Strategies and Recommendations for Modifications to City of Eugene Practices

Resulting from
Review of City of Eugene Activities
For
Potential to Affect the Natural Environment
CH2M Hill, March 2001

Introduction

In October 2000, the City hired CH2M Hill, a consulting company, to perform a review of the City's practices and activities, and their associated *potential* to affect the environment. The final report *"Review of City of Eugene Activities for Potential to Affect the Natural Environment"* was released in March 2001.

This assessment of City activities and their associated environmental impacts is an internal assessment only, and is not a comparison of City activities with any other City or organization, nor is it a comparison with any baseline or standard. The environmental impacts of the City's activities have been assessed, ranked in order of the *potential* magnitude of the environmental impact, and put into several classes. There is therefore a range of impacts, from the most negative to the most positive. It is important to note that this range is not directly comparable to any other range of environmental impacts. A City activity ranked in the class of having highest *potential* to negatively impact the environment does not imply that the activity is illegal, or is not being conducted in an appropriately environmentally protective way. In fact, many activities in the higher classes are being conducted to reduce or mitigate an otherwise larger existing environmental impact.

The environmental review project was managed by the City's Environmental Review Team, under the direction of the City's Environmental Policy Team. The Environmental Policy Team (EPT) was established in 1999 to provide oversight and establish direction for the City's environmental programs and performance. The EPT formed the Environmental Review Team (ERT) and charged it with conducting an evaluation of the environmental impact of the City's activities, and providing recommendations for necessary modifications to the City's practices. The EPT also formed the Endangered Species Act/Salmon Team (ESAST) to identify the requirements of the ESA that are applicable to City services and functions, and assess the impacts of the requirements on those services and functions. The ERT and ESAST worked with CH2M Hill during the assessment, providing information and comments to the consultant.

Review Findings

Please refer to the report "Review of City of Eugene Activities for Potential to Affect the Natural Environment" by CH2M Hill, March 2001 for details on how the assessment was conducted.

Activities are ranked in five different categories:

- **Overall environmental impact**, which includes consideration of all environmental media, such as natural resource and power consumption, waste generation, water flow variations, contaminants or toxics, riparian habitat alteration, and air quality alteration.
- **Impact on habitats**, which includes water flow and quality, aquatic, riparian, upland habitat effects.
- **ESA Relevance – Salmon**. This category ranks activities for their *potential* to affect chinook salmon.
- **ESA Relevance – Other aquatic species**. This category ranks activities for their *potential* to affect aquatic species other than salmon, such as Oregon chub, western pond turtle.
- **ESA Relevance – Terrestrial species**. This category ranks activities for their *potential* to affect terrestrial or land-using species.

As the report clearly points out, almost all activities that the City conducts have some environmental impact. Some of these activities, such as driving vehicles, occupying building space, and landscaping, are also performed by the city's residents. The report is intended to highlight those City activities that have the greatest *potential* to impact the environment, so that the City can undertake an evaluation of these activities, determine if any changes in the way

the activities are conducted is advisable, and include these changes in operational work plans and budgets.

In most cases, the environmental impact of the activity itself is what is being assessed – for example, vehicle use. In some cases, the activity also produces a lingering environmental impact – for example, for construction of streets, there is an impact from the construction activities, but also the finished street continues to have an impact as an impervious surface generating runoff. In these cases the continuing impact is included in the assessment.

The report also has an educational component for the community. As previously stated, many of the activities which have been assessed are also carried out by other organizations, businesses, and individuals in the community. To the extent that this analysis points out the environmental impacts of these activities, this may lead to behavior changes in the community.

The assessment ranks the environmental impacts of the City's activities into the following impact classes:

Activities with *highest potential to negatively* affect the natural environment, listed species, or their habitats	**-V**
Activities with *high potential to negatively* affect the natural environment, listed species, or their habitats	**-IV**
Activities with *moderate-to-high potential to negatively* affect the natural environment, listed species, or their habitats	**-III**
Activities with *low-to-moderate potential to negatively* affect the natural environment, listed species, or their habitats	**-II**
Activities with *very low or no potential* *to* affect the natural environment, listed species, or their habitats	**I**
Activities with *low-to-moderate potential to positively* affect the natural environment, listed species, or their habitats	**+II**
Activities with *moderate-to-high potential to positively* affect the natural environment, listed species, or their habitats	**+III**
Activities with *high potential to positively* affect the natural environment, listed species, or their habitats	**+IV**
Activities with *highest potential to positively* affect the natural environment, listed species, or their habitats	**+V**

In May 2001, the Environmental Review Team prepared a document *"Background and Additional Information to Accompany Review of City of Eugene Activities for Potential to Affect the Natural Environment, CH2M Hill, March 2001"* which provided details on the City activities which were rated in the highest rated classes for both positive and negative effects for overall environmental impact, habitat effects, and relevance to ESA-listed species.

