

APPENDIX A PUBLIC INVOLVEMENT

**Public Opinion Survey
Summary of Stakeholder Surveys
Corvallis Chamber of Commerce Memorandum
Barney & Worth, Inc. Response to Chamber Memorandum
Evaluation Criteria
Citizen Input Workbook, Information Packet and Summary of Exercise
Citizen Input on Policies and Short/Long Term Basin Programs
Excerpts of Meeting Minutes from USC on 8/14/01 & 8/16/01**

Corvallis Stormwater Master Plan

Summary:

Public Opinion Survey

Prepared for:

**City of Corvallis
Stormwater Planning Committee**

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Brown and Caldwell

January 1998

Table of Contents

	Page
I. Executive Summary	
Corvallis Stormwater Master Plan.....	1
Public Opinion Survey	1
Summary of Results	1
II. Appendices	
Questionnaire	
Data Cross-Tabulations	

I. Executive Summary

Corvallis Stormwater Master Plan

In 1997, the City of Corvallis engaged a multi-disciplinary consultant team headed by the engineering firm Brown and Caldwell to recommend how to control flooding and manage other stormwater problems. The Corvallis Stormwater Master Plan is scheduled to be completed, and recommendations presented to the Corvallis City Council in 1999.

Public Opinion Survey

In December 1997 and January 1998, some 366 Corvallis residents were surveyed to seek their views on many important issues linked to the Corvallis Stormwater Master Plan. Interviews were conducted by telephone with Corvallis residents 18 years and older who were randomly selected. Participants were asked to share their views related to: stormwater issues and stormwater management practices; the nature and severity of flooding problems, causes and possible solutions; values and principles to guide decisionmaking; and costs (a copy of the questionnaire is attached in an appendix).

The survey questions were developed in collaboration with the Corvallis Stormwater Planning Committee.

Summary of Results

A summary of key points offered by the Corvallis residents surveyed regarding the Corvallis Stormwater Master Plan:

1. **Corvallis is a community of "stream people."** Almost half of the Corvallis residents surveyed (44%) live within six blocks of a stream – 13% within one block. Residents say their closest streams are the Willamette River (33%), Dixon Creek (20%) and Mary's River (13%).
2. **Many citizens aren't well informed about stormwater issues,** despite their proximity to streams. Forty percent say they don't know where stormwater drains in their neighborhood, and 29% aren't sure if there are unresolved stormwater issues. This lack of information contrasts with extraordinarily high education levels – 54% of all residents surveyed have at least a bachelors degree, and 22% have earned a post-graduate degree.
3. **A variety of unresolved stormwater issues are recognized in the community.** Nearly half (46%) suspect there are stormwater issues which must be addressed in the future. Top issues (see table) include surface pollutants entering streams (93% say this is very important or important); flooding of streets, homes and businesses (91%); and loss of stream habitat (88%).

Corvallis Stormwater Issues

Issue	% Very Important / Important	% Very Important
Surface pollutants entering streams	93	62
Flooding of streets, homes, businesses	91	57
Loss of stream habitat	88	56
Erosion along stream banks	87	42
Runoff from new development	86	47
Erosion from construction sites	86	40
Development in flood plains	84	53
Use of streams to drain runoff	81	35

4. **A large number of residents have first-hand experience with flooding.** Over one-third of survey participants (37%) say they have been affected by flooding. And for most of these, it has become a routine occurrence – over three-quarters (78%) are impacted by one or more flood events annually. However, for most of these residents the flooding is little more than an inconvenience. Only 22% of respondents who have experienced flooding report any damage to their homes, basements or garages.

5. **New development is a factor – but is not fingered as the main source** of Corvallis stormwater problems. As a possible cause of flooding, 31% of participants think new upstream development may be the leading cause vs. 34% who pinpoint "too much rain" as the likely culprit. Only 14% think developers should take the lead in solving stormwater problems, and only 12% say development fees should be the only source relied on to fund stormwater system improvements.

6. **Citizen values emphasize protecting streams, safeguarding public safety, and preventing flood damage.** The principles supported by nearly all respondents (see table) include control erosion (rated as very important or important by 96%), prevent flood damage to homes / businesses (95%), prevent flood damage to streets / property (95%), protect stream habitat (94%) and improve stream water quality (93%).

Values to Guide Corvallis Stormwater Planning

Value	% Very Important / Important	% Very Important
Control erosion	96	54
Prevent flood damage to homes / businesses	95	60
Protect public safety	95	55
Prevent flood damage to streets / property	95	48
Protect stream habitat	94	60
Improve stream water quality	93	52
Meet statewide regulations	91	40
Provide public information	91	86
Control development	89	54
Protect wetlands	88	56
Minimize utility rates	73	23
Reduce City maintenance costs	71	17
Increase stream widths	66	16
Encourage public access to streams	62	17
Retain stormwater on-site	59	19

7. **Stormwater system costs are not yet an issue.** Two-thirds of all respondents (67%) say they don't know how much they are currently paying for stormwater drainage, and another 21% think they are paying over \$10/month. Nearly half (45%) can't say if the fees are too high, and only 15% are concerned the fees are already too high.
8. **Future stormwater improvements should be funded through a combination of monthly rates and development fees.** If costs must rise in the future, a strong majority (72%) favors the combined approach to financing.
9. **The City of Corvallis is counted on to take the lead in addressing stormwater issues.** A solid majority (72%) says the City should have primary leadership responsibility, vs. 30% who expect private citizens to take charge.

Demographic Profile of Survey Participants

Highlights of key demographic characteristics of the 366 Corvallis residents surveyed regarding stormwater issues:

- Survey participants are equally split by sex: 50% female, 50% male
- Most are home owners: 63% own their homes, 35% rent
- There's a mix of long-time residents and newcomers: 51% have lived in Corvallis 10 years or longer
- Respondents are well-educated: 30% of those in 35-54 age group hold post-graduate degrees
- Most survey participants (59%) live in Northwest Corvallis

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**CORVALLIS STORMWATER
ASSESSMENT SURVEY
DATA CROSS-TABULATIONS
January, 1998**

Corvallis Stormwater Survey
January, 1998
Executive Summary of Results

Background

To establish a baseline of public opinion and identify public sentiment toward the management of stormwater in Corvallis, a telephone survey of 366 residents was conducted in late December, 1997 - early January, 1998. The results of the survey are consistently straightforward: While residents generally lack much knowledge of the specifics of their stormwater service, they fully recognize the importance of stormwater management to public safety and environmental protection. Development is not necessarily viewed as a negative, but Corvallis residents think it certainly impacts stormwater issues, and should be involved in (financing) improvements and enhancements to the City's stormwater system.

Stormwater and Corvallis Residents

- Generally, Corvallis residents appear to lack awareness of the specifics of their stormwater services. Four of ten residents say they don't know where the stormwater drains to in their neighborhood (30% - streams/rivers; 20% - catch basins in the street; 11% - ditches; 9% - pipes to the wastewater treatment plant). Over two-thirds (67%) of those surveyed say they don't know how much they pay monthly for their stormwater service; 21% believe they pay over \$10 a month.
- The majority of residents either can't say whether their stormwater bills are too high, about right or relatively low (45%) or feel they pay about the right amount for their stormwater service (33%).
- While residents may not know the specifics of their stormwater service, nearly half (46%) have some awareness that there are unresolved issues with the management of stormwater in Corvallis. This awareness appears to cross most demographic segments, and does not necessarily correlate with first-hand experience with a stormwater problem. Those who have been affected by flooding (37%) do not appear to have significantly more awareness of unresolved stormwater management issues than those unaffected by flooding.
- Restricted access to home or workplace (48%) and flooded streets (42%) are the most frequent effects of flooding on residents. For those affected by flooding, the problem appears to be ongoing rather than a one time event. Seventy-eight percent of those experiencing flooding have had one or more event in each of the last two years.
- Not surprisingly, flooding of streets, homes and businesses (57% - "very important") and preventing flood damage to homes and businesses (60% - "very important") are of high priority to residents. Preventing flood damage

to streets and property is rated “very important” by 48% of the residents surveyed.

