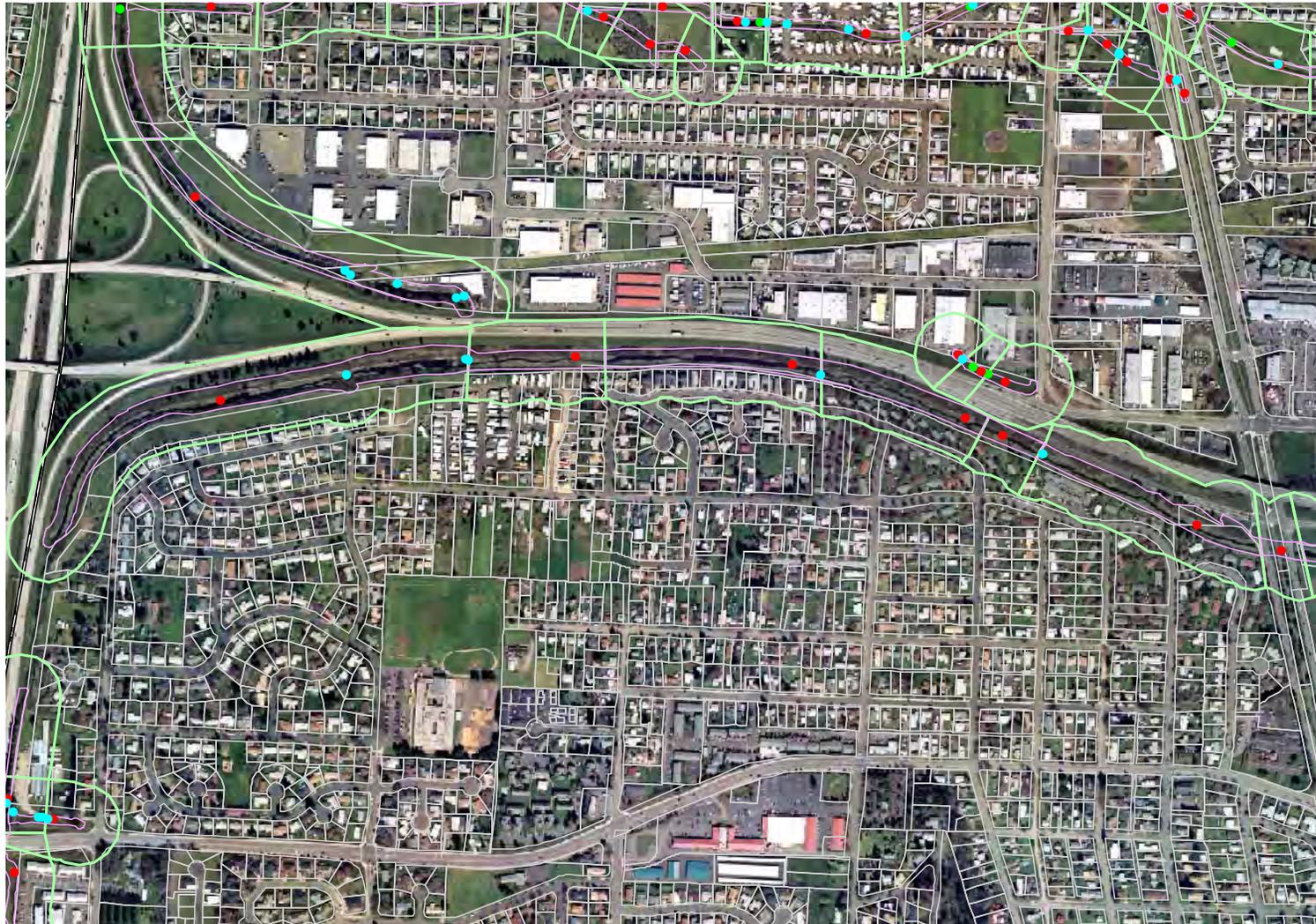
Damage by invasive plants (3.8)

In-stream fish cover (SBW) (3.3)

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover.

In-general

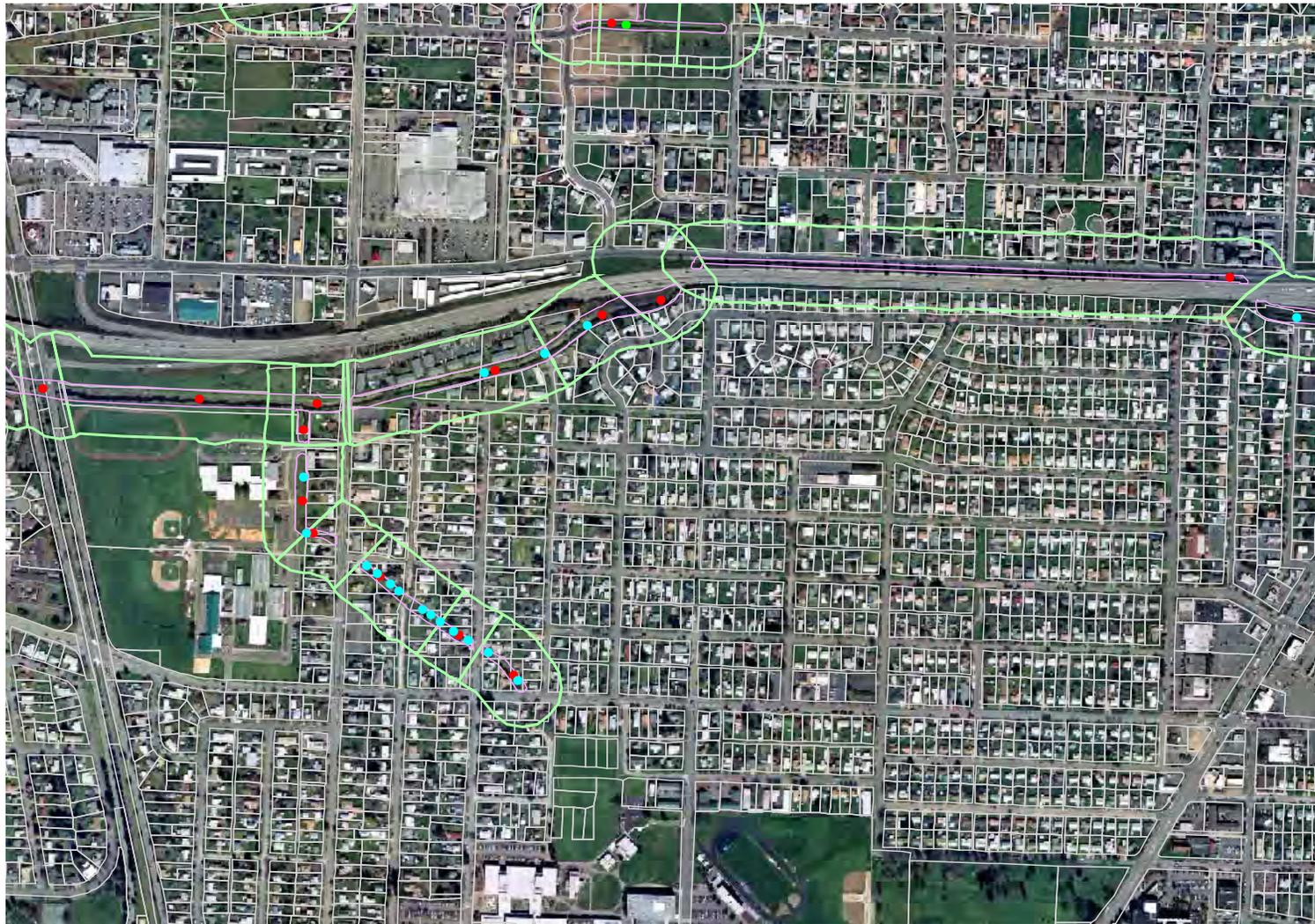
- Review which reaches require neighborhood education and target those areas for door hangers addressing yard debris, herbicide use and animal waste.
- Develop a program for nutria control/removal from the system.
- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