This document contains further information on follow-up activities developed by the Environmental Review Team in two categories. First, details on a series of inexpensive, easy and quick solution to implement changes to the way the city conducts some activities which are in process of being implemented; and second, an analysis of 16 activities which received a high rating (-IV or -V) in the CH2M Hill review for potential to negatively affect the environment, or received high rating for potential to negatively impact salmon habitats.

Recommendations for Inexpensive, Easy, and Quick Modifications to City Practices

The Environmental Review Team conducted a review of the complete list of activities and corresponding environmental impacts from the CH2M Hill review, with the goal of identifying any quick, easy, and inexpensive changes that could be made in the way the City conducts activities listed in the review to reduce the potential for a negative environmental impact or increase the potential for a positive impact. The Team's initial list was refined through review from the Environmental Policy Team, resulting in the following list. The recommendations for change in several categories are included below, along with a progress report.

Landscape Maintenance

Work towards using Integrated Pest Management principles and practices in all City-managed landscaping, including Fire, Airport, and Wastewater facilities. This may require a change in maintenance standards at some locations. Provide IPM training to staff as necessary.

> *In January 2002 over 60 City staff from several Divisions received an all-day training session on IPM principles and practices, led by Parks and Open Space Division staff.*

Implement a policy prohibiting planting of invasive species, and encouraging native species planting whenever practicable in City projects.

> *Parks and Open Space Division staff assisted by Planning Division staff are developing the language for an Administrative Order, which will include a list of invasive species, and information on native species. The intent of the Administrative Order will be implemented primarily through contract specifications.*

Pursue the use of the Maxicom computer system to manage all City irrigation where practicable.

> *Parks and Open Space staff, coordinating with Facilities Division staff, are developing a list of facilities where this technology is not in use. Cost estimates to implement system for areas on the list will then be developed for Environmental Policy Team review.*

Develop a management plan for animals (nutria, etc) destructive to restoration and other projects. Nutria are non-native animals that are very invasive into wetlands and streams. Although nutria are common in wetlands, they have not posed a problem to restoration projects. However, in Amazon Creek they have posed problems. Any plan to manage population levels will require a regional approach, and should include the US Army Corps of Engineers and ODFW. However, there may be some usefulness to localized management efforts for specific projects.

> *City Manager's Office staff will coordinate this with other animal management plans being developed. .*

Provide coordination for native plant nursery at the Wastewater Treatment Plant. The goal is to increase the capability of the nursery (in terms of production), improve ability to coordinate with volunteers, and provide City projects with useful plant materials.

> *Parks and Open Space Division has developed a Service Level Change Request (through Stormwater Funds) to get this funded at 0.5 FTE, plus additional materials and supplies. Included in FY03 budget.*

Vehicles

Develop a system to better match vehicle type to use. Have different types of readily available pool vehicles available to staff for different uses (long distance, around town).

> *Fleet Services have prepared a "Fleet Energy Management Plan" January 2002.*

Investigate the use of alternative fuels, lubricants, etc. in fleet vehicles. For example, converting diesel vehicles to bio-diesel, recycled oils, antifreeze, etc.

Included in Fleet Services' "Fleet Energy Management Plan" January 2002.

Develop and implement an intranet-based car pooling system

Development of an intranet-based car-pooling scheduler is included in the Web Coordinators Group work plan.

Encourage more work sites to have bicycles available for summer use. Current use of bicycles for City activities is sporadic, limited mostly to the wastewater treatment facility.

Under review by Public Works Transportation Division.

Streets

Establish one crew for all concrete saw cutting, and use new vacuum system to capture water. Currently there are 4 work crews that cut concrete. Only one crew has updated equipment to capture all the water.

Recommendation being reviewed by Public Works Maintenance.

Move towards the use of pervious concrete when practicable. Pervious concrete has been used on only one project in the City, at the PW/Maintenance yard. Questions remain about durability and functionality over time.

Testing continues on other projects, such as at 17th and Holly (near the new Skate Park at Cal Young Middle School).

Office

Adopt a City standard that all new printers and copiers should be capable of double-sided printing and copying. Incorporate environmentally friendly practices, such as double sided printing, into the training program for any new equipment. Develop City wide awareness program or mini-workshops for all city employees regarding environmentally friendly printing and copying practices. Include information on how staff can set their own print driver properties to default to duplex.