Stormwater and the Environment

- Corvallis residents clearly connect the importance of managing stormwater to the environment. Surface pollutants entering streams receives the highest “very important” rating (62%) of all issues reviewed. Additionally, 52% of those surveyed say improving stream water quality is “very important” for future stormwater management planning.
- Residents also consistently rate stream habitat very important. Fifty-six percent of those surveyed rate loss of stream habitat as “very important.” Sixty percent of the survey respondents say protecting stream habitat is “very important” in planning future community stormwater management.
- The importance of water quality is also underscored as residents rate less highly the option of using streams to drain urban run-off (35% - “very important”) and increasing stream corridor widths (16% - “very important”).
- Currently, stream bank erosion is not rated as intensely important of an issue (42% - “very important”). However, when looking to the future, residents do rate controlling erosion as a very important (54%) component of community storm water management planning. Residents having been affected by flooding are more likely to rate stream bank erosion as very important.
- Similarly, a majority of residents (56%) rate protecting wetlands as “very important” in planning future community stormwater management.
- Residents are willing to pay their share of improved stormwater management. With the exception of those who say their stormwater bills are already too high, the vast majority (72%) of residents surveyed say improvements should be paid through a combination of monthly utility bills and new development fees.

Stormwater and New Development

- Corvallis residents have less intense responses toward the role of development on stormwater management issues than they do when relating stormwater to environmental issues. Erosion from construction sites, runoff from new development, and development in flood plains are rated “very important” by 40% to 53% of the survey respondents; in comparison, “very important” ratings for environmental/stormwater issues range from 56% to 62% of those polled.
- This not painting development as the “bad guy” comes despite that two of the leading causes of recent flooding in Corvallis name development: new/too much upstream development (31%) and poor development

standards/standards not enforced (22%). Too much rain (34%) is the top response.

- For residents, controlling development is important in planning future community stormwater management, but less important than preventing flood damage to homes/businesses and protecting stream habitat.
- State-of-the-art options for future management of stormwater in new developments such as retaining stormwater on-site receive mixed reviews. The high percentage of “don’t knows” (30%) indicates many residents lack familiarity with the newer techniques in stormwater management.

Stormwater and the City of Corvallis

- While Corvallis residents are willing to share responsibility for paying for stormwater management improvements, they are equally of the opinion that the City of Corvallis should be responsible for taking actions to enhance urban streams and better manage stormwater drainage problems in the future. Seventy-two percent of the residents polled say stormwater management activities are the responsibility of the City, 30% say private citizens should (also) be responsible and 14% say developers (also) have responsibility.
- For residents, the City’s stormwater management planning priority should be protecting public safety (55% - “very important”). Some 40% of those surveyed say meeting state-wide regulations is “very important.”
- Beyond public safety and environmental protection, other stormwater management activities are clearly less important to residents: Providing public information (36% - “very important”), minimizing utility rates (23% - “very important”), reducing city maintenance costs (17% - “very important”), and encouraging public access to streams (17% - “very important”).

**Importance of Stormwater Management Activities
Table 1**

	<u>Very Important</u>	<u>Very Important/Important</u>
Surface pollutants entering streams	62%	93%
Flooding of streets, homes, businesses	57%	91%
Loss of stream habitat	56%	88%
Development in flood plains	53%	86%
Rapid run-off from new development	47%	86%
Erosion along stream banks	42%	87%
Erosion from construction sites	40%	86%
Use of streams to drain urban run-off	35%	81%

**Importance in Planning Future Community Stormwater Management
Table 2**

	<u>Very Important</u>	<u>Very Important/Important</u>
Preventing flood damage to homes and businesses	60%	95%
Protecting stream habitat	60%	94%
Protecting wetlands	56%	88%
Protecting public safety	55%	95%
Controlling erosion	54%	96%
Controlling development	54%	89%
Improving stream water quality	52%	93%
Preventing flood damage to streets and property	48%	95%
Meeting state-wide regulations	40%	91%
Providing public information on stormwater management	36%	91%
Minimizing utility rates	23%	73%
Retaining stormwater on-site for new development	19%	59%
Reducing city maintenance costs	17%	71%
Encouraging public access to streams	17%	62%
Increasing stream corridor widths	16%	66%

1. HOW FAR DO YOU LIVE FROM THE NEAREST STREAM OR RIVER?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
ONE CITY BLOCK	46 13%	21 11%	25 14%	13 13%	22 14%	10 10%	5 8%	10 10%	31 16%	31 13%	14 11%	4 12%	27 12%	3 11%	11 15%	28 16%	18 10%
TWO TO SIX CITY BLOCKS	113 31%	63 34%	50 27%	32 32%	55 35%	26 25%	24 39%	31 30%	58 30%	72 31%	39 30%	9 26%	60 28%	14 52%	28 37%	53 30%	60 32%
MORE THAN SIX CITY BLOCKS	199 54%	97 53%	102 56%	53 53%	79 50%	63 62%	31 50%	62 59%	102 52%	124 54%	71 55%	21 62%	125 58%	9 33%	35 47%	91 52%	106 56%
DON'T KNOW	8 2%	3 2%	5 3%	2 2%	2 1%	3 3%	2 3%	2 2%	4 2%	3 1%	5 4%	0	5 2%	1 4%	1 1%	4 2%	4 2%

1. HOW FAR DO YOU LIVE FROM THE NEAREST STREAM OR RIVER?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
ONE CITY BLOCK	46	21	25	23	23	7	15	4	20
	13%	12%	13%	17%	10%	13%	13%	14%	12%
TWO TO SIX CITY BLOCKS	113	62	51	47	66	18	37	12	46
	31%	36%	26%	35%	29%	33%	31%	43%	28%
MORE THAN SIX CITY BLOCKS	199	82	117	62	137	29	68	11	91
	54%	48%	60%	46%	60%	54%	57%	39%	55%
DON'T KNOW	8	5	3	4	4	0	0	1	7
	2%	3%	2%	3%	2%			4%	4%

2. WHICH STREAM OR RIVER?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----				--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
WILLAMETTE RIVER	120	58	62	42	41	34	29	42	47	59	57	17	64	20	12	58	61
	33%	32%	34%	42%	26%	33%	47%	40%	24%	26%	44%	50%	29%	74%	16%	33%	32%
DIXON CREEK	73	33	40	10	37	26	12	16	45	60	12	3	67	0	2	25	48
	20%	18%	22%	10%	23%	25%	19%	15%	23%	26%	9%	9%	31%		3%	14%	26%
MARY'S RIVER	47	24	23	10	18	18	5	10	31	36	9	0	10	4	31	20	27
	13%	13%	13%	10%	11%	18%	8%	10%	16%	16%	7%		5%	15%	41%	11%	14%
OAK CREEK	18	13	5	1	11	6	3	2	13	16	2	0	14	0	3	3	15
	5%	7%	3%	1%	7%	6%	5%	2%	7%	7%	2%		6%		4%	2%	8%
SQUAW CREEK	6	3	3	0	4	2	1	2	3	5	1	0	0	0	6	2	4
	2%	2%	2%		3%	2%	2%	2%	2%	2%	1%				8%	1%	2%
JACKSON/FRAZIER CREEK	4	3	1	1	2	1	0	0	4	2	2	0	4	0	0	3	1
	1%	2%	1%	1%	1%	1%			2%	1%	2%		2%			2%	1%
SEQUOIA CREEK	2	0	2	0	1	1	0	1	1	2	0	0	0	0	2	2	0
	1%		1%		1%	1%		1%	1%	1%					3%	1%	
MUDDY CREEK	2	2	0	1	0	1	0	1	1	2	0	0	0	0	2	0	2
	1%	1%		1%		1%		1%	1%	1%					3%		1%
OTHER	4	2	2	1	2	1	0	1	3	3	1	2	1	0	1	3	1
	1%	1%	1%	1%	1%	1%		1%	2%	1%	1%	6%	*		1%	2%	1%
DON'T KNOW	90	46	44	34	42	12	12	30	47	45	45	12	57	3	16	60	29
	25%	25%	24%	34%	27%	12%	19%	29%	24%	20%	35%	35%	26%	11%	21%	34%	15%

