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Chapter 9 - Cost Estimates

9.1 Cost Assumptions

The cost estimates provided in this chapter are intended to give cities and counties in eastern Washington additional information and guidance on the range of costs associated with implementing a stormwater management program. The cost estimates are based on two hypothetical cities – a small city with a population of 10,000 people and a large city with a population of 50,000 people. Implementing a stormwater management program could result in little additional expenditures to the municipal government, or could result in significant additional expenses. Costs will vary primarily on what activities the municipality is already implementing and the specific issues (such as number of construction sites, number of catch basins, etc.) the municipality must address.

9.1.1 Overall Assumptions

Cost estimates were developed for two hypothetical Phase II cities – a small city with a population of 10,000 people, and a large city with a population of 50,000 people.

The following assumptions are common to both scenarios:

- The hourly costs include salary plus 40 percent for benefits and an additional 100 percent added for overhead and administrative costs. These overhead and administrative costs typically include costs for:
 - Clerical and support staff
 - Office rent and utilities
 - Computers, basic equipment, and supplies
 - Incidental use of a vehicle

These scenarios are based on the assumption that the municipality performs the work. If a consultant is used for planning, engineering, inspections, or other aspects, the costs may be different.

- Each city is starting with no funding, staff, or existing programs before developing a stormwater management program.
- The population is consistent over the permit term (the costs are generally not overly sensitive to population).
- These costs do not include any capital costs (capital improvement projects) to correct existing flooding, drainage, or stormwater quality problems.

Table 9.1 presents hourly rates for various employee categories.

Table 9.1 Hourly Rates for Employee Categories			
Title/ Category	Direct hourly rate	Hourly rate including 40% for benefits	Loaded hourly rate inc. 40% for benefits and 100% for overhead
Technician 1	\$21	\$30	\$60
Professional 1	\$25	\$35	\$70
Professional 2	\$29	\$40	\$80
Professional 3	\$36	\$50	\$100
<p>Examples of the types of personnel in each category include:</p> <p>Technician 1 – Maintenance staff, construction inspector</p> <p>Professional 1 – Planner, plan reviewer, public outreach specialist, computer specialist, maintenance supervisor</p> <p>Professional 2 – Engineer</p> <p>Professional 3 – Manager, staff attorney</p>			

Differences between the small and large Phase II city cost estimate, primarily in the public education program, are described later in this chapter.

9.2 How to Use the Costing Spreadsheets

This Model Program includes costing spreadsheets for both the small and large hypothetical Phase II communities. Printouts of these spreadsheets are included in Appendix 9A (small communities) and Appendix 9B (large communities). These spreadsheets are intended as a tool to give communities a rough estimate of Phase II compliance costs and help communities estimate their own compliance costs.

To use the spreadsheet to estimate Phase II compliance costs more specifically for your community, you can change the following data fields:

- The hourly staff rates for the four different professional levels (cells D7, D8, D9, and D10)
- The estimated number of hours spent on program start-up costs
- The number of hours spent by each staff for each BMP, per year
- The number of hours spent to complete the annual report

For example, for BMP 2A, stormwater outreach strategy, 16 hours of public outreach specialist time is currently estimated for the small city to identify target audiences. These hours can be changed to reflect a more accurate estimate for your community.

Also, where individual BMPs are already in place and being implemented, additional funding is not required. Therefore, this spreadsheet could be

used to identify new activities that will represent new costs to the community by deleting costs for BMPs it has already developed.

9.3 Stormwater Management Program Development Costs

Both the small and large city will incur costs in planning and organizing a stormwater management program. These costs include planning time to identify lead department and staff, time to identify existing programs that could meet one of the minimum measures, and time to estimate resources needed. These costs also include time to budget resources for stormwater management. Time will be required for city/county staff to learn about and prepare to implement NPDES Phase II permit administration and compliance requirements. Time will be required to educate elected officials and management staff about regulatory requirements and to obtain initial approvals to proceed with additional work required to implement the BMPs. Obtaining initial approvals via resolutions or other elected official actions require time for completion of local public notice and involvement requirements. If no existing funding mechanisms are available, time will be required to develop one (or more), such as a utility. Development of a utility requires a plan that estimates program needs and costs and normally requires completion of public processes and adoption of a funding ordinance. Even changing rates in existing utilities involves similar activities. Ideally this work is done before year one of the permit term but in many cases this work will be done during years 1 – 2.

For the small city, it is assumed that a manager will spend 52 days (full time) and an engineer will spend 100 days on stormwater management program development costs (over one to two years).

For the large city, it is assumed that a manager will spend 80 days and an engineer will spend 150 days on stormwater management program development costs (over one to two years).

9.4 Public Education Costs

9.4.1 Public Education BMPs

The Model Program for public education and outreach is described in Chapter 2. The public education Model Program requires the development of a stormwater outreach strategy (BMP 2A), with some combination of additional BMPs required depending on what specific activities the city includes in the outreach strategy. For the small city, the following BMPs are assumed to be implemented:

- BMP 2A (stormwater outreach strategy)
- BMP 2B (stormwater brochure)
- BMP 2D (storm drain stenciling), and
- BMP 2J (stormwater Web site)

The large city is assumed to implement the following BMPs:

- BMP 2A (stormwater outreach strategy)
- BMP 2B (stormwater brochure)
- BMP 2C (targeted brochures)
- BMP 2D (storm drain stenciling)
- BMP 2E (classroom education), and
- BMP 2J (stormwater Web site)

The assumptions and costs for BMPs not selected by the two model cities are still listed below. These BMPs could be chosen by other eastern Washington cities as part of a public education program.

9.4.2 Public Education BMP Cost Assumptions

The assumptions below were used to estimate costs for the hypothetical small and large Phase II cities. The number of hours assumed per employee per year for each BMP can be found in the cost tables.

BMP 2A – Stormwater Outreach Strategy

- Will be developed over the first 3 years
- Annual reviews and updates will occur after year 3
- Both the small and large cities implement this BMP

BMP 2B – Stormwater Brochure

- Assume that an existing brochure format is used and slightly modified to meet local needs (requires some time for manager and public involvement specialist).
- Assume \$0.20/brochure for black and white printing (two-color, double-sided 8 1/2 x 11 brochure printing cost would be \$0.50).
- Distribution is through utility mailers, libraries, government offices, etc. (i.e., no additional mailing costs).
- Brochures are printed for 1/3 of total population.
- Public response to mailed brochures will result in about a 1-2 week-long flurry of work by manager, public information specialist, engineer, and maintenance staff. Assume that any MS4 problems uncovered may result in CIPs that are funded outside this Model Program. Assume maintenance supervisor spends 10 hours investigating and 30 hours supervising a two-person crew (30 hours times 2) to rectify non-CIP problems per mailing. Assume equipment costs of \$5000 per mailing for heavy equip used by crew.
- Both the small and large cities implement this BMP.