City Manager's Office will coordinate development of an Administrative Order.

Encourage staff to replace incandescent light with compact fluorescent light, and optimize the amount of light used in work spaces. Coordinate with other conservation efforts.

Administrative Order (21-01-04) provides the policy direction for this. Compact fluorescent light bulbs are now available, at no cost, for all task lighting.

Recycling

Implement better recycling program in public areas at airport.

Solid Waste and Recycling staff will make recommendations. On hold due to other priorities at Airport.

Implement consistent recycling programs (office and food waste) in all departments and facilities.

Solid Waste and Recycling staff will make recommendations. This may require an Administrative Order, combined with contract specifications for groups that rent City facilities.

Training

Implement a training program for City staff on environmental issues. Implement a regular series of "green tips" to be distributed to City staff by e-mail, and coordinate with other environmental e-mail messages.

City Manager's Office will coordinate with HRRS staff to develop and implement on-going training about environmental performance.

Capital projects

Examine the way projects are planned and funded to ensure adequate time to establish/maintain vegetation. Possibilities are including maintenance costs in project specifications, or including a second-year planting budget item.

Parks and Open Space, Facilities, and Engineering staff will discuss and report back to Environmental Policy Team.

Analysis of Activities Receiving a High Rating in CH2M Hill Review

The Environmental Review Team has coordinated an in-depth analysis of City activities which received a high rating in the CH2M Hill review for potential to negatively affect the environment, or received high rating for potential to negatively impact salmon or their habitats. The candidate activities for the analysis were those listed in the table below, with scores of -IV or -V in the two categories:

Function or Process	Operations or Facility	Activity	Overall Environmental Effects Class	ESA Relevance Category (Salmon)
Maintenance Operations	Stormwater collection system maintenance	Stormwater outfalls discharge	-V	-V
Fleet Services	General equipment and office use	Use of fleet vehicles	-V	
Transportation	Public works	Street/roadway construction and operation	-V	-V
Wastewater	Treatment Plant	Wastewater treatment and effluent discharge	-V	-V
Transportation	Public works	Parking areas construction and operation	-V	-V
General Services	General equipment and office use	Office space use	-IV	
General Services	Purchasing	City wide purchasing decisions and procurement	-IV	
General Services	General equipment and office use	Reprographics and copying	-IV	
Wastewater	Biosolids Management Facility	Lagoon operation and storage of biosolids	-IV	
Facilities Management	Energy management	HVAC system maintenance	-IV	
Library, Recreation, and Cultural Services	Swimming pool management	Swimming pool facility operation (Sheldon, Echo Hollow, Amazon)	-IV	
Maintenance operations	Street maintenance and sanitation	Street flushing	-IV	
General Services	General equipment and office use	Use and maintenance of computers, printers, and peripherals	-IV	
General Services	General equipment and office use	Use of office furniture, supplies, and equipment	-IV	
		Fire fighting (industrial /		

Fire and EMS	Field operations	commercial / multi-family units)		-V
Maintenance Operations	Stormwater collection system maintenance	Mowing of banks for open channel and ditch maintenance		-V
Maintenance Operations	Stormwater collection system maintenance	Tree and brush removal to maintain flow in channels		-IV
Maintenance Operations	Stormwater collection system maintenance	Culvert installation and maintenance		-IV
Maintenance Operations	Stormwater collection system maintenance	Unpaved road use and maintenance to access levees and ditches		-IV
Fire and EMS	Fire Stations	Fire vehicle washing		-IV
Wastewater	Treatment Plant	Extreme wet weather wastewater overflow events		-IV

The Environmental Review Team refined this list further by removing several activities:

- Stormwater outfalls discharge
- Wastewater treatment and effluent discharge
- Lagoon operation and storage of biosolids
- Extreme wet weather wastewater overflow events (which already receive substantial oversight and ongoing review and program improvement through the Stormwater Management Programs and the Wastewater programs).
- Fire vehicle washing was also removed from this priority list because this activity has been discussed at length in a separate Environmental Review Team process, and a strategy to retrofit fire stations with equipment to allow vehicle washing without impacting the stormwater system is being implemented.
- Use of fleet vehicles has been considered in the January 2002 Fleet Energy Management Plan. This left 15 activities.

From this list of 15 activities several were assigned for review to the Green Buildings Team:

- HVAC system maintenance
- Swimming pool facility maintenance
- Use of office furniture, supplies, and equipment
- Office space use

Review of the activities culvert installation and street/roadway construction and operation have been postponed.