- | | |
|------------------------|----------------------|
| Waypoints | 10ft_riparian_buffer |
| • Plot | 200ft_landuse_buffer |
| • Seed Collection Site | tax lots |
| • In Channel Structure | |

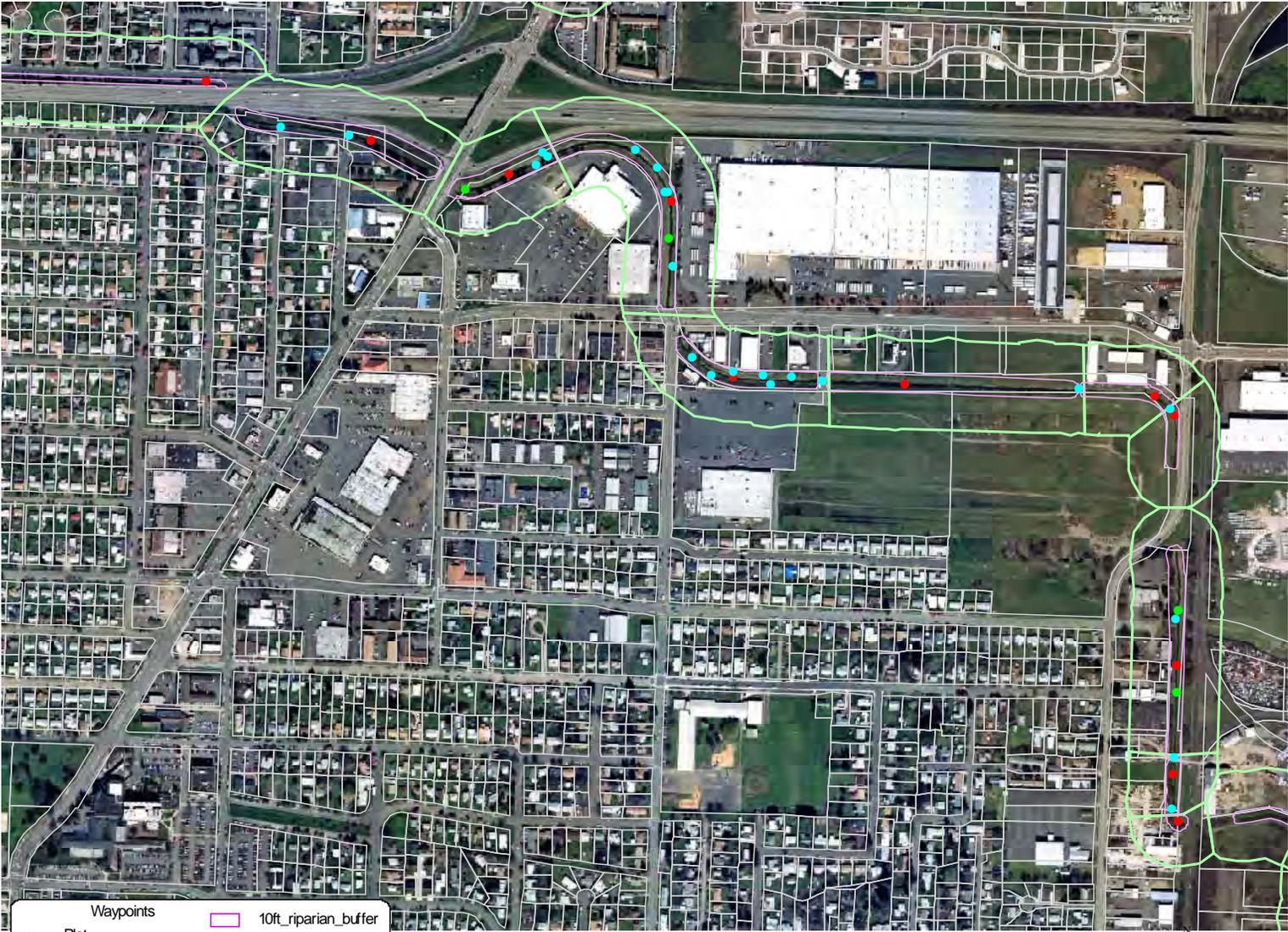
Q St Floodway - Between I-5 & PPW





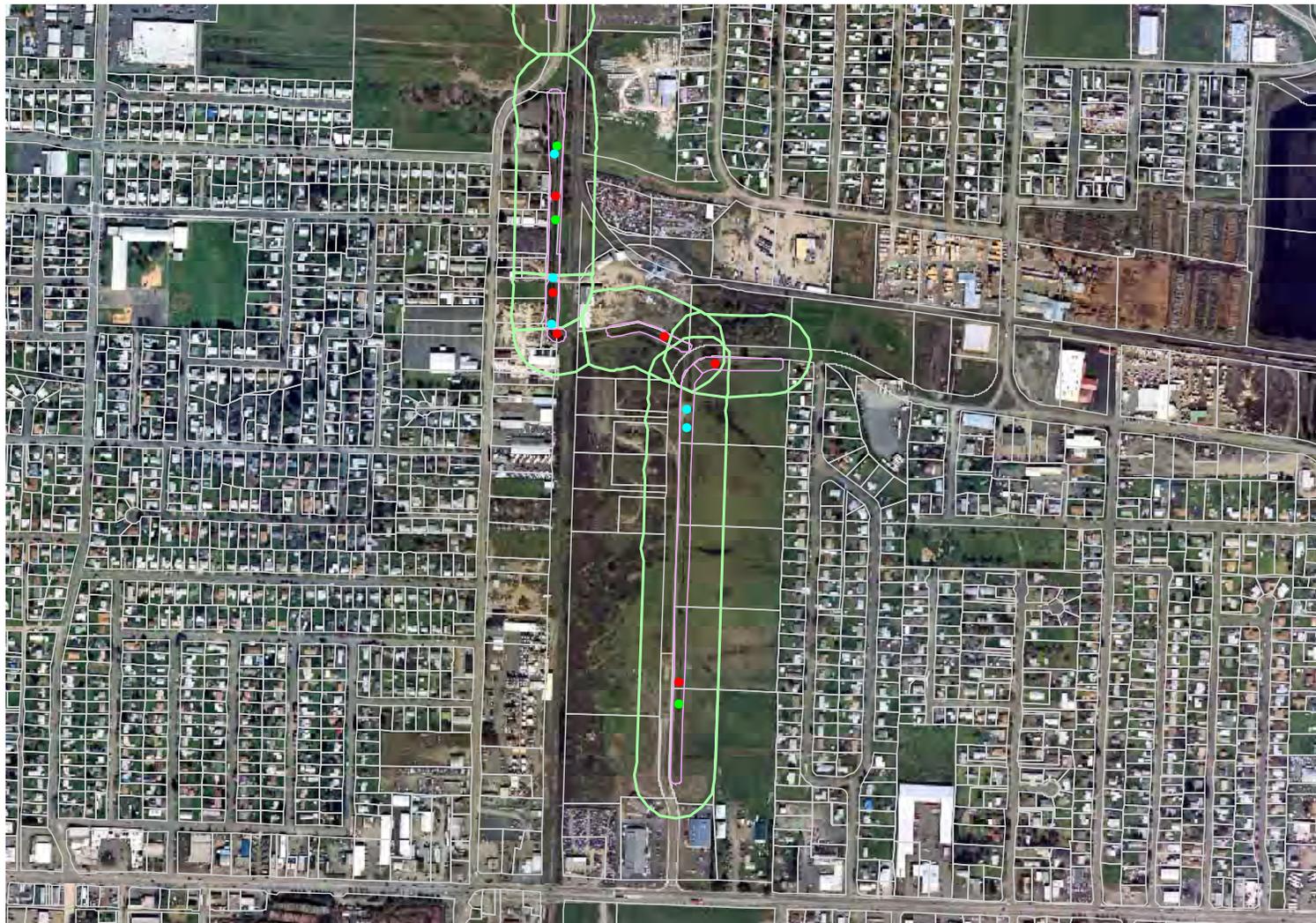
Q St Floodway - Between PPW & 15th st