BMP 2C – Targeted Brochure

- Assume targeted brochures will go out to 10 percent of addresses within city (number of addresses is 1/3 of total population).
- Assume \$0.20/brochure for black and white printing and \$0.30/brochure for mailing (two-color, double-sided 8 1/2 x 11 brochure printing cost would be \$0.50).
- Targeted audience response to mailed brochures will result in about a 1-2 week-long flurry of work by manager, public information specialist, engineer, maintenance supervisor, and crew. Assume that any MS4 problems uncovered may result in CIPs that are funded outside this Model Program. Assume maintenance supervisor spends 6 hours investigating and 16 hours supervising a two-person crew (16 hours times 2) to rectify non-CIP problems per mailing. Assume equipment costs of \$2000 per mailing for heavy equipment used by crew.
- The large city implements this BMP.

BMP 2D – Storm Drain Stenciling

- Assume volunteer groups are used to place stencils
- City provides safety and stenciling materials (\$5/stencil), transportation, and oversight/planning
- Assume 2 volunteers can complete 4 stencils/hour. City oversees 2 teams of volunteers at a time. 4 hours spent each outing on stencils
- City spends 12 hours each outing planning, managing, overseeing, and recording the stenciling
- Small city – assume city organizes volunteers to stencil the equivalent of six times each year (192 catch basins stenciled per year)
- Large city – assume city organizes volunteers to stencil the equivalent of 15 times each year (480 catch basins stenciled per year)

BMP 2E – Classroom Education

- Year 3 – obtain contact info for all school districts
- Year 4 – determine classroom educational opportunities
- Year 5 – contact schools on list
- The large city implements this BMP

BMP 2F – Work with Volunteers

- Assumes that follow-up will be necessary in years 4 and 5 to provide groups with information

BMP 2G – Speakers Bureau

- Year 3 – Begin planning for speakers bureau
- Year 4 – Contact potential speakers, develop list
- Year 5 – Promote, distribute speakers bureau list

BMP 2H – Stormwater PSAs

- Costs will vary depending on newspaper, television, or radio. Costs are for development, placement of PSAs are usually free but there is no guarantee that they will be run. Advertisements are paid and provide control over frequency of distribution.

BMP 2I – Stormwater Display

- Cost for developing a table-top display is approximately \$500. For a 10" x 10" display, approximately \$2,000
- Time is for scheduling event, transport and set up; does not include cost of display
- Assume 4 hours time per display, 4 displays per year

BMP 2J – Stormwater Web Site

- Assume 100 hours for computer specialist (Professional Level 1) to develop web pages, 40 hours for engineer or public information specialist, and 20 hours for manager.
- Quarterly maintenance and updates will consist of approximately 16 hours each quarter for computer specialist, and 4 hours each quarter for engineer or public information specialist.

9.4.3 Public Education Cost Summary

For the small city, the total five-year public education costs were estimated to be approximately \$87,300. This included the following five-year costs for each of the BMPs:

- | | |
|---|----------|
| • BMP 2A (stormwater outreach strategy) | \$7,500 |
| • BMP 2B (stormwater brochure) | \$41,400 |
| • BMP 2D (storm drain stenciling) | \$20,900 |
| • BMP 2J (stormwater Web site) | \$17,600 |

For the large city, the total five-year public education costs were estimated to be approximately \$184,800.

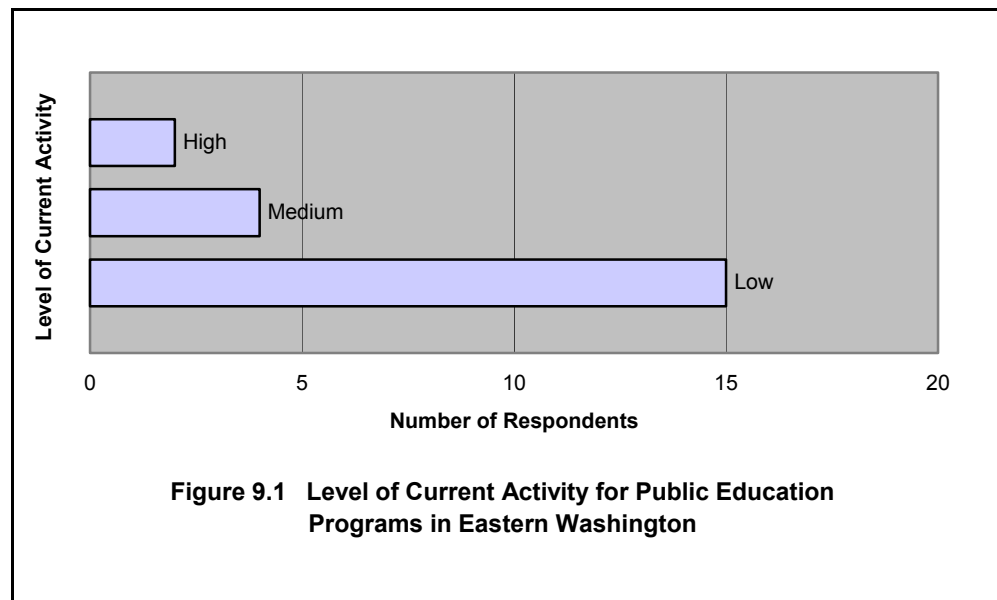
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|---|----------|
| • BMP 2A (stormwater outreach strategy) | \$7,500 |
| • BMP 2B (stormwater brochure) | \$49,400 |
| • BMP 2C (targeted brochures) | \$46,900 |
| • BMP 2D (storm drain stenciling) | \$51,500 |
| • BMP 2E (classroom education) | \$12,000 |
| • BMP 2J (stormwater Web site) | \$17,600 |

9.4.4 Existing Practices in Eastern Washington

The costs in Section 9.4.3 assume that the small and large Phase II cities are not currently implementing any stormwater public education activities. A survey of eastern Washington cities and counties found that this is true in many, but not all, jurisdictions.