The Environmental Review Team established work teams of staff “experts” to review the remaining selected activities, and make recommendations for modifications in City practices to reduce the potential for negative environmental impact. These teams have in most cases completed their reviews, and the recommendations are included below.

Activity: FIRE FIGHTING (INDUSTRIAL/COMMERCIAL/MULTI-FAMILY UNITS)

Description of Activity: Actual fighting of industrial/commercial/multi-family unit fires. Large fires with high potential for water discharges to stormwater, with potential runoff of chemicals, petroleum, contaminants. Post fire cleaning and decontamination of equipment. (CH2M Hill Report)

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -1 Water: -3	Solid Waste: -1 Stormwater: -3 Contaminants or Toxics: -3	Water Quality: -2 Groundwater: -1 Soils: -1 Aquatic Habitat: -1 Air Quality: +3 Aesthetics: -2

The potential environmental impacts resulting from fighting large fires are mostly due to the impact of the contaminated water runoff on the stormwater system and receiving waters.

Strategies to Reduce Potential Negative Environmental Effects

- No strategies or changes to modify the ways the actual fire fighting is conducted are being recommended.
- To respond to a variety of potential stormwater impacts resulting from spills and other events, the Public Works Maintenance Division operates an environmental spill response team, with a specially equipped vehicle. The dispatch protocol for this team has recently been modified. A timely response by this team to a large fire is regarded as critical to mitigating the environmental impacts resulting from the fire fighting.
- Since early notification of the spill response team is key to reducing the environmental impact from fire fighting, it is recommended that ways to reduce the response time be investigated and implemented. One potential strategy is to have appropriate maintenance personnel connected to the group paging system used by Fire.

Recommendations

Implement a system to ensure that Public Works Maintenance personnel are appropriately notified in the event of a large fire which may require mobilization of the spill response team.

Activity: **REPROGRAPHICS AND COPYING**

Description of Activity: Purchase, use, and maintenance of copiers and copier supplies. Reprographics services include paper use. (CH2M Hill Report)

Potential Environmental Effects

Potential Environmental Effects		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -3 Power: -2 Conservation: +1	Solid Waste: -2 Contaminants or Toxics: -1 Recycling: +1	

The potential environmental impacts from this activity are due to the consumption of paper involved in copying activities, and associated power use.

Strategies to Reduce Potential Negative Environmental Effects

- The Digital Output Project Plan being implemented by ISD has as one of its planned products "customer education program to lower costs, maximize technology, gain efficiencies, and lower environmental impact of document output."
- A key recommendation for this activity is staff education on use of copier equipment. All staff should receive training on use of copier equipment, duplex copying, etc.
- Reprographics staff will continue to evaluate more environmentally friendly paper products for use in copiers.

Recommendations

Ensure timely implementation of the Digital Output Project Plan. Continue to evaluate copier papers.

Activity: USE AND MAINTENANCE OF COMPUTERS, PRINTERS, AND PERIPHERALS.

Description of Activity: Purchase, use, and maintenance of computers, printers, and peripherals. Includes printer paper use. (CH2M Hill Report)

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -2 Power: -2 Conservation: +1	Solid Waste: -1 Contaminants or Toxics: -1 Recycling: +2	

Paper and power uses are the principle potential environmental impacts resulting from this activity.

Strategies to Reduce Potential Negative Environmental Effects

Recommendations for power use reductions addressed through Administrative Order No. 21-01-04 (July 2001). Flat screen monitors may also be a useful strategy.

Recommendations

Ensure that requirements of Administrative Order are implemented throughout the City organization. Continue to evaluate new equipment, such as flat screen monitors, for environmental benefits, and include in City inventory when cost effective.

Activity: **PARKING AREAS CONSTRUCTION AND OPERATION**

Description of Activity: Construction and operation of uncovered parking areas by the City at various City facilities. This activity accounts for construction of new parking areas, and operation effects of new and existing areas, including impervious area effects (e.g. stormwater runoff). This activity does not include parking area maintenance (e.g. sweeping, patching, painting, etc.). (CH2M Hill Report)

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -2 Water: -1 Conservation: +1	Solid Waste: -1 Stormwater: -3 Contaminants or Toxics: -2	Water Flow: -2 Water Quality: -2 Groundwater: -1 Soils: -1 Aquatic Habitat: -2 Riparian Habitat: -1 Upland Habitat/Flora: -2 Air Quality: -1 Aesthetics (Noise, Light): -1

The impervious surfaces in parking lots contribute to a number of stormwater system and receiving water impacts, such as increased "flashiness" of flows, and pollutants loads. This activity also includes the impacts of construction, including natural resource consumption (asphalt).