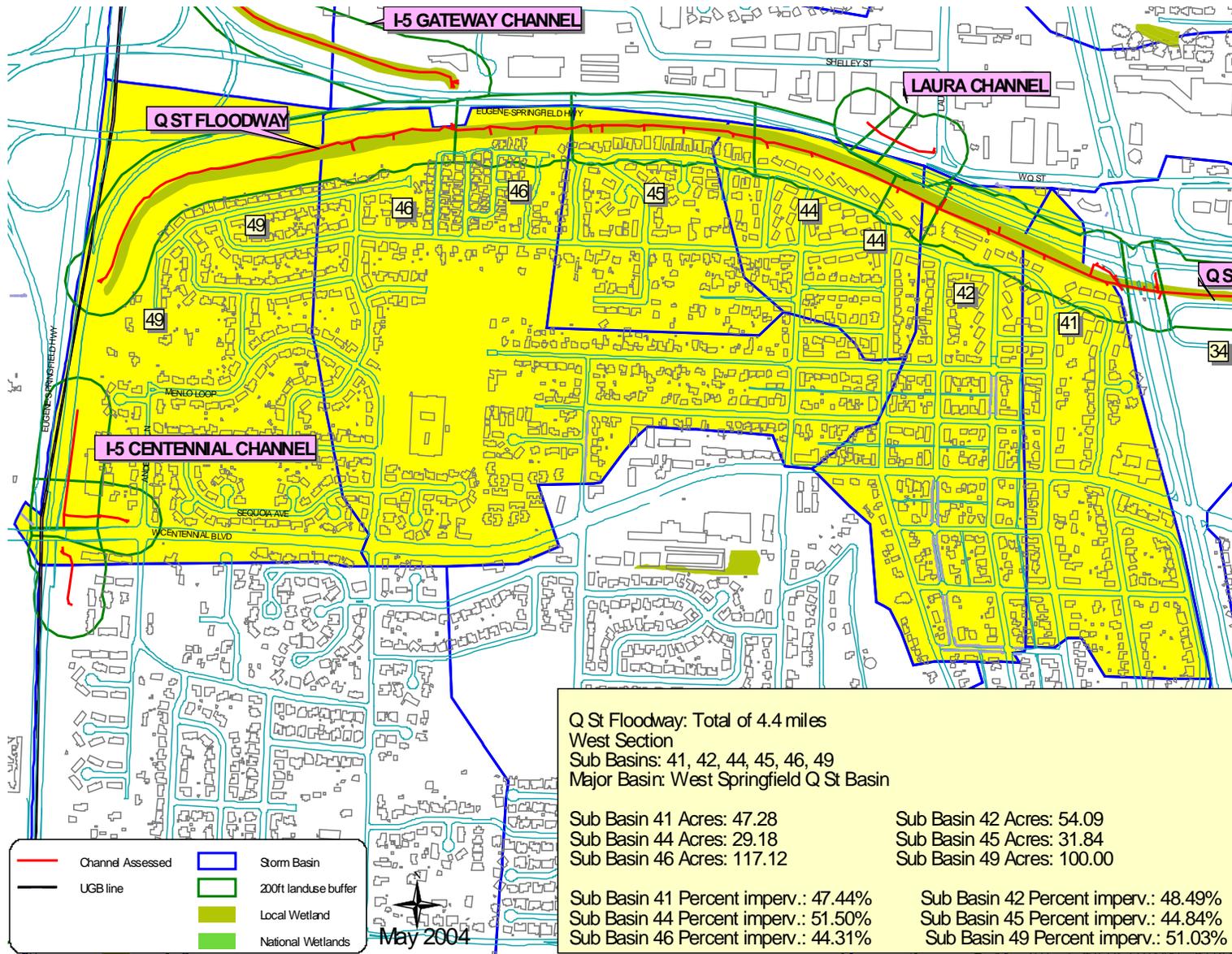


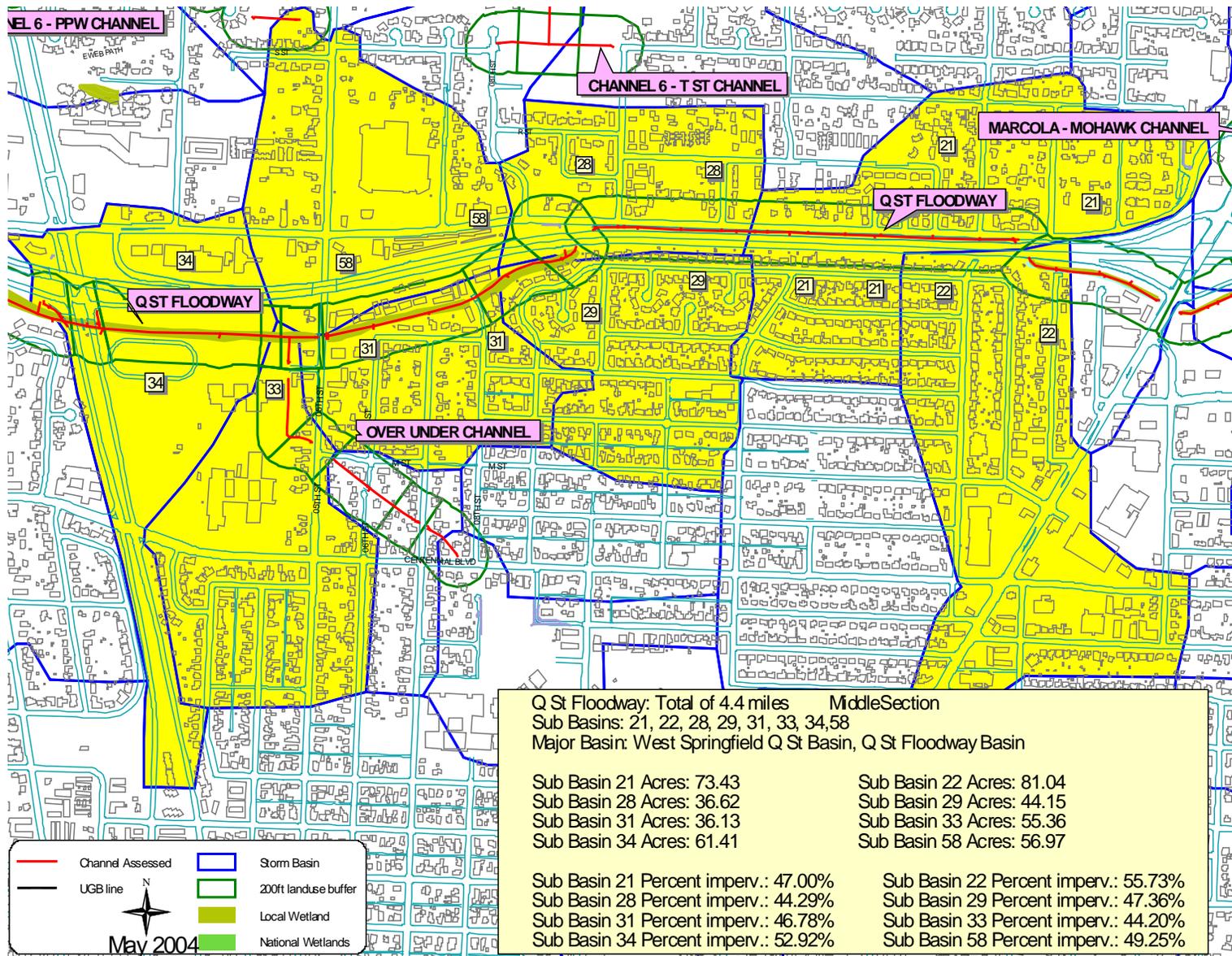
Q St Floodway - between 15th and 28th

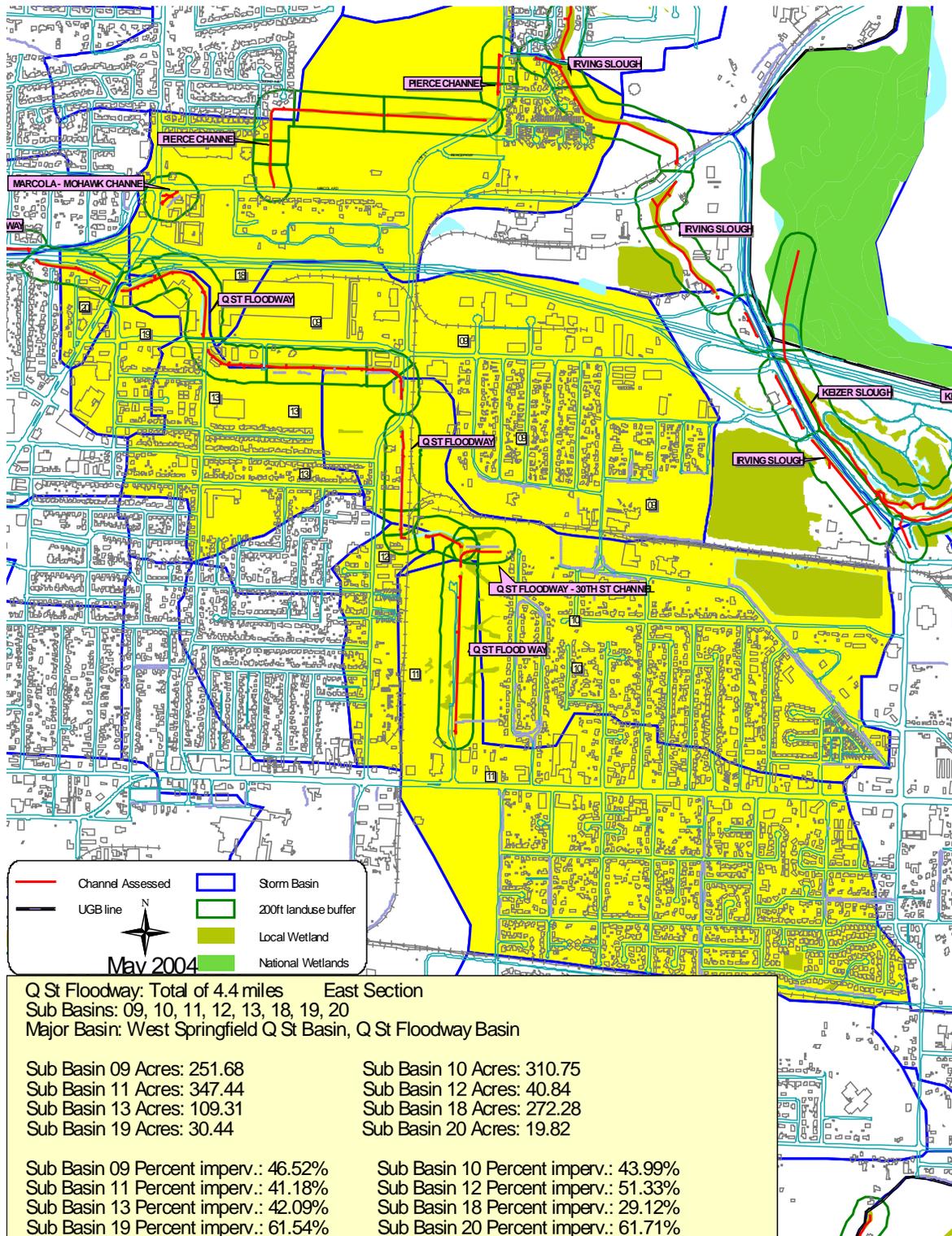
North arrow symbol and "No scale"



Q St Floodway - Between 28th & Main St  No scale







Appendix II - Q St Floodway - 30th Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

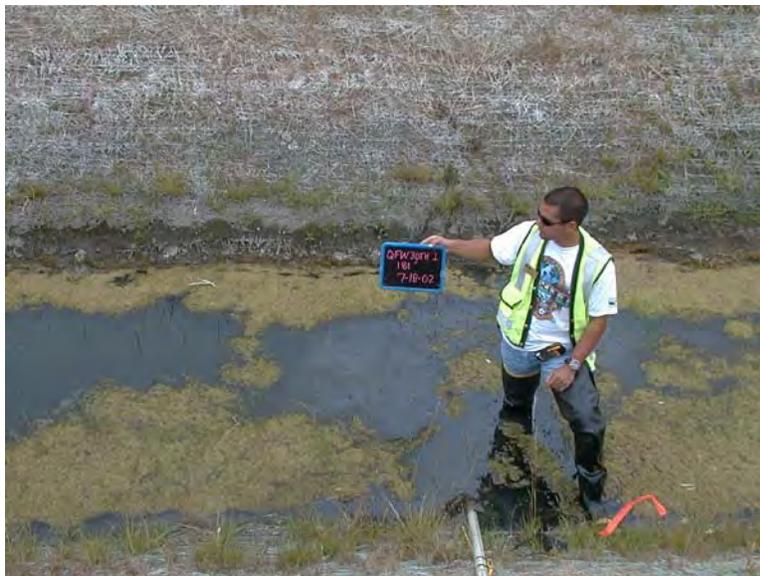
Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Q St Floodway – 30th St Channel is a tributary to the Q St Floodway. It starts east of 30th St north of Main St and at the end of 30th St. It flows west to intersect with the Q St Floodway at 30th St. This channel had just been reconstructed under city project P30176 at the time of the assessment.