2. WHICH STREAM OR RIVER?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
WILLAMETTE RIVER	120	51	69	51	69	17	34	8	61
	33%	30%	35%	38%	30%	31%	28%	29%	37%
DIXON CREEK	73	40	33	27	46	12	31	7	23
	20%	24%	17%	20%	20%	22%	26%	25%	14%
MARY'S RIVER	47	19	28	14	33	6	13	5	23
	13%	11%	14%	10%	14%	11%	11%	18%	14%
OAK CREEK	18	12	6	5	13	4	7	2	5
	5%	7%	3%	4%	6%	7%	6%	7%	3%
SQUAW CREEK	6	5	1	3	3	0	1	0	5
	2%	3%	1%	2%	1%		1%		3%
JACKSON/FRAZIER CREEK	4	2	2	1	3	0	1	1	2
	1%	1%	1%	1%	1%		1%	4%	1%
SEQUOIA CREEK	2	0	2	0	2	0	1	0	1
	1%		1%		1%		1%		1%
MUDDY CREEK	2	1	1	2	0	0	1	0	1
	1%	1%	1%	1%			1%		1%
OTHER	4	3	1	1	3	0	3	0	1
	1%	2%	1%	1%	1%		3%		1%
DON'T KNOW	90	37	53	32	58	15	28	5	42
	25%	22%	27%	24%	25%	28%	23%	18%	26%

3. DO YOU KNOW WHERE THE STORMWATER DRAINS TO IN YOUR NEIGHBORHOOD?
(MULTIPLE RESPONSE)

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TO STREAMS OR RIVERS	108	60	48	24	55	29	11	27	70	79	28	6	59	11	28	46	61
	30%	33%	26%	24%	35%	28%	18%	26%	36%	34%	22%	18%	27%	41%	37%	26%	32%
TO CATCH BASINS IN THE STREET	75	39	36	17	30	27	9	19	47	49	25	5	50	4	14	33	42
	20%	21%	20%	17%	19%	26%	15%	18%	24%	21%	19%	15%	23%	15%	19%	19%	22%
TO DITCHES	41	22	19	9	21	10	7	9	25	34	7	5	16	4	14	13	28
	11%	12%	10%	9%	13%	10%	11%	9%	13%	15%	5%	15%	7%	15%	19%	7%	15%
IN PIPES TO THE WASTEWATER TREATMENT PLANT	34	17	17	7	9	16	6	12	15	21	11	3	22	4	4	8	25
	9%	9%	9%	7%	6%	16%	10%	11%	8%	9%	9%	9%	10%	15%	5%	5%	13%
DON'T KNOW	145	69	76	53	57	33	35	49	58	72	69	19	85	10	25	86	59
	40%	38%	42%	53%	36%	32%	56%	47%	30%	31%	53%	56%	39%	37%	33%	49%	31%

3. DO YOU KNOW WHERE THE STORMWATER DRAINS TO IN YOUR NEIGHBORHOOD?
(MULTIPLE RESPONSE)

	TOTAL	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
TO STREAMS OR RIVERS	108	63	45	50	58	22	39	7	40
	30%	37%	23%	37%	25%	41%	33%	25%	24%
TO CATCH BASINS IN THE STREET	75	37	38	28	47	12	27	5	31
	20%	22%	19%	21%	20%	22%	23%	18%	19%
TO DITCHES	41	21	20	22	19	4	10	6	21
	11%	12%	10%	16%	8%	7%	8%	21%	13%
IN PIPES TO THE WASTEWATER TREATMENT PLANT	34	18	16	14	20	6	14	4	10
	9%	11%	8%	10%	9%	11%	12%	14%	6%
DON'T KNOW	145	53	92	38	107	19	41	9	76
	40%	31%	47%	28%	47%	35%	34%	32%	46%

4. CURRENTLY DO YOU THINK THERE ARE UNRESOLVED ISSUES WITH THE MANAGEMENT OF
STORMWATER IN CORVALLIS?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
YES	170 46%	90 49%	80 44%	47 47%	85 54%	35 34%	17 27%	47 45%	103 53%	106 46%	62 48%	17 50%	98 45%	15 56%	34 45%	76 43%	93 49%
NO	89 24%	49 27%	40 22%	25 25%	29 18%	33 32%	18 29%	24 23%	46 24%	56 24%	31 24%	5 15%	58 27%	7 26%	17 23%	45 26%	44 23%
DON'T KNOW	107 29%	45 24%	62 34%	28 28%	44 28%	34 33%	27 44%	34 32%	46 24%	68 30%	36 28%	12 35%	61 28%	5 19%	24 32%	55 31%	51 27%

4. CURRENTLY DO YOU THINK THERE ARE UNRESOLVED ISSUES WITH THE MANAGEMENT OF
 STORMWATER IN CORVALLIS?

	TOTAL	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366 100%	170 100%	196 100%	136 100%	230 100%	54 100%	120 100%	28 100%	164 100%
YES	170 46%	170 100%	0	73 54%	97 42%	30 56%	56 47%	15 54%	69 42%
NO	89 24%	0	89 45%	28 21%	61 27%	11 20%	29 24%	6 21%	43 26%
DON'T KNOW	107 29%	0	107 55%	35 26%	72 31%	13 24%	35 29%	7 25%	52 32%

5. PLEASE TELL ME WHETHER EROSION FROM CONSTRUCTION SITES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	148	58	90	42	64	39	20	51	74	95	50	17	84	10	32	70	77
	40%	32%	49%	42%	41%	38%	32%	49%	38%	41%	39%	50%	39%	37%	43%	40%	41%
IMPORTANT	166	91	75	46	76	42	32	40	94	102	60	10	110	10	31	85	81
	45%	49%	41%	46%	48%	41%	52%	38%	48%	44%	47%	29%	51%	37%	41%	48%	43%
NOT IMPORTANT	36	29	7	9	12	15	5	9	22	22	14	4	19	5	7	14	22
	10%	16%	4%	9%	8%	15%	8%	9%	11%	10%	11%	12%	9%	19%	9%	8%	12%
DON'T KNOW	16	6	10	3	6	6	5	5	5	11	5	3	4	2	5	7	8
	4%	3%	5%	3%	4%	6%	8%	5%	3%	5%	4%	9%	2%	7%	7%	4%	4%
TOTAL VERY IMPORTANT/IMPORTANT	314	149	165	88	140	81	52	91	168	197	110	27	194	20	63	155	158
	86%	81%	91%	88%	89%	79%	84%	87%	86%	86%	85%	79%	89%	74%	84%	88%	84%

5. PLEASE TELL ME WHETHER EROSION FROM CONSTRUCTION SITES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	148	73	75	60	88	19	53	15	61
	40%	43%	38%	44%	38%	35%	44%	54%	37%
IMPORTANT	166	73	93	57	109	25	52	11	78
	45%	43%	47%	42%	47%	46%	43%	39%	48%
NOT IMPORTANT	36	15	21	13	23	9	13	2	12
	10%	9%	11%	10%	10%	17%	11%	7%	7%
DON'T KNOW	16	9	7	6	10	1	2	0	13
	4%	5%	4%	4%	4%	2%	2%		8%
TOTAL VERY IMPORTANT/IMPORTANT	314	146	168	117	197	44	105	26	139
	86%	86%	86%	86%	86%	81%	88%	93%	85%

6. PLEASE TELL ME WHETHER EROSION ALONG STREAM BANKS IS VERY IMPORTANT,
IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	154	69	85	50	66	32	21	51	80	95	57	18	84	14	35	74	79
	42%	38%	47%	50%	42%	31%	34%	49%	41%	41%	44%	53%	39%	52%	47%	42%	42%
IMPORTANT	165	86	79	42	74	49	35	42	86	100	60	13	104	11	30	80	85
	45%	47%	43%	42%	47%	48%	56%	40%	44%	43%	47%	38%	48%	41%	40%	45%	45%
NOT IMPORTANT	37	25	12	7	15	15	5	9	23	27	10	3	24	1	7	18	19
	10%	14%	7%	7%	9%	15%	8%	9%	12%	12%	8%	9%	11%	4%	9%	10%	10%
DON'T KNOW	10	4	6	1	3	6	1	3	6	8	2	0	5	1	3	4	5
	3%	2%	3%	1%	2%	6%	2%	3%	3%	3%	2%		2%	4%	4%	2%	3%
TOTAL VERY IMPORTANT/IMPORTANT	319	155	164	92	140	81	56	93	166	195	117	31	188	25	65	154	164
	87%	84%	90%	92%	89%	79%	90%	89%	85%	85%	91%	91%	87%	93%	87%	88%	87%