Strategies to Reduce Potential Negative Environmental Effects

- Construction:
    - Better and more frequent inspection by City inspectors during construction.
    - Design of new parking areas should ensure that features can be cleaned with existing City equipment.
- Operation and Maintenance:
    - Operation and maintenance of pollution control features is critical.
    - Sweeping is sporadic and inadequate (community centers and pools).
    - An inventory is needed for parking area catch basins, separators, etc.
    - Inappropriate landscaping around parking areas can result in problems (e.g. leaves plugging stormwater system).

Recommendations

- Conduct an inventory of catch basins, separators, and other pollution control structures in City-owned parking lots. Include these structures in the City's routine maintenance program.
- Evaluate parking lot sweeping frequency, and increase if necessary.
- Ensure that environmental issues are included in the design of new surface parking lots.

Activity: **STREET FLUSHING**

Description of Activity: Water used to "flush" street debris to side of street to enable more efficient clean-up by street sweepers subsequent to flushing, performed at night. (CH2M Hill Report)

Street Flushing is used to clean mud and other course aggregate and debris from paved streets and rights-of way. In Eugene, street flushing is done in coordination with the street sweeping program and is divided into two distinct components. The night shift flushing program encompasses the largest use of this equipment with primarily the centers of multi-lane arterial streets being flushed once per month to increase the time and effectiveness of the street sweepers assigned to these areas. The night shift flushing routes are completed once per month during spring, summer and early fall seasons. During periods of freezing and extremely wet weather conditions, flushing is not performed. The day shift portion of the program includes the flushing of residential streets. This is performed during the spring and summer months with the goal of getting through all streets once annually.

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Water: -2	Stormwater: -1	Water Quality: -1 Aquatic Habitat: -1

The potential negative environmental impacts from this activity are largely due to the impact associated with flushing contaminants and debris from paved streets into the catch basin and piped storm system and the use of water as the means of accomplishing this activity. The vast majority of water used is captured in the catch basin system with limited amounts finding its way into the piped portion of the system. Actual downstream impacts are dependant on system design and proximity to open waterways. Effects on water quality are not yet known as no viable studies have been completed to assess local impacts. This is also the case in determining effects to downstream aquatic habitats.

Strategies to Reduce Potential Negative Environmental Effects:

- Reduction of the existing flushing schedules could be made without substantial impact to the overall sweeping program. However, total elimination of this program may lead to increased costs and negative public response related to overall street sanitation activities due to the need for additional sweeping passes and the negative public perception of mud/dust accumulation on paved streets. Currently Public Works Maintenance is attempting to reduce frequency on both arterial and residential streets and is assessing the effect to the street sweeping program. Without any flushing activity on residential streets during the summer months there has been an increase in air born particulate generated from vehicular traffic.

Recommendations

- Perform program effectiveness assessment and experimentation with regard to minimizing water use during flushing operations, and maximizing the coordination with other storm water structure maintenance operations such as street sweeping and catch basin cleaning functions.
- Conduct a comprehensive comparison to other municipal flushing programs as part of program effectiveness assessment.

Activity: **MOWING OF BANKS FOR OPEN CHANNEL AND DITCH MAINTENANCE**

Description of Activity: Mowing of channel banks to reduce vegetation so as to maintain flow conveyance to prevent flooding (as directed by Corps of Engineers). This involves flail mowing along tops of banks and occasional mowing within channel. (CH2M Hill Report)

Three types of mowing practices occur on the banks of open channels and ditches. Rough mowers working in tandem mow access routes along the top of the bank along with a deck width of the bank slope three times annually along several sections of the Amazon channel, the A-3, the North Beltline Floodway, and the Roosevelt Channel. Once each year the rough mowers work in tandem with the articulated flail boom attachment to mow lower on the bank slopes. Efforts are made to work around willows and other native vegetation when feasible. Finally, the Gradall is used to mow heavy brush for special non-routine projects throughout the system. In all cases, efforts are made to leave a strip of vegetation near the waterline.