It receives flow from stormwater runoff, industrial runoff and flows through a wetland. The channel is approximately 0.08 miles long



Findings/Conclusions

Data outcome:

- Consists of one (1) reach.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 4.89 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- One photo of a plot site was taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 18th, 2002. Ambient air temperature was at 24.9°C (76.8° F), which dictates a rating of sunny & hot for weather condition.
- Land use consists of Un-developed on both sides.
- The north side has a sidewalk recorded as a full impingement.

Water/Bank Profile details

- Water pH at 7.4.
- Water temperature at 16.4.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel was recorded at 1/2 flow.
- Algae and algae color were recorded as abundant and green in color.
- Channel profile is V-shaped and bank slopes are between 45% and 59% with an average of 52%.
- Bed material consists primarily of gravel.
- No in-channel structures were recorded.

Riparian Profile details

- Plant community of grass/field.
- No dominant invasive plant species recorded. *Note:* this channel was just lined with a grass seed mat.
- No co-dominant invasive plant species recorded. *Note:* this channel was just lined with a grass seed mat.
- No invasive plant species listed as present. *Note:* this channel was just lined with a grass seed mat.
- No others invasive plant species observed in the system. *Note:* this channel was just lined with a grass seed mat.
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No plant species were identified for seed collection.
- Bank stabilization was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.0
Water Appearance	1.0
Nutrient Enrichment	1.0
Bank Stability	5.0
Canopy Density/Cover	1.0
Invasive Damage – P	10.0
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
4.9 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.0), water appearance (1.0), nutrient enrichment (1.0) and canopy density/cover (1.0) received the lowest rating (below mid scale). Perform an evaluation to assess what may be done to improve these four factors.

Channel condition (1.0)

- This channel was just constructed and is a very straight channel. The rip rap banks had no growth and the banks were unstable at the time of assessment. It too early to determine if this will be a continuing problem.

Water appearance (1.0)

Nutrient enrichment (1.0)

- The water appearance and nutrient enrichment is because the channel was just constructed and is adjacent to an agricultural field. There is no grass or vegetation growing in the seed mat as of this assessment. It too early to determine if this will be a continuing problem.

Canopy density/cover (1.0)

- This channel was just lined with a grass seed mat. If a native plant planting project was not incorporated into the construction project, a native tree or shrub planting activity should take place to establish some native plant growth before the invasive plants can form monocultures.
- Develop and perform maintenance activity for invasive species eradication; use *City of Springfield Invasive Plants List* as a guide.
- Add to mowing and other maintenance activities.

In-general

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.
- No dominant or co-dominant plant species were listed because the area consists mostly of non-native agricultural grasses.

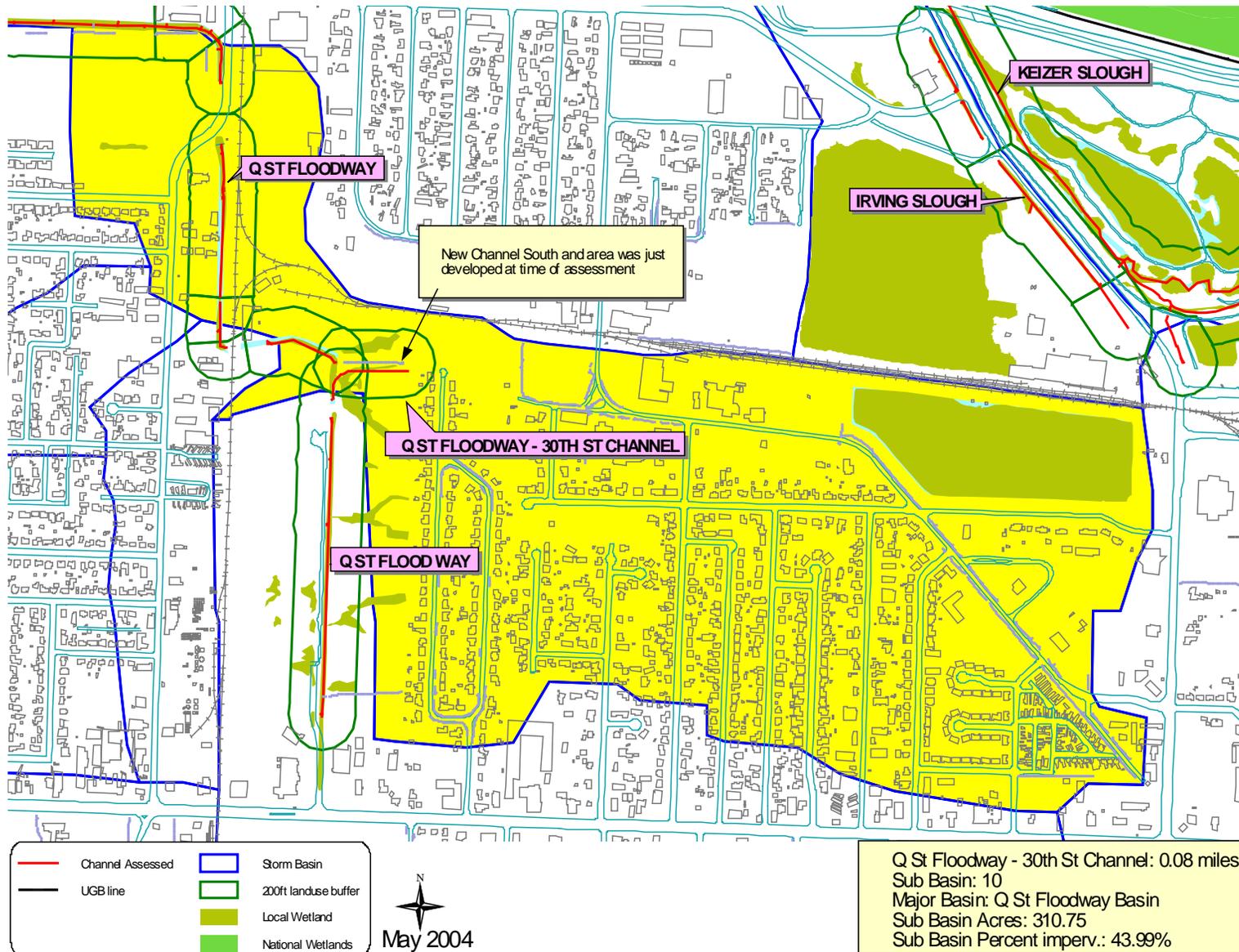


This channel was not constructed when this photo was taken

Waypoints	10ft_riparian_buffer
• Plot	200ft_landuse_buffer
• Seed Collection Site	tax lots
• In Channel Structure	

Q St Floodway - 30th St Channel





Appendix JJ - Riverview - Augusta Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Riverview – Augusta Channel is a tributary to the Glenwood Slough. It starts on the east side of I-5 southwest of Judkins Rd behind the current Pepsi Cola facility. It flows northwest to intersect with the Glenwood Slough after going under the railroad tracks.

It receives flows from stormwater runoff from industrial and commercial sites, both from within Glenwood and from adjacent land in Eugene. It is also fed by an underground spring. The channel enters Eugene's jurisdiction under the I-5 Bridge before emptying to the Willamette River. It is approximately 0.42 miles long.