6. PLEASE TELL ME WHETHER EROSION ALONG STREAM BANKS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	TOTAL	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	154	77	77	69	85	16	56	11	71
	42%	45%	39%	51%	37%	30%	47%	39%	43%
IMPORTANT	165	76	89	58	107	31	48	14	72
	45%	45%	45%	43%	47%	57%	40%	50%	44%
NOT IMPORTANT	37	11	26	6	31	5	14	3	15
	10%	6%	13%	4%	13%	9%	12%	11%	9%
DON'T KNOW	10	6	4	3	7	2	2	0	6
	3%	4%	2%	2%	3%	4%	2%		4%
TOTAL VERY IMPORTANT/IMPORTANT	319	153	166	127	192	47	104	25	143
	87%	90%	85%	93%	83%	87%	87%	89%	87%

7. PLEASE TELL ME WHETHER SURFACE POLLUTANTS ENTERING STREAMS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	227	103	124	76	98	51	35	72	117	134	88	25	126	16	53	124	103
	62%	56%	68%	76%	62%	50%	56%	69%	60%	58%	68%	74%	58%	59%	71%	70%	55%
IMPORTANT	112	63	49	22	51	38	26	28	57	75	35	4	77	11	16	43	67
	31%	34%	27%	22%	32%	37%	42%	27%	29%	33%	27%	12%	35%	41%	21%	24%	36%
NOT IMPORTANT	16	13	3	2	6	7	0	2	14	13	3	3	8	0	4	5	11
	4%	7%	2%	2%	4%	7%		2%	7%	6%	2%	9%	4%		5%	3%	6%
DON'T KNOW	11	5	6	0	3	6	1	3	7	8	3	2	6	0	2	4	7
	3%	3%	3%		2%	6%	2%	3%	4%	3%	2%	6%	3%		3%	2%	4%
TOTAL VERY IMPORTANT/IMPORTANT	339	166	173	98	149	89	61	100	174	209	123	29	203	27	69	167	170
	93%	90%	95%	98%	94%	87%	98%	95%	89%	91%	95%	85%	94%	100%	92%	95%	90%

7. PLEASE TELL ME WHETHER SURFACE POLLUTANTS ENTERING STREAMS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	227	109	118	87	140	22	79	22	104
	62%	64%	60%	64%	61%	41%	66%	79%	63%
IMPORTANT	112	51	61	38	74	26	35	5	46
	31%	30%	31%	28%	32%	48%	29%	18%	28%
NOT IMPORTANT	16	7	9	4	12	5	4	1	6
	4%	4%	5%	3%	5%	9%	3%	4%	4%
DON'T KNOW	11	3	8	7	4	1	2	0	8
	3%	2%	4%	5%	2%	2%	2%		5%
TOTAL VERY IMPORTANT/IMPORTANT	339	160	179	125	214	48	114	27	150
	93%	94%	91%	92%	93%	89%	95%	96%	91%

8. PLEASE TELL ME WHETHER LOSS OF STREAM HABITAT IS VERY IMPORTANT, IMPORTANT,
OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	204	93	111	73	90	37	32	68	101	116	82	24	111	15	48	112	91
	56%	51%	61%	73%	57%	36%	52%	65%	52%	50%	64%	71%	51%	56%	64%	64%	48%
IMPORTANT	119	62	57	23	56	40	24	30	64	79	39	7	76	11	20	49	69
	33%	34%	31%	23%	35%	39%	39%	29%	33%	34%	30%	21%	35%	41%	27%	28%	37%
NOT IMPORTANT	33	26	7	3	9	20	5	4	24	27	6	2	24	1	5	10	23
	9%	14%	4%	3%	6%	20%	8%	4%	12%	12%	5%	6%	11%	4%	7%	6%	12%
DON'T KNOW	10	3	7	1	3	5	1	3	6	8	2	1	6	0	2	5	5
	3%	2%	4%	1%	2%	5%	2%	3%	3%	3%	2%	3%	3%		3%	3%	3%
TOTAL VERY IMPORTANT/IMPORTANT	323	155	168	96	146	77	56	98	165	195	121	31	187	26	68	161	160
	88%	84%	92%	96%	92%	75%	90%	93%	85%	85%	94%	91%	86%	96%	91%	91%	85%

8. PLEASE TELL ME WHETHER LOSS OF STREAM HABITAT IS VERY IMPORTANT, IMPORTANT,
OR NOT IMPORTANT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	204	97	107	79	125	19	72	16	97
	56%	57%	55%	58%	54%	35%	60%	57%	59%
IMPORTANT	119	55	64	44	75	26	32	9	52
	33%	32%	33%	32%	33%	48%	27%	32%	32%
NOT IMPORTANT	33	14	19	9	24	8	15	3	7
	9%	8%	10%	7%	10%	15%	13%	11%	4%
DON'T KNOW	10	4	6	4	6	1	1	0	8
	3%	2%	3%	3%	3%	2%	1%		5%
TOTAL VERY IMPORTANT/IMPORTANT	323	152	171	123	200	45	104	25	149
	88%	89%	87%	90%	87%	83%	87%	89%	91%

9. PLEASE TELL ME WHETHER FLOODING OF STREETS, HOMES AND BUSINESSES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----				-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	208	87	121	56	96	55	38	72	96	127	78	23	129	14	39	111	97
	57%	47%	66%	56%	61%	54%	61%	69%	49%	55%	60%	68%	59%	52%	52%	63%	52%
IMPORTANT	125	74	51	39	50	32	20	28	75	76	45	9	66	12	31	52	72
	34%	40%	28%	39%	32%	31%	32%	27%	38%	33%	35%	26%	30%	44%	41%	30%	38%
NOT IMPORTANT	26	20	6	4	10	12	3	4	19	21	5	2	20	1	1	10	15
	7%	11%	3%	4%	6%	12%	5%	4%	10%	9%	4%	6%	9%	4%	1%	6%	8%
DON'T KNOW	7	3	4	1	2	3	1	1	5	6	1	0	2	0	4	3	4
	2%	2%	2%	1%	1%	3%	2%	1%	3%	3%	1%		1%		5%	2%	2%
TOTAL VERY IMPORTANT/IMPORTANT	333	161	172	95	146	87	58	100	171	203	123	32	195	26	70	163	169
	91%	88%	95%	95%	92%	85%	94%	95%	88%	88%	95%	94%	90%	96%	93%	93%	90%

9. PLEASE TELL ME WHETHER FLOODING OF STREETS, HOMES AND BUSINESSES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	208	97	111	94	114	28	70	17	93
	57%	57%	57%	69%	50%	52%	58%	61%	57%
IMPORTANT	125	61	64	32	93	18	37	9	61
	34%	36%	33%	24%	40%	33%	31%	32%	37%
NOT IMPORTANT	26	9	17	7	19	5	12	2	7
	7%	5%	9%	5%	8%	9%	10%	7%	4%
DON'T KNOW	7	3	4	3	4	3	1	0	3
	2%	2%	2%	2%	2%	6%	1%		2%
TOTAL VERY IMPORTANT/IMPORTANT	333	158	175	126	207	46	107	26	154
	91%	93%	89%	93%	90%	85%	89%	93%	94%

10. PLEASE TELL ME WHETHER RAPID RUNOFF FROM NEW DEVELOPMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----				--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	171	75	96	43	75	48	27	52	89	119	48	20	96	14	34	85	85
	47%	41%	53%	43%	47%	47%	44%	50%	46%	52%	37%	59%	44%	52%	45%	48%	45%
IMPORTANT	145	76	69	44	66	35	26	39	79	80	62	9	97	10	27	68	77
	40%	41%	38%	44%	42%	34%	42%	37%	41%	35%	48%	26%	45%	37%	36%	39%	41%
NOT IMPORTANT	35	29	6	9	12	14	4	9	22	24	11	3	19	2	10	17	18
	10%	16%	3%	9%	8%	14%	6%	9%	11%	10%	9%	9%	9%	7%	13%	10%	10%
DON'T KNOW	15	4	11	4	5	5	5	5	5	7	8	2	5	1	4	6	8
	4%	2%	6%	4%	3%	5%	8%	5%	3%	3%	6%	6%	2%	4%	5%	3%	4%
TOTAL VERY IMPORTANT/IMPORTANT	316	151	165	87	141	83	53	91	168	199	110	29	193	24	61	153	162
	86%	82%	91%	87%	89%	81%	85%	87%	86%	87%	85%	85%	89%	89%	81%	87%	86%