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -1	Contaminants or Toxics: -1	Water Flow: -1 Water Quality: -2 Aquatic Habitat: -1 Riparian Habitat: -2 Upland Habitat/Flora: -1 Air Quality: -1 Aesthetics (Noise, Light): -1

- Impacts to the structure and function of riparian habitat from this activity are significant as shrubs and trees are not permitted to grow in areas routinely mowed. Reduction in forested riparian habitat along open channels affects wildlife through removal of food, shelter, and travel corridors. Direct impacts to breeding or nesting wildlife may occur if brush removal occurs from May to late July. Direct impacts to reptiles, amphibians, small mammals, and invertebrates may occur incidentally. Water temperatures may be increased if the activities prevent trees/shrubs from shading the watercourse.
- Removal of woody plants with larger root systems can increase the chances of slumping along sloped channel banks. Clearing channel banks of large woody vegetation also increases the rate of water flow through the channel, which increases the peak discharge and decreases the duration of discharge from a system, both of which may contribute to downstream flooding.
- Flail mowers are unable to collect trimmings, which may wash into the channel, increasing nutrient loading in the watercourse and diminishing water quality. The mowers and Gradall used in this frequent activity consume significant quantities of fuel and contribute to air pollution, and also produce noise that may be disturbing to humans and wildlife. Due to the proximity of equipment to the watercourse, there is an increased risk that hydraulic and fuel line breaks could result in petrochemicals entering the watercourse and contaminating water.

Strategies to Reduce Potential Negative Environmental Effects:

- Reduce mow area. Wider vegetated buffers between the mow zone and the water line could be left. Larger vegetated buffers are better for natural resources and water quality but reduce conveyance. Larger buffer areas may become invaded with exotic woody species. Increasing the vegetated buffer may require more intensive hand labor to manage exotic species and maintain adequate conveyance.
- Less frequent mowing. The lower bank mowing may not be required annually to retain conveyance capacity.

Either a less frequent mowing schedule could be developed or routine monitoring could be used to identify areas that would benefit from mowing.

- Careful consideration should be given both to removing and leaving trees. Trees provide valuable habitat and improve water quality through shading. However, trees that are in danger of falling over and undermining channel structural integrity should not be permitted in and along large channels.
- Equipment used in these activities could be fitted with special filtering equipment to reduce air pollution impacts, could be fueled with bio-diesel products, and could be retrofitted with commercially available non-petroleum based hydraulic fluids.

Recommendations

Continue evaluation and implementation of strategies outlined above.

Activity: **TREE AND BRUSH REMOVAL TO MAINTAIN FLOWS IN CHANNELS**

Description of Activity: Tree and brush removal in channels to maintain flow conveyance to prevent flooding. This involves use of equipment (heavy and light), fuel use, and disturbance of riparian zones. (CH2M Hill Report)

Larger trees and willows are removed from the channel using either heavy equipment or volunteer crews using hand equipment. This activity is conducted to increase channel capacity in an effort to reduce the risk of flooding. Historically, tree and brush removal in channels was performed on a routine cycle. However, in an effort to balance conveyance concerns with natural resource and water quality goals, the City now performs this activity on an "as needed" basis. Thus, many of the below listed negative environmental effects are already being minimized.

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -1	Solid Waste: -1 Contaminants or Toxics: -1	Water Flow: -1 Water Quality: -2 Soils: -1 Aquatic Habitat: -1 Riparian Habitat: -2 Upland Habitat/Flora: -1 Aesthetics (Noise, Light): -1

- Removing trees and shrubs from channels significantly reduces the amount of forested riparian habitat, affecting wildlife through removal of food, shelter and travel corridors. Direct impacts to breeding or nesting wildlife may occur if brush removal occurs from May to late July.
- Water temperatures may be increased if these activities prevent trees/shrubs from shading the watercourse.
- Removal of woody plants with larger root systems can increase the chances of slumping along sloped channel banks. Alternatively, allowing trees to mature may also place the channel structure at risk. As mature trees begin to fall over, they may pull up large portions of the channel banks destabilizing the bank and increasing the likelihood of slumping. Clearing channel banks of large woody vegetation increases the rate of water flow through the channel. This increases the peak discharge and decreases the duration of discharge from a system, both of which may contribute to downstream flooding.
- Flail mowers are unable to collect trimmings, which may wash into the channel increasing nutrient loading in the watercourse and diminishing water quality. Equipment used in this activity consumes significant quantities of fuel and contribute to air pollution, and also produce noise that may be disturbing to humans and wildlife.
- Due to the proximity of equipment to the watercourse, there is an increased risk that hydraulic and fuel line breaks on the Gradall could result in petrochemicals entering the watercourse and contaminating water.