For example, a medium-sized city currently has a stormwater display that is set up during public works week and mails out stormwater inserts with local utility bills. A large city with a stormwater utility has conducted outreach about the utility, provides information on stormwater during the construction/development review process, and participates in public education activities to support other programs such as the wellhead protection program and solid waste/recycling program. Also, a large county has developed brochures for the public on ground water quality and aquifer issues. This county also conducts watershed tours and has put on workshops for the public and specific stakeholder groups.

Figure 9.1 graphically represents the current level of activity on a high, medium, and low scale for public education from the jurisdictions that responded to the survey. This graph is subjective, with a high level of activity representing jurisdictions that are probably meeting or even going beyond the Model Program for public education. A low level of activity indicates jurisdictions that will probably have more work to develop a public education program. A total of 21 cities and counties in eastern Washington replied to this survey.



9.5 Public Involvement Costs

9.5.1 Public Involvement BMPs

The Model Program for public involvement/participation is described in Chapter 3. The public involvement Model Program requires the jurisdiction to hold public meetings and seek public review. Option BMPs

describe distributing new releases or organizing a stormwater advisory panel. For both the small and large cities, it is assumed that public meetings/public review is conducted and new releases are produced. In addition, additional costs were assumed to respond to public calls generated by the public meetings.

9.5.2 Public Involvement BMP Cost Assumptions

BMP 3A – Public Review/Public Meetings

- Assume time for public outreach specialist (8 hours), engineer (4 hours) and manager (4 hours) to develop public notice, publish in local newspaper each time
- Assume time for public outreach specialist (16 hours), engineer (8 hours) and manager (4 hours) to develop public meeting presentation materials each time
- Includes time for public outreach specialist (16 hours), engineer (16 hours), and manager (4 hours) to attend and respond to public comments. Some comments will require field investigations and may result in CIPs or other corrective actions (CIPs are funded outside this program). Assume maintenance supervisor spends 4 hours investigating and 6 hours supervising a two-person crew (6 hours times 2) to rectify non-CIP problems per public meeting. Assume equipment costs of \$1000 per maintenance activity to address comments.
- Assume 2 public meetings, 2 hours each
- For large city, assume double the number of public meetings (4 meetings) and double the meeting and follow-up labor time and equipment costs

BMP 3B – News Releases

- Assume time to draft and distribute news release

Additional Activity – Respond to Public Calls

This is not a BMP but is work that will reasonably be expected by the jurisdiction.

- Estimated times needed for public response: Time to respond to other public calls. Time to respond to complaints about utility fees, stormwater standards, BMP O&M requirements, or other public or business concerns.
- Estimated time for manager (small - 30 hrs/yr, large – 60 hrs/yr), pi-specialist (small - 60 hrs/yr, large – 120 hrs/yr), engineer (small - 60 hrs/yr, large – 120 hrs/yr), inspector (small - 30 hrs/yr, large – 60 hrs/yr). Assume work by maintenance supervisor and maintenance crew is covered in other costs (good housekeeping).

9.5.3 Public Involvement Cost Summary

For the small city, the total five-year public involvement costs were estimated to be approximately \$90,000. This included the following five-year costs for each of the BMPs:

- BMP 3A (public review/meetings) \$15,300
- BMP 3B (news release) \$5,700
- Additional activity – respond to public calls \$69,000

For the large city, the total five-year public involvement costs were estimated to be \$174,300.

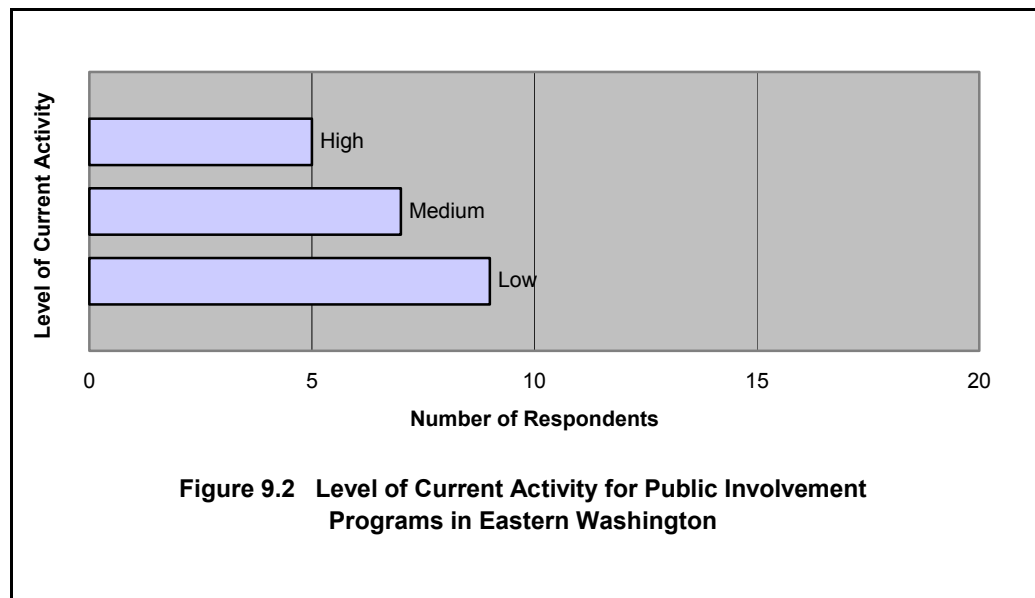
- BMP 3A (public review/meetings) \$30,600
- BMP 3B (news release) \$5,700
- Additional activity – respond to public calls \$138,000

9.5.4 Existing Practices in Eastern Washington

The costs in Section 9.5.3 assume that the small and large Phase II cities are not currently implementing any stormwater public involvement activities. A survey of eastern Washington cities and counties found that many jurisdictions currently conduct public meetings or council meetings where stormwater issues could be discussed.

Some cities and counties are going well beyond the Phase II regulations. For example, Liberty Lake meets monthly with a Watershed Advisory Committee. The city of Union Gap uses a Citizen’s Advisory Committee to help develop their regional stormwater plan, and the city of Walla Walla Wastewater Advisory Board, which is composed of citizens, works closely with city staff on stormwater issues.