10. PLEASE TELL ME WHETHER RAPID RUNOFF FROM NEW DEVELOPMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	171	84	87	65	106	24	59	15	73
	47%	49%	44%	48%	46%	44%	49%	54%	45%
IMPORTANT	145	68	77	55	90	25	46	11	63
	40%	40%	39%	40%	39%	46%	38%	39%	38%
NOT IMPORTANT	35	15	20	8	27	4	12	2	17
	10%	9%	10%	6%	12%	7%	10%	7%	10%
DON'T KNOW	15	3	12	8	7	1	3	0	11
	4%	2%	6%	6%	3%	2%	3%		7%
TOTAL VERY IMPORTANT/IMPORTANT	316	152	164	120	196	49	105	26	136
	86%	89%	84%	88%	85%	91%	88%	93%	83%

11. PLEASE TELL ME WHETHER USE OF STREAMS TO DRAIN URBAN RUNOFF IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	129	61	68	45	56	27	14	47	64	77	50	11	70	9	34	67	61
	35%	33%	37%	45%	35%	26%	23%	45%	33%	33%	39%	32%	32%	33%	45%	38%	32%
IMPORTANT	167	84	83	39	76	48	39	37	91	105	60	19	107	9	28	82	85
	46%	46%	46%	39%	48%	47%	63%	35%	47%	46%	47%	56%	49%	33%	37%	47%	45%
NOT IMPORTANT	37	25	12	12	14	11	6	7	24	22	13	0	27	4	5	18	19
	10%	14%	7%	12%	9%	11%	10%	7%	12%	10%	10%		12%	15%	7%	10%	10%
DON'T KNOW	33	14	19	4	12	16	3	14	16	26	6	4	13	5	8	9	23
	9%	8%	10%	4%	8%	16%	5%	13%	8%	11%	5%	12%	6%	19%	11%	5%	12%
TOTAL VERY IMPORTANT/IMPORTANT	296	145	151	84	132	75	53	84	155	182	110	30	177	18	62	149	146
	81%	79%	83%	84%	84%	74%	85%	80%	79%	79%	85%	88%	82%	67%	83%	85%	78%

11. PLEASE TELL ME WHETHER USE OF STREAMS TO DRAIN URBAN RUNOFF IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	--UNRESOLVED-		-AFPEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	129	71	58	58	71	14	44	10	61
	35%	42%	30%	43%	31%	26%	37%	36%	37%
IMPORTANT	167	72	95	50	117	27	53	15	72
	46%	42%	48%	37%	51%	50%	44%	54%	44%
NOT IMPORTANT	37	15	22	14	23	5	17	1	14
	10%	9%	11%	10%	10%	9%	14%	4%	9%
DON'T KNOW	33	12	21	14	19	8	6	2	17
	9%	7%	11%	10%	8%	15%	5%	7%	10%
TOTAL VERY IMPORTANT/IMPORTANT	296	143	153	108	188	41	97	25	133
	81%	84%	78%	79%	82%	76%	81%	89%	81%

12. PLEASE TELL ME WHETHER DEVELOPMENT IN FLOOD PLAINS IS VERY IMPORTANT,
IMPORTANT, OR NOT IMPORTANT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	194	98	96	52	91	47	28	56	106	123	66	18	113	11	44	100	93
	53%	53%	53%	52%	58%	46%	45%	53%	54%	53%	51%	53%	52%	41%	59%	57%	49%
IMPORTANT	114	55	59	37	44	32	22	32	60	66	46	6	81	10	16	54	60
	31%	30%	32%	37%	28%	31%	35%	30%	31%	29%	36%	18%	37%	37%	21%	31%	32%
NOT IMPORTANT	34	22	12	6	14	14	6	10	18	25	9	4	19	5	5	16	18
	9%	12%	7%	6%	9%	14%	10%	10%	9%	11%	7%	12%	9%	19%	7%	9%	10%
DON'T KNOW	24	9	15	5	9	9	6	7	11	16	8	6	4	1	10	6	17
	7%	5%	8%	5%	6%	9%	10%	7%	6%	7%	6%	18%	2%	4%	13%	3%	9%
TOTAL VERY IMPORTANT/IMPORTANT	308	153	155	89	135	79	50	88	166	189	112	24	194	21	60	154	153
	84%	83%	85%	89%	85%	77%	81%	84%	85%	82%	87%	71%	89%	78%	80%	88%	81%

12. PLEASE TELL ME WHETHER DEVELOPMENT IN FLOOD PLAINS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT?

	--UNRESOLVED-		-AFPEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	194	96	98	77	117	22	66	18	88
	53%	56%	50%	57%	51%	41%	55%	64%	54%
IMPORTANT	114	47	67	38	76	22	39	6	47
	31%	28%	34%	28%	33%	41%	33%	21%	29%
NOT IMPORTANT	34	14	20	12	22	7	9	3	15
	9%	8%	10%	9%	10%	13%	8%	11%	9%
DON'T KNOW	24	13	11	9	15	3	6	1	14
	7%	8%	6%	7%	7%	6%	5%	4%	9%
TOTAL VERY IMPORTANT/IMPORTANT	308	143	165	115	193	44	105	24	135
	84%	84%	84%	85%	84%	81%	88%	86%	82%

13. WHAT DO YOU THINK HAS HELPED TO CAUSE THE FLOODING IN THE CORVALLIS
COMMUNITY DURING THE PAST FEW YEARS? (MULTIPLE RESPONSE)

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---			-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOO MUCH RAINFALL	125	79	46	24	60	41	17	34	73	85	37	5	81	11	25	48	77
	34%	43%	25%	24%	38%	40%	27%	32%	37%	37%	29%	15%	37%	41%	33%	27%	41%
NEW/TOO MUCH/UPSTREAM DEVELOPMENT	112	52	60	24	54	31	15	31	65	78	33	10	72	9	18	40	72
	31%	28%	33%	24%	34%	30%	24%	30%	33%	34%	26%	29%	33%	33%	24%	23%	38%
POOR DEVELOPMENT STANDARDS/NOT ENFORCED	80	33	47	23	37	17	9	25	44	48	31	6	51	6	15	37	42
	22%	18%	26%	23%	23%	17%	15%	24%	23%	21%	24%	18%	24%	22%	20%	21%	22%
CLOGGED STREET GUTTER OR CATCH BASIN	51	21	30	19	24	6	7	17	27	27	23	4	31	6	7	23	28
	14%	11%	16%	19%	15%	6%	11%	16%	14%	12%	18%	12%	14%	22%	9%	13%	15%
DEVELOPMENT IN FLOOD PLAINS	51	24	27	13	23	13	7	14	30	34	16	7	31	2	9	22	29
	14%	13%	15%	13%	15%	13%	11%	13%	15%	15%	12%	21%	14%	7%	12%	13%	15%
STREAM OVERFLOWING BANKS	38	19	19	8	17	13	7	12	19	30	8	6	23	2	7	14	24
	10%	10%	10%	8%	11%	13%	11%	11%	10%	13%	6%	18%	11%	7%	9%	8%	13%
INADEQUATE SEWER/DRAINAGE SYSTEM/PIPES	18	10	8	2	12	4	3	4	11	11	7	0	12	2	4	7	11
	5%	5%	4%	2%	8%	4%	5%	4%	6%	5%	5%		6%	7%	5%	4%	6%
STREAM OVERFLOWING AT CULVERT UNDER STREET	9	5	4	4	4	1	1	2	6	5	4	1	4	2	1	4	5
	2%	3%	2%	4%	3%	1%	2%	2%	3%	2%	3%	3%	2%	7%	1%	2%	3%
EXCESS/EARLY/TOO MUCH/SNOW MELT	9	5	4	2	5	2	1	4	4	8	1	0	6	0	3	4	5
	2%	3%	2%	2%	3%	2%	2%	4%	2%	3%	1%		3%		4%	2%	3%
TOO MUCH LOGGING/CLEARCUTTING	8	6	2	3	3	2	0	1	7	4	4	0	4	0	2	4	4
	2%	3%	1%	3%	2%	2%		1%	4%	2%	3%		2%		3%	2%	2%
TOO MUCH PAVEMENT/CONCRETE/ ROAD SURFACE	8	3	5	0	3	3	0	2	5	5	2	1	3	0	3	1	6
	2%	2%	3%		2%	3%		2%	3%	2%	2%	3%	1%		4%	1%	3%
TOO MANY PEOPLE/POPULATION GROWTH/OVERPOPULATION	7	4	3	1	4	1	1	2	4	5	2	2	3	2	0	2	5
	2%	2%	2%	1%	3%	1%	2%	2%	2%	2%	2%	6%	1%	7%		1%	3%