Strategies to Reduce Potential Negative Environmental Effects:

- Routine annual or biannual inspection of the entire system with an emphasis on balancing conveyance goals with natural resource and water quality goals would increase the effectiveness of this program and reduce unnecessary negative environmental impacts.
- Minimizing use of the Gradall and maximizing hand labor would reduce impacts to habitat and water quality. Vegetation could be more selectively and precisely removed and material could be removed from the watercourse using hand labor. However, the Gradall may be useful for some spot vegetation removal projects where hand labor would be dangerous or significantly less efficient.
- Careful consideration should be given both to removing and leaving trees. Trees provide valuable habitat and

improve water quality through shading. However, trees that are in danger of falling over and undermining channel structural integrity should not be permitted in and along large channels.

- Timing in-channel tree and brush removal after late July will reduce the potential for direct impacts to nesting birds.
- Equipment used in these activities could be fitted with special filtering equipment to reduce air pollution impacts, could be fueled with bio-diesel products, and could be retrofitted with commercially available non-petroleum based hydraulic fluids.

Recommendations

Continue evaluation and implementation of strategies outlined above.

Activity: **UNPAVED ROAD USE AND MAINTENANCE TO ACCESS LEVEES AND DITCHES**

Description of Activity: Addition of gravel and grading of road, erosion during rain events. Run off from roads along open channels. (CH2M Hill Report)

Unpaved road access is maintained along several sections of the Amazon channel, the A-3, and the North Beltline Floodway. Maintaining unpaved access consists primarily of three annual mowing passes and infrequent minor gravel applications to problem areas. Grass and other vegetation are well established along these routes, reducing erosion and runoff impacts. Little to no grading occurs as most of these access routes are well-established. Similarly, very little traffic passes on these routes other than infrequent maintenance and inspection equipment.

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -1		Water Quality: -1 Soils: -1 Aquatic Habitat: -1 Riparian Habitat: -1 Upland Habitat/Flora: -1

- Maintaining unpaved access along channels significantly reduces the potential of these areas to serve as forested riparian habitat. Reduction in forested riparian habitat along open channels affects wildlife habitat through removal of food, shelter and travel corridors.
- Water temperatures may be increased if these activities prevent trees/shrubs from shading the watercourse.
- Another impact is the reduction of prairie habitat caused by frequent mowing. Since these routes are dominated by grasses, they could potentially serve as prairie communities. However, frequent mowing, especially in late spring/early summer reduces this potential significantly. Direct impacts to ground nesting birds may occur if brush removal occurs from May to late July. Direct impacts to reptiles, amphibians, small mammals, and invertebrates may occur incidentally.
- Equipment used in this activity consumes significant quantities of fuel and contribute to air pollution, and also produce noise that may be disturbing to humans and wildlife.
- Due to the proximity of equipment to the watercourse, there is an increased risk that hydraulic and fuel line breaks could result in petrochemicals entering the watercourse and contaminating water.

Strategies to Reduce Potential Negative Environmental Effects:

- Access roads are critical to maintaining our open waterway system adequately to protect the community from flooding. Thus, while not maintaining them is not a viable option, one potential improvement to current practices would be reducing the frequency of access road mowing however, this action must also be considered in light of concerns regarding fire prevention and the City's nuisance vegetation code. The most likely location to experiment with reduced mowing frequency would be near natural areas such as the lower Amazon channel north of Royal Avenue, where substantial prairie already exists and few structures would be at risk if a fire occurred.
- Equipment used in these activities could be fitted with special filtering equipment to reduce air pollution impacts, could be fueled with bio-diesel products, and could be retrofitted with commercially available non-petroleum based hydraulic fluids.

Recommendations

Continue evaluation and implementation of strategies outlined above.

Activity: CULVERT MAINTENANCE

Description of Activity: Install, widen, and improve culverts as necessary. Rock is added to slow flow and minimize erosion, spread grass and use erosion control techniques. (CH2M Hill Report)

Maintenance of culverts occurs on an "as needed" basis. The types of equipment and methods employed depend on the blockage type. Accumulated sediment and debris inside a culvert are cleared using a jet rod attachment on the vactor truck. Wash water, sediment, and small debris are then vacuumed up at the downstream end. Accumulated material blocking a culvert outside the inlet may be removed using the Gradall with a bucket attachment. Prior to beginning in-channel work, silt fencing is placed in the waterway around the project area to minimize sediment migration. Material is removed using the Gradall bucket and placed in a truck to be shipped to a proper disposal site. In addition to these clearing practices, routine inspections and trash/debris removal are conducted by hand on all major channels. Similarly, mapped "hot spots", which are sites where blockages have historically occurred more frequently, are inspected and cleared by hand after all major storm events. Finally, most major culverts have been fitted with trash racks to facilitate collection and removal of debris. Trash racks are designed to allow continued flow even with a significant accumulation of debris against them.