Findings/Conclusions

Data outcome:

- Consists of five (5) reaches.
- Listed as a Springfield WQLW Tributary. System is <1000cfs, requires a site plan review for property within 100' and has a riparian corridor of 50'.
- The averaged overall health rating for this system is 6.3 which is a rating of fair. (6.1 – 7.4 = Fair).

Seed Collection outcome:

- *Camassia quamash* (Common camas) and *Juncus pantens* (Spreading rush) were recorded for seed collection.

Photos:

- Three photos of plot sites taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed May 30th, 31st, & June 7th, 2002. Ambient air temperature was between 20.1°C & 31.6°C (68.1° F & 89° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of a Transportation corridor on the west and south sides, Undeveloped and a Utility corridor on the east and north sides.
- There are no impingements on either side.

Water/Bank Profile details

- Water pH: 1 dry – 1 stagnant - 3 reaches averaged 7.4 with a minimum of 7.3 and maximum of 7.7.
- Water temperature: 1 reaches dry – 1 stagnant - 3 reaches averaged 14.8° C with a minimum of 13.8° C and a maximum of 15.7° C.
 - *Note:* Optimal is 13°C to 20°C, lethal is >25° C and TMDL standard is 17.8°C.
- Water level/movement in relation to active channel ranged from dry to ½ flowing.
- No algae were recorded for the system.
- Channel profile is ponded to U-shaped with U-shape and V-shaped intermittent. Bank slopes are between 35% and 267% with an average of 83%.
- Bed material consists primarily of silt/sand/clay and ending in gravel.
- A bridge abutment was recorded as an in-channel structure.

Riparian Profile details

- Plant community of grass/field, two of hardwoods and one of a brush/shrub/scrub.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry), *Holcus lanatus* (Velvet Grass), and *Rubus laciniatus* (Evergreen Blackberry).
- Co-dominant invasive plant species: *Solanum dulcamara* (Nightshade) and *Cytisus scoparius* (Scotch Broom).
- Invasive plant species listed as present: *Solanum dulcamara* (Nightshade), *Convolvulus sp.* (Morning Glory/Bindweed), *Parentucellia viscosa* (Parentucellia), and *Rubus laciniatus* (Evergreen Blackberry).
- No other invasive plant species observed in the system.
- Nutria was recorded as invasive animals/amphibian observed.
- No damage by invasive animals/amphibian was recorded.
- No wildlife other than nutria was observed.
- Animal paths were recorded for wildlife evidence.

- *Camassia quamash* (Common camas) and *Juncus pantens* (Spreading rush) were recorded for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	5.0
Water Appearance	7.5
Nutrient Enrichment	2.0
Bank Stability	7.4
Canopy Density/Cover	6.0
Invasive Damage – P	2.8
Invasive Damage – A/A	10.0
Waste Presence	7.0
Barriers to Fish (SBW)	10.0
Insect/Invert Habitat (SBW)	4.0
In-stream Fish Cover (SBW)	3.0

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
6.3 = Fair

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Health Rating definitions)

Actions

The scoring averages reveal that nutrient enrichment (2.0), insect/invert habitat (SBW) (4.0), in-stream fish cover (SBW) (3.0) and damage by invasive plants (2.8) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these four factors.

- Damage by invasive plants (2.8)*
- Insect/invert habitat (SBW) (4.0)*
- In-stream fish cover (SBW) (3.0)*

- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent. This will also aid in providing in-stream fish cover. Investigate outreach to private land owners to accomplish plantings, because of private land ownership and maintenance of the channel.

Nutrient Enrichment (2.0)

- Perform an impact assessment to determine what may be causing the nutrient enrichment in this system.

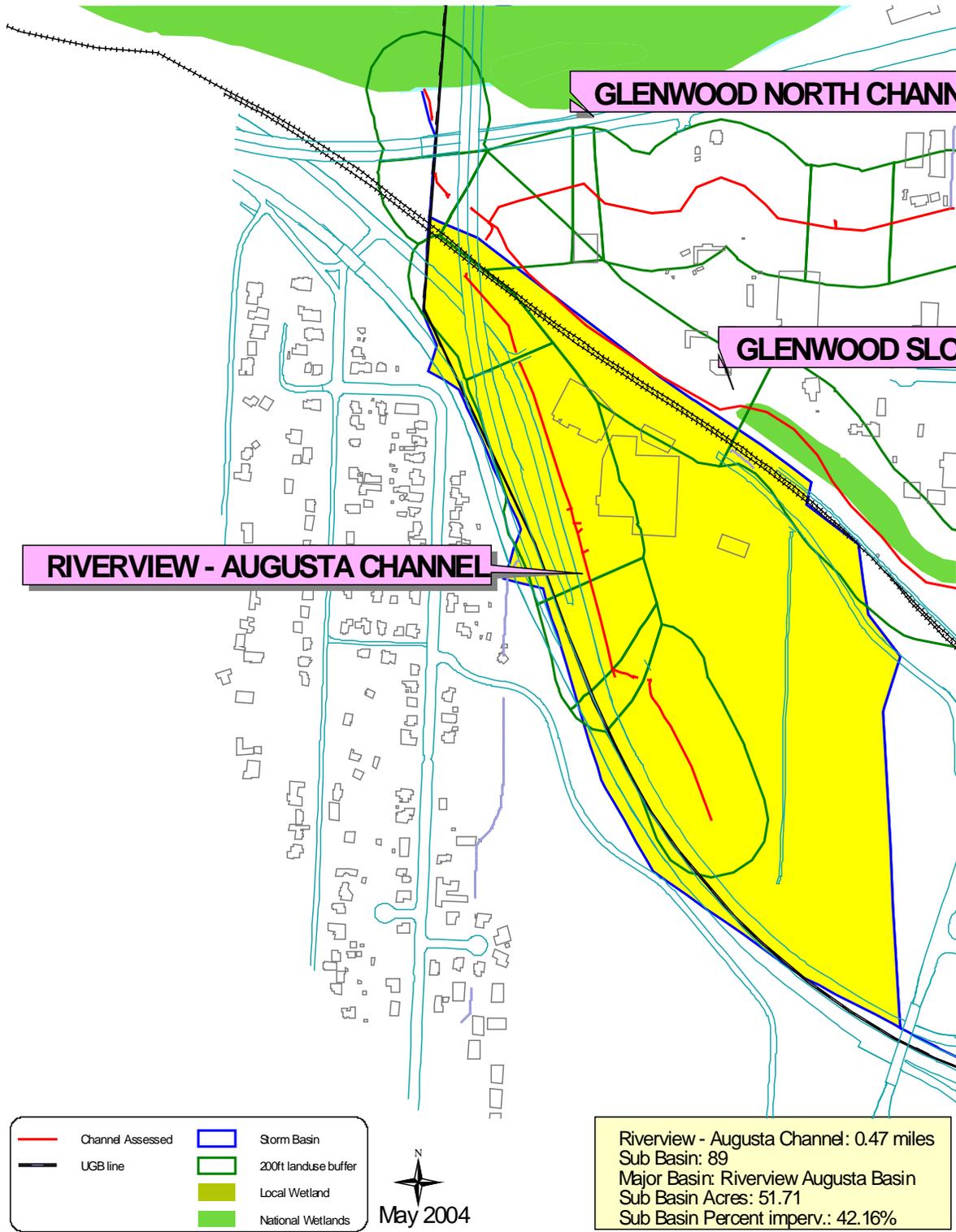
In-general

- Add to maintenance activity list and continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- This system is in Glenwood and flows through private properties. Investigate this waterway more to gather information on the water quality and quantity coming from the Eugene side of the system.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints	10ft_riparian_buffer
• Plot	200ft_landuse_buffer
• Seed Collection Site	tax lots
• In Channel Structure	