13. WHAT DO YOU THINK HAS HELPED TO CAUSE THE FLOODING IN THE CORVALLIS
COMMUNITY DURING THE PAST FEW YEARS? (MULTIPLE RESPONSE)

	--UNRESOLVED--		--AFFEC FLOOD--		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOO MUCH RAINFALL	125	50	75	45	80	16	49	11	49
	34%	29%	38%	33%	35%	30%	41%	39%	30%
NEW/TOO MUCH/UPSTREAM DEVELOPMENT	112	70	42	46	66	19	45	11	37
	31%	41%	21%	34%	29%	35%	38%	39%	23%
POOR DEVELOPMENT STANDARDS/NOT ENFORCED	80	60	20	39	41	13	33	7	27
	22%	35%	10%	29%	18%	24%	28%	25%	16%
CLOGGED STREET GUTTER OR CATCH BASIN	51	29	22	33	18	6	14	5	26
	14%	17%	11%	24%	8%	11%	12%	18%	16%
DEVELOPMENT IN FLOOD PLAINS	51	29	22	19	32	5	19	3	24
	14%	17%	11%	14%	14%	9%	16%	11%	15%
STREAM OVERFLOWING BANKS	38	15	23	18	20	6	10	5	17
	10%	9%	12%	13%	9%	11%	8%	18%	10%
INADEQUATE SEWER/DRAINAGE SYSTEM/PIPES	18	13	5	9	9	4	9	0	5
	5%	8%	3%	7%	4%	7%	8%		3%
STREAM OVERFLOWING AT CULVERT UNDER STREET	9	6	3	7	2	1	4	1	3
	2%	4%	2%	5%	1%	2%	3%	4%	2%
EXCESS/EARLY/TOO MUCH/SNOW MELT	9	3	6	6	3	4	2	0	3
	2%	2%	3%	4%	1%	7%	2%		2%
TOO MUCH LOGGING/CLEARCUTTING	8	6	2	3	5	0	2	0	6
	2%	4%	1%	2%	2%		2%		4%
TOO MUCH PAVEMENT/CONCRETE/ROAD SURFACE	8	5	3	5	3	1	3	2	2
	2%	3%	2%	4%	1%	2%	3%	7%	1%
TOO MANY PEOPLE/POPULATION GROWTH/OVERPOPULATION	7	3	4	3	4	1	4	0	2
	2%	2%	2%	2%	2%	2%	3%		1%

13. WHAT DO YOU THINK HAS HELPED TO CAUSE THE FLOODING IN THE CORVALLIS
COMMUNITY DURING THE PAST FEW YEARS? (MULTIPLE RESPONSE)

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
STREAM DEBRIS	6	3	3	3	2	1	1	2	3	3	3	0	4	1	1	4	2
	2%	2%	2%	3%	1%	1%	2%	2%	2%	1%	2%		2%	4%	1%	2%	1%
STORMS/WEATHER PATTERNS/ CYCLES/EL NINO	5	2	3	0	4	1	0	1	4	4	1	0	3	0	1	3	2
	1%	1%	2%		3%	1%		1%	2%	2%	1%		1%		1%	2%	1%
EROSION	4	3	1	2	2	0	1	3	0	1	3	0	3	1	0	2	2
	1%	2%	1%	2%	1%		2%	3%		*	2%		1%	4%		1%	1%
FLOW COMING OUT OF MANHOLE	3	3	0	2	1	0	0	2	1	1	2	0	2	0	0	1	2
	1%	2%		2%	1%			2%	1%	*	2%		1%			1%	1%
DON'T KNOW	60	16	44	25	17	18	21	18	20	31	27	9	26	4	18	44	15
	16%	9%	24%	25%	11%	18%	34%	17%	10%	13%	21%	26%	12%	15%	24%	25%	8%

13. WHAT DO YOU THINK HAS HELPED TO CAUSE THE FLOODING IN THE CORVALLIS
COMMUNITY DURING THE PAST FEW YEARS? (MULTIPLE RESPONSE)

	TOTAL	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366 100%	170 100%	196 100%	136 100%	230 100%	54 100%	120 100%	28 100%	164 100%
STREAM DEBRIS	6 2%	3 2%	3 2%	5 4%	1 *	3 6%	1 1%	2 7%	0
STORMS/WEATHER PATTERNS/ CYCLES/EL NIMO	5 1%	2 1%	3 2%	4 3%	1 *	0	2 2%	0	3 2%
EROSION	4 1%	3 2%	1 1%	3 2%	1 *	2 4%	1 1%	0	1 1%
FLOW COMING OUT OF MANHOLE	3 1%	3 2%	0	2 1%	1 *	0	0	0	3 2%
DON'T KNOW	60 16%	13 8%	47 24%	9 7%	51 22%	8 15%	11 9%	4 14%	37 23%

14. HAVE YOU BEEN AFFECTED BY THE FLOODING IN CORVALLIS?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>	
TOTAL	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
YES	136	62	74	40	62	29	12	51	72	83	49	12	71	21	26	55	80
	37%	34%	41%	40%	39%	28%	19%	49%	37%	36%	38%	35%	33%	78%	35%	31%	43%
NO	230	122	108	60	96	73	50	54	123	147	80	22	146	6	49	121	108
	63%	66%	59%	60%	61%	72%	81%	51%	63%	64%	62%	65%	67%	22%	65%	69%	57%

14. HAVE YOU BEEN AFFECTED BY THE FLOODING IN CORVALLIS?

	TOTAL	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
YES	136	73	63	136	0	19	48	13	56
	37%	43%	32%	100%		35%	40%	46%	34%
NO	230	97	133	0	230	35	72	15	108
	63%	57%	68%		100%	65%	60%	54%	66%

15. HOW HAS FLOODING AFFECTED YOU? (MULTIPLE RESPONSE)

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BASE:	136	62	74	40	62	29	12	51	72	83	49	12	71	21	26	55	80
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
RESTRICTED ACCESS TO HOME OR WORKPLACE	65	32	33	21	36	7	5	28	31	38	26	4	34	15	9	25	39
	48%	52%	45%	53%	58%	24%	42%	55%	43%	46%	53%	33%	48%	71%	35%	45%	49%
FLOODED STREETS	57	26	31	13	29	14	5	21	30	35	20	4	27	13	12	19	37
	42%	42%	42%	33%	47%	48%	42%	41%	42%	42%	41%	33%	38%	62%	46%	35%	46%
FLOODED YARD OR DRIVEWAY	30	13	17	7	11	11	3	12	15	21	7	5	12	4	7	12	18
	22%	21%	23%	18%	18%	38%	25%	24%	21%	25%	14%	42%	17%	19%	27%	22%	23%
FLOODED BASEMENT/GARAGE OR CRAWL SPACE	23	7	16	10	8	4	2	6	15	15	7	0	18	2	2	13	10
	17%	11%	22%	25%	13%	14%	17%	12%	21%	18%	14%		25%	10%	8%	24%	13%
RESTRICTED/DIFFICULT TRANSPORTATION	10	4	6	3	4	1	1	2	6	1	8	1	7	0	1	5	4
	7%	6%	8%	8%	6%	3%	8%	4%	8%	1%	16%	8%	10%		4%	9%	5%
FLOODED FIRST FLOOR	7	3	4	3	0	2	0	4	3	5	2	1	2	1	2	2	5
	5%	5%	5%	8%		7%		8%	4%	6%	4%	8%	3%	5%	8%	4%	6%
WATER SERVICE WAS SHUT OFF	1	0	1	1	0	0	0	1	0	0	1	1	0	0	0	1	0
	1%		1%	3%				2%			2%	8%				2%	