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -1	Solid Waste: -1	Water Flow: +1 Water Quality: -2 Aquatic Habitat: -2 Riparian Habitat: -1

- Removal of sediment and debris accumulations by the Gradall may result in some incidental "back fall" and suspension of some disturbed sediment. In channels where this activity occurs when there is flow in the channel, it can lead to sediment delivery downstream and impaired water quality.
- Accumulated sediment bars in front of culvert inlets may become vegetated and begin to serve as terrestrial habitat features serving plants and wildlife prior to removal, and may also begin to serve as aquatic habitat features serving fish and invertebrates by adding hydraulic complexity to the channel.
- Equipment used in this activity consumes significant quantities of fuel and contribute to air pollution, and also produce noise that may be disturbing to humans and wildlife.
- Due to the proximity of equipment to the watercourse, there is an increased risk that hydraulic and fuel line breaks could result in petrochemicals entering the watercourse and contaminating water.

Strategies to Reduce Potential Negative Environmental Effects

- In addition to installation of structural erosion control BMPs, the vactor truck could be used in tandem with the Gradall to more effectively remove suspended sediment from the water column. However, depending on the flow rates in the channel, this practice could be relatively ineffective. Alternatively, the vactor truck may be used as the primary sediment excavating equipment, reducing the intensity of soil disturbance. However, both of these techniques involving the vactor truck are experimental and depend on soil and flow conditions.
- Removal of sediment accumulations where habitat features have formed should be timed so as to minimize the likelihood of disturbing nesting birds and other wildlife. This typically means after late July.
- Equipment used in these activities could be fitted with special filtering equipment to reduce air pollution impacts, could be fueled with bio-diesel products, and could be retrofitted with commercially available non-

petroleum based hydraulic fluids.

Recommendations

Continue evaluation and implementation of strategies outlined above.

Activity: CITY WIDE PURCHASING DECISIONS AND PROCUREMENT

Description of Activity: City wide purchasing for goods (including vehicles, paper, equipment, materials) and services (including recycling and solid waste, contractors). This includes paper use and web site development (such as development of RFPs and request for bids). (CH2M Hill Report)

Potential Environmental Effects

Potential Environmental Effects Scores from CH2M Hill Report		
Consumption	**Waste Generation**	**Environmental/Habitat Alteration**
Natural Resources: -3 Conservation: +1	Solid Waste: -1 Contamination or Toxics: -2 Recycling: +1	

"Environmentally preferable" or "green" purchasing practices have become more common in the last few years. These practices include a consideration of the environmental impacts of products or services in the selection criteria. These environmental effects can include the environmental impacts created during manufacture of a product, the impacts created while using the product, and the impact and options for ultimate product disposal or recycling.

Strategies to Reduce Potential Negative Environmental Effects

Numerous guidance documents for environmentally preferable purchasing strategies have been published, including the following as examples:

- Environmentally Preferable Purchasing Guide, published by the Solid Waste Management Coordinating Board, http://www.swmcb.org/EPPG/1_1.htm
- The Environmental Protection Agency has published guidance on Environmentally Preferable Purchasing at http://www.epa.gov/. This web site contains a "tool suite" with numerous tools for implementing environmentally preferable purchasing practices, including a database of environmental information on products and services.
- EPA has also published "Profile of Local Government Operations" which includes a section on purchasing practices.http://www.epa.gov/Compliance/resources/publications/assistance/sectors/notebooks/government.html
- The Pacific Northwest Pollution Prevention Resource Center (PPRC) has compiled information to assist purchasers in their efforts to establish or maintain an environmental purchasing program. Included is information that can assist in identifying "green" products, setting up an environmental purchasing program, general and specific resources that are available to purchasers, guides for locating green products, and examples of procurement programs that can be used as a guide for purchasers building or improving their own programs. http://www.pprc.org/
- The National Association of Counties web site contains numerous links to purchasing resources. http://www.naco.org/
- The City of Santa Monica web site contains information about the city's programs and policies that promote the purchase of more sustainable goods and services, including examples of policies and ordinances, and bid specifications. http://www.smgov.net/. King County also presents similar information: http://www.kingcounty.gov/. The City of Seattle's purchasing program is described at http://www.seattle.gov/

Recommendations

Develop and implement changes to City procedures that will ensure that environmental issues are routinely considered in the purchase and procurement of materials and services.