Figure 9.2 graphically represents the current level of activity, on a high, medium, and low scale, for public involvement from the jurisdictions that responded to the survey. This graph is subjective, with a high level of activity representing jurisdictions that are probably meeting or even going beyond the Model Program for public involvement. A low level of activity indicates jurisdictions that will probably have more work to develop a public involvement program.



9.6 Illicit Discharge Costs

9.6.1 Illicit Discharge BMPs

The Model Program for illicit discharge detection and elimination is described in Chapter 4. The illicit discharge Model Program requires the jurisdiction to map and screen outfalls, develop an illicit discharge ordinance, develop an illicit discharge, spill response, and enforcement plan, and provide training for municipal staff. For both the small and large cities, it is assumed that all of these BMPs are implemented.

9.6.2 Illicit Discharge BMP Cost Assumptions

BMP 4A – Create Map

- Assume some information exists (old paper maps, files).
- Time spent to collect existing information, acquire and review record drawings (small city: 30 hours, large city: 80 hours).
- Mapping outfalls will be included as part of mapping the full municipal separate storm sewer system and local receiving waters. A full storm system map is needed to trace illicit discharges and for other minimum control measures (good housekeeping).
- Field mapping outfalls will take 2 hours/outfall, and will occur in year one or two as part of the preliminary planning work.
- 80 hours (small) or 160 hours (large) by engineer to complete a full storm system map in year 2, 16 hours (small), or 32 hours (large) for manager.

- Small city: 40 outfalls
- Large city: 100 outfalls

BMP 4B – Ordinance

- Cost to develop an ordinance (small city: \$45,000, large city: \$60,000)
- This includes time spent by all municipal technical and legal staff, and completion of the local public review/involvement process
- This ordinance covers the ordinances required in Chapters 4, 5 and 6
- Costs spread over first two years

BMP 4C – Illicit Discharge Plan

- Plan developed in year 3
- Small city: 120 hours total by engineer, 20 hours by manager, 20 hours by maintenance crew supervisor to develop plan
- Small city: 160 hours total by engineer, 24 hours by manager, 40 hours by maintenance crew supervisor to develop plan

BMP 4D – Conduct Field Inspections

- Assume 2 hours per outfall for visual screening. Assume that 25 percent of outfalls appear suspicious and need 2 rounds of additional chemical testing during each permit term (minutes of \$300 per testing (\$600 for both rounds) depending on chemicals analyzed for). Assume that additional testing and data analysis requires 20 engineer hours and 4 manager hours per testing event (40 hours and 8 hours for both rounds per outfall tested).

NOTE: Costs for this activity should decrease as the jurisdiction finds and eliminates illicit discharges.

BMP 4E - Spill Response Plan

- Plan developed in year 3 (as an appendix to Illicit Discharge Plan)
- Plan will integrate with existing spill responder programs (Ecology, Fire Dept., Health, Police, etc.)
- Time to develop plan (small city: 100 hours engineer, 16 hours manager, large city: 150 hours engineer, 24 hours manager)

BMP 4F – Enforcement Plan

- 80 hours by engineer, 16 hours by manager to develop plan in year 3 (as an appendix to Illicit Discharge Plan)
- Investigation/enforcement will take 24 hours per event (3 by engineer)
- Assume 4 hours of record keeping by engineer (plus 1 hr by manager) per enforcement event (written record of events, map, resolution)

- Small city: assume one event every other month for 6 events per year
- Large city: assume 2 events per month for 24 events per year

BMP 4G – Training

- Assume an 8-hour training course on Illicit Discharge Detection and Elimination is developed and held in 3rd permit year, instructed by an engineer
- Assume a four-hour refresher training course on Illicit Discharge Detection and Elimination is developed and held in 4th permit year, along with the full 8-hour course (for new people) both instructed by an engineer
- After the initial training, assume 50 percent of staff have been through the initial training and will attend a refresher course of 4 hours
- After the initial training, assume that turnover results in the need to train 50 percent of the staff that attended the initial training (hours will be cut in half)
- Assume 8 hours (engineer) and 2 hours (manager) to prepare training materials and record training activities per event
- Assume 4 hours by engineer to schedule and organize training per event
- Small city: attendance will include 1 inspector, 2 field staff, and an engineer
- Large city: attendance will include 3 inspectors, 5 field staff, and 2 engineers

9.6.3 Illicit Discharge Cost Summary

For the small city, the total five-year illicit discharge costs were estimated to be approximately \$175,900. This included the following five-year costs for each of the BMPs:

• BMP 4A (Develop map)	\$16,000
• BMP 4B (Ordinance)	\$45,000
• BMP 4C (Illicit Discharge Plan)	\$13,000
• BMP 4D (Conduct Field Inspections)	\$54,100
• BMP 4E (Spill Response Plan)	\$9,600
• BMP 4F (Enforcement Plan)	\$31,900
• BMP 4G (Training)	\$6,400

For the large city, the total five-year illicit discharge costs were estimated to be \$382,300.

• BMP 4A (Develop map)	\$30,000
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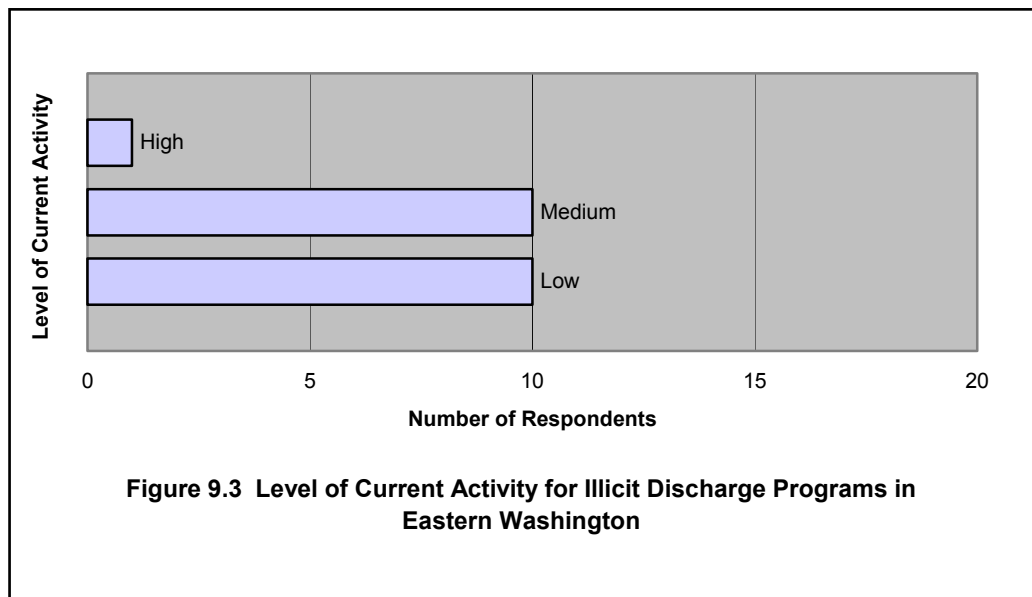
- BMP 4B (Ordinance) \$60,000
- BMP 4C (Illicit Discharge Plan) \$18,000
- BMP 4D (Conduct Field Inspections) \$135,600
- BMP 4E (Spill Response Plan) \$14,400
- BMP 4F (Enforcement Plan) \$110,000
- BMP 4G (Training) \$14,400