Riverview - Augusta Channel  No scale



Appendix KK - River Glen Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

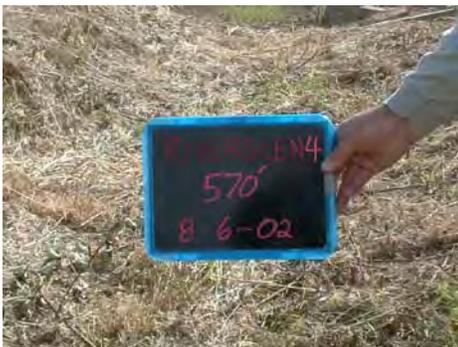
Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

The River Glen Channel is a tributary to the McKenzie River. It starts west of Harvest Ln. north of Delrose Dr. It flows northwest to the river.

It receives flow from stormwater runoff. The channel is approximately 0.43 miles long.



Findings/Conclusions

Data outcome:

- Consists of four (4) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall rating for this system is 5.6 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Four photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed August 6th, 2002. Ambient air temperature was between 15°C & 21.4°C (59° F & 70.5° F), which dictates a rating of mild & dry to sunny & hot for weather condition.
- Land uses consist of Agriculture on the north and Residential on the south side.
- Fences and concrete were recorded as partial to full impingements.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature was recorded.
- System was dry no water level/movement in relation to active channel was recorded.
- System was dry no algae or algae color recorded.
- Channel profile is mostly U-shaped with ponded areas in between. Bank slopes are between 5% and 50% with an average of 24.75%.
- Bed material consists primarily of silt/sand/clay.
- Irrigation pipe, a footbridge, fences and culverts were recorded as in-channel structures.

Riparian Profile details

- Plant community of non-vegetated/developed, and dominated by invasive species.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Phalaris arundinacea* (Reed Canary-grass).
- Invasive plant species listed as present: *Phalaris arundinacea* (Reed Canary-grass) and *Holcus lanatus* (Velvet Grass).
- Others invasive plant species observed in the system: *Solanum dulcamara* (Nightshade), *Convolvulus sp.* (Morning Glory/Bindweed), and *Dipsacus fullonum* (Teasel).
- No invasive animals/amphibian was recorded.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No pant species were identified for seed collection.
- Riparian buffer enhancement was recorded for project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	1.0
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	3.5
Canopy Density/Cover	1.3
Invasive Damage – P	7.8
Invasive Damage – A/A	10.0
Waste Presence	10.0
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
5.6 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that channel condition (1.0), bank stability (3.5) and canopy density/cover (1.3) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these three factors.

Channel condition (1.0)

- Develop a training and awareness program with maintenance staff to broaden their understanding of channel conditions and erosion concerns related to maintenance practices of cleaning and contouring open channels.
- This system has not received any routine maintenance by City of Springfield crews as of this writing.

Bank stability (3.5)

Canopy density/cover (1.3)

- Bank stability problems are due to over-channelization, producing steep banks, in close proximity to residential back yards. Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.
- After development of educational handouts, distribute door to door along waterways for the public regarding native and invasive plants.
- Evaluate planting native trees or shrubs along top of bank to provide shade to waterway and create a riparian buffer, and implement planting if significant benefits are apparent

In-general

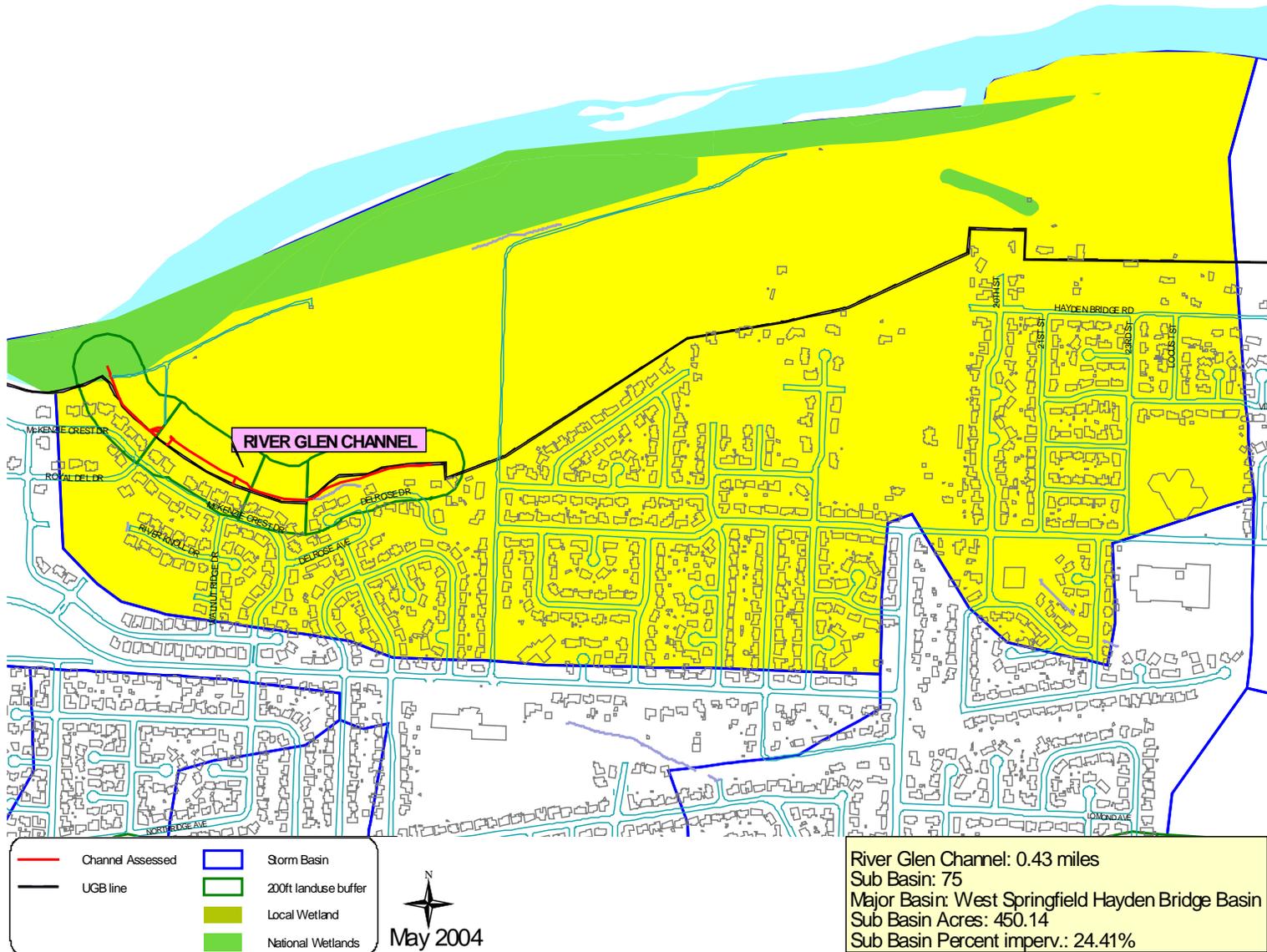
- Pesticide use was noted throughout system. This is an agriculture area closely adjoining a residential area, and so appropriate use of these materials is important. Research state and federal laws involving agricultural pesticide use in close proximity to residential areas, and ensure compliance if appropriate.
- Review which reaches require neighborhood education and target those areas for public outreach through door hangers addressing yard debris, herbicide use and animal waste.
- Develop a follow-up and evaluation process for tracking progress in addressing current public outreach activities. This follow-up and evaluation process can be used adaptively to modify or develop other outreach formats such as community/neighborhood/school work group projects for education, clean-up, improvement and restoration projects.
- Include this area for mowing and other routine maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