15. HOW HAS FLOODING AFFECTED YOU? (MULTIPLE RESPONSE)

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
BASE:	136	73	63	136	0	19	48	13	56
	100%	100%	100%	100%		100%	100%	100%	100%
RESTRICTED ACCESS TO HOME OR WORKPLACE	65	38	27	65	0	15	19	6	25
	48%	52%	43%	48%		79%	40%	46%	45%
FLOODED STREETS	57	33	24	57	0	11	17	6	23
	42%	45%	38%	42%		58%	35%	46%	41%
FLOODED YARD OR DRIVEWAY	30	17	13	30	0	4	10	3	13
	22%	23%	21%	22%		21%	21%	23%	23%
FLOODED BASEMENT/GARAGE OR CRAWL SPACE	23	11	12	23	0	3	11	2	7
	17%	15%	19%	17%		16%	23%	15%	13%
RESTRICTED/DIFFICULT TRANSPORTATION	10	7	3	10	0	1	2	1	6
	7%	10%	5%	7%		5%	4%	8%	11%
FLOODED FIRST FLOOR	7	6	1	7	0	1	2	1	3
	5%	8%	2%	5%		5%	4%	8%	5%
WATER SERVICE WAS SHUT OFF	1	0	1	1	0	0	0	0	1
	1%		2%	1%					2%

16. HOW OFTEN HAS FLOODING AFFECTED YOU IN THE LAST TWO YEARS?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
BASE:	136	62	74	40	62	29	12	51	72	83	49	12	71	21	26	55	80
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TWO OR MORE EVENTS PER YEAR	55	21	34	22	21	10	4	21	30	27	28	7	25	5	14	28	27
	40%	34%	46%	55%	34%	34%	33%	41%	42%	33%	57%	58%	35%	24%	54%	51%	34%
ONE EVENT PER YEAR	52	28	24	14	26	10	5	22	24	35	14	3	28	14	6	17	34
	38%	45%	32%	35%	42%	34%	42%	43%	33%	42%	29%	25%	39%	67%	23%	31%	43%
LESS THAN ONE EVENT PER YEAR	20	11	9	4	10	6	2	6	12	13	6	2	12	0	5	7	13
	15%	18%	12%	10%	16%	21%	17%	12%	17%	16%	12%	17%	17%		19%	13%	16%
DON'T KNOW/NOT SURE	9	2	7	0	5	3	1	2	6	8	1	0	6	2	1	3	6
	7%	3%	9%		8%	10%	8%	4%	8%	10%	2%		8%	10%	4%	5%	8%

16. HOW OFTEN HAS FLOODING AFFECTED YOU IN THE LAST TWO YEARS?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366 100%	170 100%	196 100%	136 100%	230 100%	54 100%	120 100%	28 100%	164 100%
BASE:	136 100%	73 100%	63 100%	136 100%	0	19 100%	48 100%	13 100%	56 100%
TWO OR MORE EVENTS PER YEAR	55 40%	35 48%	20 32%	55 40%	0	5 26%	20 42%	5 38%	25 45%
ONE EVENT PER YEAR	52 38%	24 33%	28 44%	52 38%	0	10 53%	20 42%	6 46%	16 29%
LESS THAN ONE EVENT PER YEAR	20 15%	9 12%	11 17%	20 15%	0	1 5%	7 15%	1 8%	11 20%
DON'T KNOW/NOT SURE	9 7%	5 7%	4 6%	9 7%	0	3 16%	1 2%	1 8%	4 7%

17. PLEASE TELL ME WHETHER IMPROVING STREAM WATER QUALITY IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	191	90	101	62	89	36	27	60	101	110	76	21	106	14	45	102	88
	52%	49%	55%	62%	56%	35%	44%	57%	52%	48%	59%	62%	49%	52%	60%	58%	47%
IMPORTANT	151	78	73	33	58	59	33	34	83	105	45	10	101	13	23	65	86
	41%	42%	40%	33%	37%	58%	53%	32%	43%	46%	35%	29%	47%	48%	31%	37%	46%
NOT IMPORTANT	16	13	3	3	8	5	1	6	9	10	6	1	9	0	6	8	8
	4%	7%	2%	3%	5%	5%	2%	6%	5%	4%	5%	3%	4%		8%	5%	4%
DON'T KNOW	8	3	5	2	3	2	1	5	2	5	2	2	1	0	1	1	6
	2%	2%	3%	2%	2%	2%	2%	5%	1%	2%	2%	6%	*		1%	1%	3%
TOTAL VERY IMPORTANT/IMPORTANT	342	168	174	95	147	95	60	94	184	215	121	31	207	27	68	167	174
	93%	91%	96%	95%	93%	93%	97%	90%	94%	93%	94%	91%	95%	100%	91%	95%	93%

17. PLEASE TELL ME WHETHER IMPROVING STREAM WATER QUALITY IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	191	98	93	77	114	19	68	15	89
	52%	58%	47%	57%	50%	35%	57%	54%	54%
IMPORTANT	151	61	90	49	102	30	49	12	60
	41%	36%	46%	36%	44%	56%	41%	43%	37%
NOT IMPORTANT	16	8	8	6	10	5	1	1	9
	4%	5%	4%	4%	4%	9%	1%	4%	5%
DON'T KNOW	8	3	5	4	4	0	2	0	6
	2%	2%	3%	3%	2%		2%		4%
TOTAL VERY IMPORTANT/IMPORTANT	342	159	183	126	216	49	117	27	149
	93%	94%	93%	93%	94%	91%	98%	96%	91%

18. PLEASE TELL ME WHETHER INCREASING STREAM CORRIDOR WIDTHS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	58	28	30	19	27	11	11	15	32	33	25	6	33	6	13	30	28
	16%	15%	16%	19%	17%	11%	18%	14%	16%	14%	19%	18%	15%	22%	17%	17%	15%
IMPORTANT	185	97	88	55	74	54	31	55	96	114	66	14	114	13	36	89	95
	51%	53%	48%	55%	47%	53%	50%	52%	49%	50%	51%	41%	53%	48%	48%	51%	51%
NOT IMPORTANT	71	41	30	18	34	19	10	16	44	51	19	2	48	5	14	35	36
	19%	22%	16%	18%	22%	19%	16%	15%	23%	22%	15%	6%	22%	19%	19%	20%	19%
DON'T KNOW	52	18	34	8	23	18	10	19	23	32	19	12	22	3	12	22	29
	14%	10%	19%	8%	15%	18%	16%	18%	12%	14%	15%	35%	10%	11%	16%	13%	15%
TOTAL VERY IMPORTANT/IMPORTANT	243	125	118	74	101	65	42	70	128	147	91	20	147	19	49	119	123
	66%	68%	65%	74%	64%	64%	68%	67%	66%	64%	71%	59%	68%	70%	65%	68%	65%

18. PLEASE TELL ME WHETHER INCREASING STREAM CORRIDOR WIDTHS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	58	36	22	27	31	9	19	6	24
	16%	21%	11%	20%	13%	17%	16%	21%	15%
IMPORTANT	185	86	99	63	122	31	68	13	73
	51%	51%	51%	46%	53%	57%	57%	46%	45%
NOT IMPORTANT	71	27	44	26	45	11	21	7	32
	19%	16%	22%	19%	20%	20%	18%	25%	20%
DON'T KNOW	52	21	31	20	32	3	12	2	35
	14%	12%	16%	15%	14%	6%	10%	7%	21%
TOTAL VERY IMPORTANT/IMPORTANT	243	122	121	90	153	40	87	19	97
	66%	72%	62%	66%	67%	74%	73%	68%	59%

19. PLEASE TELL ME WHETHER PREVENTING FLOOD DAMAGE TO STREETS AND PROPERTY IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	175	78	97	51	69	52	34	54	85	105	65	22	108	11	28	97	78
	48%	42%	53%	51%	44%	51%	55%	51%	44%	46%	50%	65%	50%	41%	37%	55%	41%
IMPORTANT	172	96	76	47	77	46	27	46	97	111	59	11	100	14	42	72	98
	47%	52%	42%	47%	49%	45%	44%	44%	50%	48%	46%	32%	46%	52%	56%	41%	52%
NOT IMPORTANT	14	9	5	2	8	4	1	4	9	9	5	1	8	1	4	5	9
	4%	5%	3%	2%	5%	4%	2%	4%	5%	4%	4%	3%	4%	4%	5%	3%	5%
DON'T KNOW	5	1	4	0	4	0	0	1	4	5	0	0	1	1	1	2	3
	1%	1%	2%		3%			1%	2%	2%			*	4%	1%	1%	2%
TOTAL VERY IMPORTANT/IMPORTANT	347	174	173	98	146	98	61	100	182	216	124	33	208	25	70	169	176
	95%	95%	95%	98%	92%	96%	98%	95%	93%	94%	96%	97%	96%	93%	93%	96%	94%