9.6.4 Existing Practices in Eastern Washington

The costs in Section 9.6.3 assume that the small and large Phase II cities are not currently implementing any illicit discharge activities, and do not have a stormwater map. A survey of eastern Washington cities and counties found that this is true for about half of the jurisdictions.

For example, about half of the respondents to the survey have some type of stormwater map showing pipes and outfalls. A smaller number of jurisdictions have a program in place to address illicit discharges. In most cases, illicit discharge and spill response is a reactive program responding to citizen complaints.

Figure 9.3 graphically represents the current level of activity, on a high, medium, and low scale for illicit discharge programs from the jurisdictions that responded to the survey. This graph is subjective, with a high level of activity representing jurisdictions that are probably meeting or even going beyond the Model Program for illicit discharge control. A low level of activity indicates jurisdictions that will probably have more work to develop an illicit discharge program.



9.7 Construction Program Costs

9.7.1 Construction BMPs

The Model Program for construction is described in Chapter 5. The construction Model Program requires the jurisdiction to develop an erosion and sediment control ordinance, review site plans, develop a program to receive information from the public, inspect construction sites, provide training for municipal staff and information construction operators of training opportunities. Jurisdictions will implement this program primarily by following the Eastern Washington Stormwater Manual, or an equivalent manual. For both the small and large cities, it is assumed that all of these BMPs are implemented.

9.7.2 Construction BMP Cost Assumptions

BMP 5A - Ordinance

- Costs for ordinance are included in BMP 4A

BMP 5B – Training for MS4 Staff

- To develop the training materials, assume 16 hours for a supervisor, 20 hours for engineer, and 8 hours for manager in 3rd permit year
- A 4 hour Plan Review and Construction Inspection training and record keeping course is taught by the engineer and supervisor in 4th permit year and every subsequent year
- Small city: attendees include a plan reviewer, inspector and engineer
- Large city: attendees include 2 plan reviewers, 2 inspectors, and an engineer
- Assume that 50 percent of the staff attends an annual 2 hour refresher course for the plan reviewers, inspectors, and engineer in 5th permit year. Assume that turnover results in the need to provide ongoing full training to 50 percent of the staff lineup starting in year 5.

BMP 5C – Review Site Plans

- Small city: 30 construction sites per year are greater than one acre
- Large city: 80 construction sites per year are greater than one acre
- Plan reviews start in permit year 4
- Assume that each “normal” plan review, record keeping, and project correspondence takes 3 plan reviewer hours, 1 engineer hour, and 0.5 manager hour for engineer and supervisor control review. Assume that 20 percent of the projects deserve special consideration because of complexity, size, type, location, phasing, or other factors and plan review time for all staff is quadrupled.
- Assume that each site is subject to two plan reviews (initial & final)

BMP 5D – Receive Information From the Public

- Assume that it takes 8 hours to set up a system to receive information from the public in the 3rd permit year.
- Small: assume that 1 hour per week is spent by a public outreach specialist taking calls and referring them to engineer, inspectors, or maintenance supervisor. Assume that 1 hour per week is spent by the public outreach specialist tracking and recording the disposition of prior calls.
- Large: assume that 3 hours per week is spent by a public outreach specialist taking calls and referring them to engineer, inspectors, or maintenance supervisor. Assume that 3 hours per week is spent by the public outreach specialist tracking and recording the disposition of prior calls.
- Small: assume 3 hours by an inspector, 2 hours by a supervisor, 1 hour by a manager every week to follow up on complaints, make notes, correspond with property owners, keep records, and resolve problems (either owner fixes, or enforcement staff take over).
- Large: assume 12 hours by inspectors, 6 hours by a supervisor, 3 hours by a manager every week to follow up on complaints, make notes, correspond with property owners, keep records, and resolve problems (either owner fixes, or enforcement staff take over).
- Large: assume that public information origin enforcement actions consume 60 inspector hours, 30 supervisor hours, 60 maintenance technician hours, and 24 manager hours per year.
- Small: assume that public information origin enforcement actions consume 20 inspector hours, 10 supervisor hours, 20 maintenance technician hours, and 8 manager hours per year.

BMP 5E – Inspect Sites

- Small city: 30 construction sites per year are greater than one acre
- Large city: 80 construction sites per year are greater than one acre
- Every site inspected at least twice (site set-up, interim check after a storm event to assure ESC BMPs are operated, maintained, and repaired properly)
- Each inspection takes 4 hours (travel, notes, correspondence, recording) inspector time and 2 hours engineer time
- Assume that 20 percent of sites will require some level of follow-up enforcement actions requiring 8 hours of inspector time, 4 hours engineer time and 2 hour of manager time each

BMP 5F – Training for Operators

- Assume one training event per year starting in year 4
- Small: assume 20 engineer hours and 4 manager hours locating information about existing ECS training opportunities and distributing this information to local contractors and engineers
- Large: assume 60 engineer hours and 12 manager hours spent in year 4 collecting existing training information, modifying as needed for local conditions, organizing training events, conducting training, and keeping records of training activities
- Small: assume 8 engineer hours spent each subsequent year updating training information and distributing to local engineers and contractors
- Large: assume 30 engineer hours and 4 manager hours spent each subsequent year modify prior training materials, organizing training events, conducting training, and keeping records of training activities

9.7.3 Construction Cost Summary

For the small city, the total five-year construction program costs were estimated to be approximately \$164,300. This included the following five-year costs for each of the BMPs:

- BMP 5A (Ordinance) \$0 (cost included in BMP 4B)
- BMP 5B (Training for staff) \$7,800
- BMP 5C (Review site plans) \$66,000
- BMP 5D (Receive information from public) \$97,700
- BMP 5E (Inspect sites) \$55,200
- BMP 5F (Training for operators) \$2,600

For the large city, the total five-year construction program costs were estimated to be \$478,200.