Waypoints		10ft_riparian_buffer
	Plot	200ft_landuse_buffer
	Seed Collection Site	tax lots
	In Channel Structure	

River Glen Channel





Appendix LL – Sports Way Channel

Overview

This appendix is part of the document *Inventory and Channel Assessment Report for Springfield Waterways*. Each appendix in this section addresses a particular system along with the findings and conclusions for that system.

The main document, *Inventory and Channel Assessment Report for Springfield Waterways* addresses the findings and conclusions for the City's waterways as a whole (a composite view of all the City's waterways). Refer to the main document to inquire about City-wide findings, recommendations, and conclusions.

Approach

Data consisting of the system/reach structure, water/bank profile, and riparian profile was gathered on a reach-by-reach basis. Each system was inspected in the field, using a standardized assessment technique and scoring methodology. Several aspects of each plot were subjectively scored from 1 to 10 (see table 4 in the main document) representing general waterway and riparian area health. This scoring was always based on the consensus of at least two observers. An overall health rating was derived from the scoring results. The health rating results return a condition of poor, fair, good or excellent for the reach.

The assessment used eight general scoring categories, plus three additional categories for systems designated as Salmonid Bearing Waters (SBW) by the state or listed as Water Quality Limited Watercourses (WQLW) by the City.

Site location

Sports Way Channel starts north of International Way and lies between International Way Court and Sports Way. It flows north to the Sports Way Soccer field parking lots and either absorbs into the ground or enters a piped system that has not been located. This system daylights again at the end of Sports Way and flows northwest into Maple Island Slough.

It receives flow from stormwater runoff. The channel is approximately 0.31 miles long.



Findings/Conclusions

Data outcome:

- Consists of four (4) reaches.
- Not listed as a SBW or a Springfield WQLW system.
- The averaged overall health rating for this system is 3.4 which is a rating of poor. (<6.0 = Poor).

Seed Collection outcome:

- No seed collection was recorded for this system.

Photos:

- Two photos of plot sites were taken.

All of the *details* listed below are *averages* derived from the evaluation and scoring of each reach.

System and Reach details

- Assessment performed July 21st, 2003. Ambient air temperature was between 32.4°C & 34.9°C (90.3° F & 94.8° F), which dictates a rating of sunny & hot for weather condition.
- Land uses consist of Undeveloped and Public Park on the north and west sides with Undeveloped on the south and east sides.
- Mostly non-impinged on the north and west sides with section of Partial and full impingements consisting of fences and an asphalt parking lot The south side is non-impinged.

Water/Bank Profile details

- System was dry at the time of assessment, no water pH, or temperature was recorded.
- System was dry; no water level/movement in relation to active channel was recorded.
- System was dry; no algae or algae color recorded.
- Channel profile is Ponded and U-shaped. Bank slopes are between 22% and 88% with an average of 51.8%.
- Bed material consists primarily of silt/sand/clay.
- In the two reaches that were accessible, a grouping of large trees was recorded in one reach as an in-channel structure.

Riparian Profile details

- Plant community consisting of hardwoods with one reach being dominated by invasives.
- Dominant invasive plant species: *Rubus armeniacus* (Armenian Blackberry).
- Co-dominant invasive plant species: *Convolvulus sp.* (Morning Glory/Bindweed)
- Invasive plant species listed as present: *Dipsacus fullonum* (Teasel).
- Others invasive plant species observed in the system: *Dipsacus fullonum* (Teasel).
- No invasive animals/amphibian was observed.
- No damage by invasive animals/amphibian was recorded.
- No wildlife was observed.
- No wildlife evidence was recorded.
- No pant species were identified for seed collection.
- Riparian buffer enhancement was recorded most often with one Neighborhood education listed as project opportunities.

Scoring and Overall Health rating details

Averages for the system are listed below. Criteria averages were derived by adding each criteria score together and dividing it by the number of reaches. Overall health rating averages were derived by adding each health rating for each reach together then dividing it by the number of reaches.

Scored Criteria	Criteria Averages on a Scale of 1 to 10
Channel Condition	5.5
Water Appearance	0 dry
Nutrient Enrichment	0 dry
Bank Stability	5.5
Canopy Density/Cover	9.5
Invasive Damage – P	1.5
Invasive Damage – A/A	9.0
Waste Presence	3.5
Barriers to Fish (SBW)	0 N/A
Insect/Invert Habitat (SBW)	0 N/A
In-stream Fish Cover (SBW)	0 N/A

(See table 4 in the main document for scale definitions)

Average Overall Health Rating
3.4 = Poor

Health Rating Scale
<6.0 = Poor
6.1 – 7.4 = Fair
7.5 – 8.9 = Good
>9.0 = Excellent

(See the section “Scoring and Rating” Methodology” in the main document for Heath Rating definitions)

Actions

The scoring averages reveal that damage by invasive plants (1.5) and waste presence (3.5) received the lowest rating (below mid-scale). Perform ‘Impact Assessments’ (see main document under ‘Actions’ for definition) to assess what may be done to improve these two factors.

Damage by invasive plants (1.5)

- This system has not been managed by City of Springfield as of this writing. Add to mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Develop a training and awareness program with maintenance staff on identifying invasive plant species. Once developed use BMPs for eradication of various common species.
- Once developed use the priority list for maintenance when targeting species for herbicide use and/or hand removal programs. Use *City of Springfield Invasive Plants List* as a guide.

Waste presence (3.5)

- This system flows through a soccer ball field and park where there is a lot of human activity. Garbage is and has been collecting in the system. Some homeless camp activity is also seen in the area and should be removed and cleaned up.

In-general

- The Park Service or Kids Sports Maintenance crews are dumping lawn clippings and yard waste into a reach - suggest educating or posting for proper handling of yard waste.
- Parts of this system were not clear as to how it drains, or flows. Determine if this system enters a piped system at the Sports Way parking lots or if it absorbs into the ground.
- This system is very overgrown with blackberries causing access problems. Suggest a large scale mowing activity take place to open the area up for future access and assessments. Only two out of four reaches were accessible.

- Continue mowing and other maintenance activities. Concentrate more effort on blackberry eradication that can promote native plant growth.
- Perform another channel assessment to measure progress (or lack of progress). Schedule assessments to be performed earlier in the season to obtain water quality data.
- Incorporate impact assessments to obtain a complete unified stream assessment.