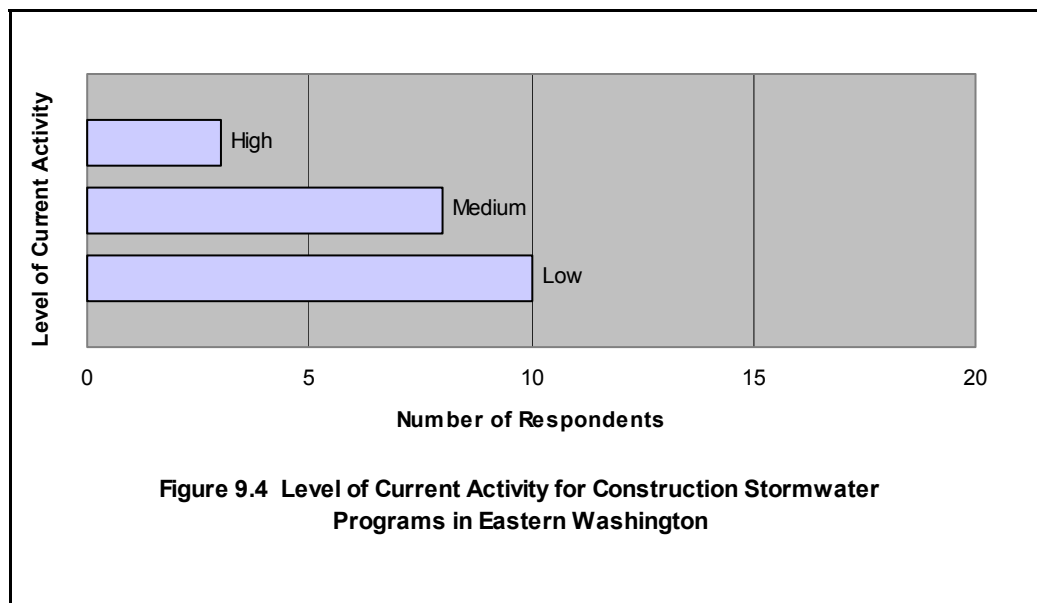
- BMP 5A (Ordinance) \$0 (cost included in BMP4B)
- BMP 5B (Training for staff) \$13,000
- BMP 5C (Review site plans) \$174,000
- BMP 5D (Receive information from public) \$314,700
- BMP 5E (Inspect sites) \$139,500
- BMP 5F (Training for operators) \$8,800

9.7.4 Existing Practices in Eastern Washington

The costs in Section 9.7.3 assume that the small and large Phase II cities are not currently implementing any construction program activities. A survey of eastern Washington cities and counties found that this is true in some, but not all, jurisdictions.

For example, over half of the respondents required some type of erosion and sediment control. Several cited that staff had completed WSDOT erosion control training and certification. Several cities and counties replied that erosion control was not an issue due to limited rainfall and high infiltration rate.

Figure 9.4 graphically represents the current level of activity, on a high, medium, and low scale for construction programs from the jurisdictions that responded to the survey. This graph is subjective, with a high level of activity representing jurisdictions that are probably meeting or even going beyond the Model Program for construction. A low level of activity indicates jurisdictions that will probably have more work to develop a construction program.



9.8 Post-Construction Program Costs

9.8.1 Post-Construction BMPs

The Model Program for post-construction runoff control is described in Chapter 6. The post-construction Model Program requires the jurisdiction to develop an ordinance to address post-construction runoff, review post-construction site plans, train staff, and inspect structural BMPs.

Jurisdictions will implement this program primarily by following the Eastern Washington Stormwater Manual, or an equivalent manual. For both the small and large cities, it is assumed that all of these BMPs are implemented.

9.8.2 Post-Construction BMP Cost Assumptions

BMP 6A - Ordinance

- Assume that ordinance developed for BMP 4A also covers BMP 6A

BMP 6B – Post-Construction Plan

- Post construction plan is developed in year 3 and will describe in detail the municipal processes of: adoption of standards, stormwater plan review procedures, stormwater BMP inspection during construction, enforcement of BMP design standards, adoption of BMP O&M requirements, methods of assuring perpetual proper O&M of public and private BMPs, BMP inspection to assure proper O&M is occurring, enforcement of BMP maintenance requirements on private developments, plan review and enforcement fees, variance procedures, and so on.
- Small city: Engineer 120 hours, manager 20 hours to develop post-construction plan
- Large city: Engineer 200 hours, manager 40 hours to develop post-construction plan

BMP 6C - Training

- To develop the training materials, assume 16 hours for a supervisor, 20 hours for engineer, and 8 hours for manager in 3rd permit year
- A 4-hour Plan Review and Maintenance Inspection training and record-keeping course is taught by the engineer and Supervisor in 4th permit year and every subsequent year
- Small city: Attendees include a plan reviewer, inspector and engineer
- Large city: Attendees include 2 plan reviewers, 2 inspectors, and an engineer
- Assume that 50 percent of the staff attend an annual 2-hour refresher course for the plan reviewers, inspectors, and engineer in 5th permit year. Assume that turnover results in the need to provide ongoing full training to 50 percent of the staff lineup starting in year 5.

BMP 6D – Plan review

- Small city: 30 construction sites per year are greater than one acre
- Large city: 80 construction sites per year are greater than one acre
- Plan reviews start in permit year 4
- Assume that each “normal” plan review, record keeping, and project correspondence takes 3 plan reviewer hours, 1 engineer hour, and 0.5 manager hour for E&S control review. Assume that 20 percent of the projects deserve special consideration because of complexity, size, type, location, phasing, or other factors and plan review time for all staff is quadrupled.
- Assume that each site is subject to two plan reviews (initial & final)

BMP 6E – Inspect Post-construction BMPs

- Assume that 80 percent of construction sites will have structural post-construction controls
- Assume 3 hours per inspection
- Not all sites need to be inspected every year, post-construction plan will prioritize using adaptive management approach
- In permit years 4 and 5, all new post-construction BMPs will be inspected
- Small city: 8 post-construction controls to be inspected in year 4, 16 post-construction controls to be inspected in year 5
- Large city: 40 post-construction controls to be inspected in year 4, 80 post-construction controls to be inspected in year 5
- Number of sites that need to be inspected will escalate every year

9.8.3 Post-Construction Cost Summary

For the small city, the total five-year post-construction program costs were estimated to be approximately \$104,500. This included the following five-year costs for each of the BMPs:

- BMP 6A (Ordinance) \$0 (Cost included in BMP 4B)
- BMP 6B (Post-construction plan) \$11,600
- BMP 6C (Training for staff) \$7,500
- BMP 6D (Review site plans) \$65,900
- BMP 6E (Inspect BMPs) \$19,500

For the large city, the total five-year post-construction program costs were estimated to be \$233,200.

- BMP 6A (Ordinance) \$0 (cost included in BMP 4B)
- BMP 6B (Post-construction plan) \$20,000
- BMP 6C (Training for staff) \$8,500
- BMP 6D (Review site plans) \$174,000
- BMP 6E (Inspect BMPs) \$30,600

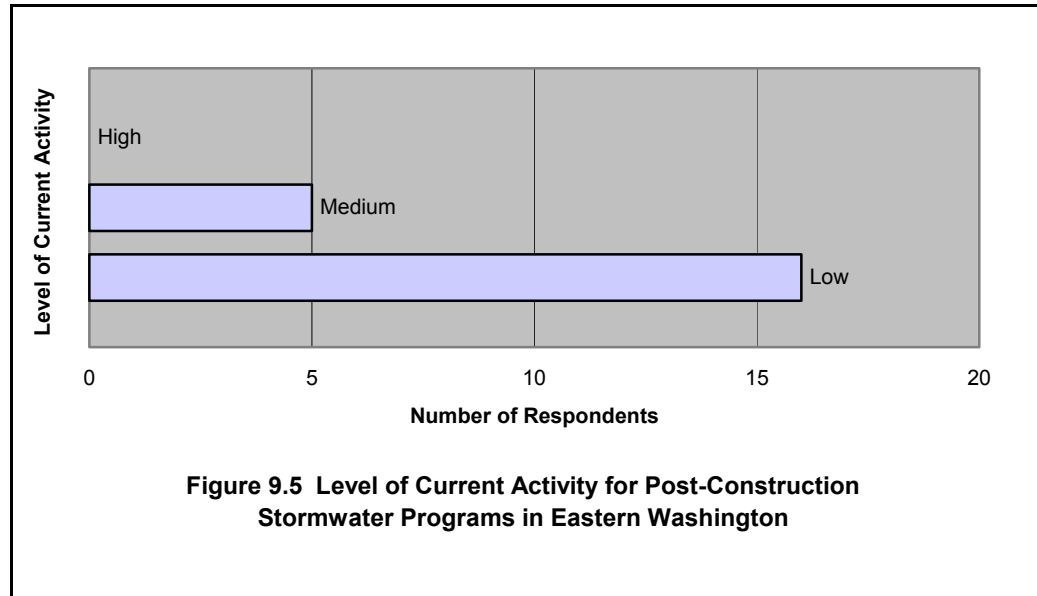
9.8.4 Existing Practices in Eastern Washington

The costs in Section 9.8.3 assume that the small and large Phase II cities are not currently implementing any post-construction program activities. A survey of eastern Washington cities and counties found that this is true in most jurisdictions.

For example, most communities do not have any post-construction requirements. One county requires maintenance plans for any planned on-site stormwater facilities such as ponds. Another city has a stormwater

ordinance that provides authority to assure maintenance of private and commercial stormwater systems within the city.

Figure 9.5 graphically represents the current level of activity, on a high, medium, and low scale, for post-construction programs from the jurisdictions that responded to the survey. This graph is subjective, with a high level of activity representing jurisdictions that are probably meeting or even going beyond the Model Program for post-construction. A low level of activity indicates jurisdictions that will probably have more work to develop a post-construction stormwater program.



9.9 Good Housekeeping Program Costs

9.9.1 Good Housekeeping BMPs

The Model Program for good housekeeping is described in Chapter 7. The good housekeeping Model Program requires the jurisdiction to develop an operation and maintenance plan. This plan will address all the municipal activities within the jurisdiction that could significantly impact stormwater. These activities could include practices for parks or open spaces, vehicle washing BMPs, catch basin cleaning, open channel/structural controls, deicing BMPs, and other municipal activities. For both the small and large cities, it is assumed that all of these BMPs are implemented.

9.9.2 Good Housekeeping BMP Cost Assumptions

BMP 7A – Develop O&M Plan

- Small city: To develop plan, assume 40 hours for field staff, 80 hours for maintenance supervisor, 120 hours for engineer, and 24 hours for manager

- Large city: To develop plan, assume 60 hours for field staff, 100 hours for maintenance supervisor, 160 hours for engineer, and 40 hours for manager

BMP 7B – Park/Open Space BMPs

- Activity starts in year 5
- Small city: 120 hours for field staff, 60 hours for maintenance supervisor, 24 hours for engineer, and 16 hours for manager
- Large city: 200 hours for field staff, 120 hours for maintenance supervisor, 40 hours for engineer, and 24 hours for manager

BMP 7C – Vehicle Washing BMPs

- Activity starts in year 5
- Small city: 120 hours for field staff, 60 hours for maintenance supervisor, 24 hours for engineer, and 16 hours for manager
- Large city: 200 hours for field staff, 120 hours for maintenance supervisor, 40 hours for engineer, and 24 hours for manager

BMP 7D – Dust Control

- Activity starts in year 5
- Small city: 120 hours for field staff, 60 hours for maintenance supervisor, 24 hours for engineer, and 16 hours for manager
- Large city: 200 hours for field staff, 120 hours for maintenance supervisor, 40 hours for engineer, and 24 hours for manager

BMP 7E – Storm System Maintenance

- Assume 40 hours (small) and 60 hours (large) by an engineer to oversee annual maintenance and keep records, manager time at 8 (small) and 16 (large)
- Assume one week spent cleaning catch basins for every 10 outfalls in city
- Small: Assume 4 weeks spent maintaining the rest of the storm drain system
- Large: Assume 12 weeks spent maintaining the rest of the storm drain system
- Small city: 2 person crew (one supervisor, one maintenance worker)
- Large city: 3 person crew (one supervisor, two maintenance workers)
- Catch basin cleaning is above and beyond what is already occurring to respond to complaints and for flood control (assume virtually none since no funding is dedicated for this)
- Small city: 50 percent of a vacuum truck (contracted for), large city: 2 vacuum trucks financed over 10 years with annual payment to include

the cost of the financing plus the cost of a new one in ten years without financing

- Assume \$500 per year (small) and \$2000 per year (large) for analytical testing of maintenance residuals (assume no hazardous loads or costs will increase). Assume that engineer spends 16 hours (small) and 30 hours (large) to analyze chemical testing data and arrange for proper disposal.

BMP 7F – Open Channel/Structural

- Activity starts in year 5
- Small city: 120 hours for field staff, 60 hours for maintenance supervisor, 24 hours for engineer, and 16 hours for manager
- Large city: 200 hours for field staff, 120 hours for maintenance supervisor, 40 hours for engineer, and 24 hours for manager

BMP 7G – Deicing BMPs

- Activity starts in year 5
- Small city: 120 hours for field staff, 60 hours for maintenance supervisor, 24 hours for engineer, and 16 hours for manager
- Large city: 200 hours for field staff, 120 hours for maintenance supervisor, 40 hours for engineer, and 24 hours for manager

BMP 7H – Flood Mgmt. BMPs

- Activity starts in year 5
- Small city: 120 hours for field staff, 60 hours for maintenance supervisor, 24 hours for engineer, and 16 hours for manager
- Large city: 200 hours for field staff, 120 hours for maintenance supervisor, 40 hours for engineer, and 24 hours for manager

BMP 7I – Employee Training

- 8-Hour training course covers O&M Plan and BMPs
- Small city: 1 inspector, 2 field staff, 1 engineer
- Large city: 2 inspectors, 5 field staff, 2 engineers
- Annual refresher training is 2 hours

BMP 7J – Stormwater Plans for Municipal Facilities

- Small city: Assume 10 sites are screened and 4 need plans.
- Large city: Assume 20 sites are screened and 6 need plans.
- Year 3 is spent assessing and screening facilities, year 4 is spent preparing plans and conducting training, and year 5 and future years are spent implementing plans.

9.9.3 Good Housekeeping Cost Summary

For the small city, the total five-year good housekeeping program costs were estimated to be approximately \$174,200. This included the following five-year costs for each of the BMPs:

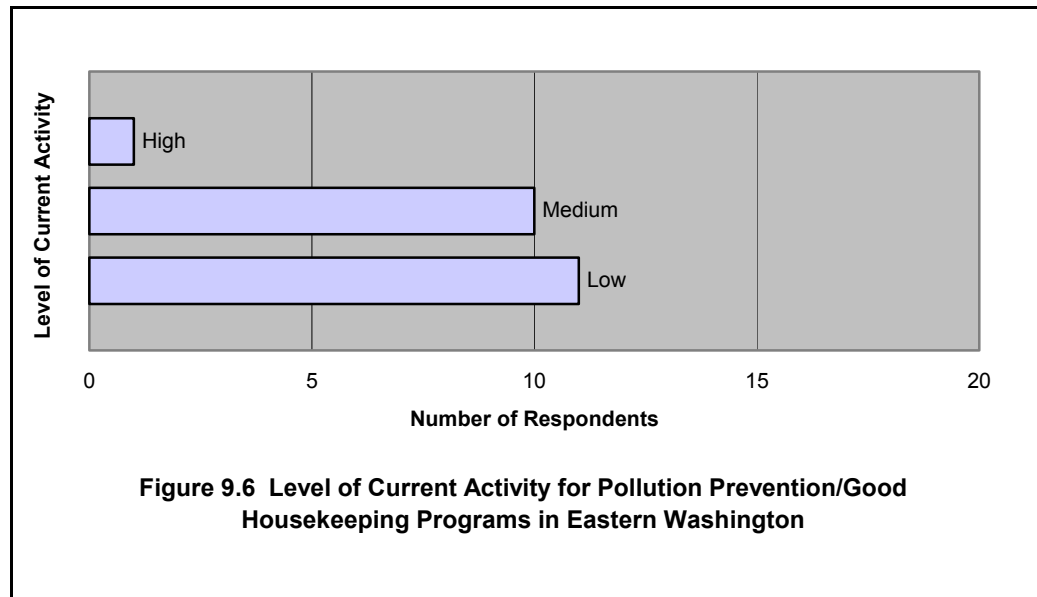
For the large city, the total five-year good housekeeping program costs were estimated to be \$279,600

9.9.4 Existing Practices in Eastern Washington

The costs in Section 9.9.3 assume that the small and large Phase II cities are not currently implementing any good housekeeping program activities. A survey of eastern Washington cities and counties found that this is not true in many of the jurisdictions.

For example, over half of the survey respondents indicated that they clean catch basins and dry wells at least once a year. Several cities also have street sweepers. Information on additional good housekeeping practices, such as deicing and vehicle washing practices were not specifically asked for on the survey.

Figure 9.6 graphically represents the current level of activity, on a high, medium, and low scale, for good housekeeping programs from the jurisdictions that responded to the survey. This graph is subjective, with a high level of activity representing jurisdictions that are probably meeting or even going beyond the Model Program for good housekeeping. A low level of activity indicates jurisdictions that will probably have more work to develop a good housekeeping program.



9.10 Annual Report Costs

Each Phase II community will need to submit an annual report to Ecology detailing compliance with the Phase II NPDES municipal stormwater permit (see Chapter 8 for more information). The costs to collect and write the annual report for the Phase II permit are assumed to be:

- Small city: 40 hours for the engineer, 8 hours for the manager, and 16 hours for the Public Involvement Specialist.
- Large city: Annual reporting costs are assumed to be 80 hours for the engineer, 16 hours for the manager, and 40 hours for the Public Information Specialist.

The total five-year annual report costs for the small municipality are estimated to be approximately \$25,600 (or \$5,100/year). The total five-year annual report costs for the large municipality are estimated to be approximately \$54,000 (or \$10,800/year).

Appendices

Appendix 9A – Small Hypothetical Phase II Communities

Appendix 9B – Large Hypothetical Phase II Communities