19. PLEASE TELL ME WHETHER PREVENTING FLOOD DAMAGE TO STREETS AND PROPERTY IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	175	88	87	75	100	32	60	10	73
	48%	52%	44%	55%	43%	59%	50%	36%	45%
IMPORTANT	172	75	97	55	117	17	57	16	82
	47%	44%	49%	40%	51%	31%	48%	57%	50%
NOT IMPORTANT	14	7	7	2	12	4	2	2	6
	4%	4%	4%	1%	5%	7%	2%	7%	4%
DON'T KNOW	5	0	5	4	1	1	1	0	3
	1%		3%	3%	*	2%	1%		2%
TOTAL VERY IMPORTANT/IMPORTANT	347	163	184	130	217	49	117	26	155
	95%	96%	94%	96%	94%	91%	98%	93%	95%

20. PLEASE TELL ME WHETHER PROVIDING PUBLIC INFORMATION ON STORMWATER MANAGEMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	133	52	81	48	53	31	20	50	62	72	59	15	76	14	25	67	66
	36%	28%	45%	48%	34%	30%	32%	48%	32%	31%	46%	44%	35%	52%	33%	38%	35%
IMPORTANT	200	109	91	46	91	61	40	50	107	138	58	17	120	13	41	95	103
	55%	59%	50%	46%	58%	60%	65%	48%	55%	60%	45%	50%	55%	48%	55%	54%	55%
NOT IMPORTANT	29	21	8	6	13	9	1	4	24	17	11	1	20	0	8	14	15
	8%	11%	4%	6%	8%	9%	2%	4%	12%	7%	9%	3%	9%		11%	8%	8%
DON'T KNOW	4	2	2	0	1	1	1	1	2	3	1	1	1	0	1	0	4
	1%	1%	1%		1%	1%	2%	1%	1%	1%	1%	3%	*		1%		2%
TOTAL VERY IMPORTANT/IMPORTANT	333	161	172	94	144	92	60	100	169	210	117	32	196	27	66	162	169
	91%	88%	95%	94%	91%	90%	97%	95%	87%	91%	91%	94%	90%	100%	88%	92%	90%

20. PLEASE TELL ME WHETHER PROVIDING PUBLIC INFORMATION ON STORMWATER MANAGEMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	133	59	74	57	76	20	36	10	67
	36%	35%	38%	42%	33%	37%	30%	36%	41%
IMPORTANT	200	95	105	68	132	28	77	15	80
	55%	56%	54%	50%	57%	52%	64%	54%	49%
NOT IMPORTANT	29	15	14	9	20	6	7	3	13
	8%	9%	7%	7%	9%	11%	6%	11%	8%
DON'T KNOW	4	1	3	2	2	0	0	0	4
	1%	1%	2%	1%	1%				2%
TOTAL VERY IMPORTANT/IMPORTANT	333	154	179	125	208	48	113	25	147
	91%	91%	91%	92%	90%	89%	94%	89%	90%

21. PLEASE TELL ME WHETHER ENCOURAGING PUBLIC ACCESS TO STREAMS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	63	32	31	23	28	12	12	17	32	36	26	6	33	5	18	37	26
	17%	17%	17%	23%	18%	12%	19%	16%	16%	16%	20%	18%	15%	19%	24%	21%	14%
IMPORTANT	165	80	85	45	73	45	32	56	77	101	60	21	99	11	30	82	83
	45%	43%	47%	45%	46%	44%	52%	53%	39%	44%	47%	62%	46%	41%	40%	47%	44%
NOT IMPORTANT	113	64	49	29	47	35	14	24	73	73	39	7	73	11	17	49	63
	31%	35%	27%	29%	30%	34%	23%	23%	37%	32%	30%	21%	34%	41%	23%	28%	34%
DON'T KNOW	25	8	17	3	10	10	4	8	13	20	4	0	12	0	10	8	16
	7%	4%	9%	3%	6%	10%	6%	8%	7%	9%	3%		6%		13%	5%	9%
TOTAL VERY IMPORTANT/IMPORTANT	228	112	116	68	101	57	44	73	109	137	86	27	132	16	48	119	109
	62%	61%	64%	68%	64%	56%	71%	70%	56%	60%	67%	79%	61%	59%	64%	68%	58%

21. PLEASE TELL ME WHETHER ENCOURAGING PUBLIC ACCESS TO STREAMS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	63	27	36	19	44	12	20	5	26
	17%	16%	18%	14%	19%	22%	17%	18%	16%
IMPORTANT	165	74	91	67	98	24	52	13	76
	45%	44%	46%	49%	43%	44%	43%	46%	46%
NOT IMPORTANT	113	58	55	39	74	13	44	8	48
	31%	34%	28%	29%	32%	24%	37%	29%	29%
DON'T KNOW	25	11	14	11	14	5	4	2	14
	7%	6%	7%	8%	6%	9%	3%	7%	9%
TOTAL VERY IMPORTANT/IMPORTANT	228	101	127	86	142	36	72	18	102
	62%	59%	65%	63%	62%	67%	60%	64%	62%

22. PLEASE TELL ME WHETHER PROTECTING PUBLIC SAFETY IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	203	95	108	65	91	45	34	64	103	128	73	24	120	19	33	102	101
	55%	52%	59%	65%	58%	44%	55%	61%	53%	56%	57%	71%	55%	70%	44%	58%	54%
IMPORTANT	146	79	67	32	64	48	25	39	81	92	50	10	89	7	36	69	76
	40%	43%	37%	32%	41%	47%	40%	37%	42%	40%	39%	29%	41%	26%	48%	39%	40%
NOT IMPORTANT	11	9	2	2	1	7	2	1	7	6	4	0	7	0	3	3	7
	3%	5%	1%	2%	1%	7%	3%	1%	4%	3%	3%		3%		4%	2%	4%
DON'T KNOW	6	1	5	1	2	2	1	1	4	4	2	0	1	1	3	2	4
	2%	1%	3%	1%	1%	2%	2%	1%	2%	2%	2%		*	4%	4%	1%	2%
TOTAL VERY IMPORTANT/IMPORTANT	349	174	175	97	155	93	59	103	184	220	123	34	209	26	69	171	177
	95%	95%	96%	97%	98%	91%	95%	98%	94%	96%	95%	100%	96%	96%	92%	97%	94%

22. PLEASE TELL ME WHETHER PROTECTING PUBLIC SAFETY IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	203	93	110	88	115	33	64	16	90
	55%	55%	56%	65%	50%	61%	53%	57%	55%
IMPORTANT	146	68	78	43	103	18	51	12	65
	40%	40%	40%	32%	45%	33%	43%	43%	40%
NOT IMPORTANT	11	5	6	3	8	2	5	0	4
	3%	3%	3%	2%	3%	4%	4%		2%
DON'T KNOW	6	4	2	2	4	1	0	0	5
	2%	2%	1%	1%	2%	2%			3%
TOTAL VERY IMPORTANT/IMPORTANT	349	161	188	131	218	51	115	28	155
	95%	95%	96%	96%	95%	94%	96%	100%	95%

23. PLEASE TELL ME WHETHER PREVENTING FLOOD DAMAGE TO HOMES AND BUSINESSES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	218	94	124	56	92	67	42	65	109	135	79	24	139	12	37	107	111
	60%	51%	68%	56%	58%	66%	68%	62%	56%	59%	61%	71%	64%	44%	49%	61%	59%
IMPORTANT	130	78	52	41	58	30	16	35	77	82	45	8	69	14	34	63	65
	36%	42%	29%	41%	37%	29%	26%	33%	39%	36%	35%	24%	32%	52%	45%	36%	35%
NOT IMPORTANT	13	10	3	3	6	4	3	4	6	8	5	1	9	1	2	5	8
	4%	5%	2%	3%	4%	4%	5%	4%	3%	3%	4%	3%	4%	4%	3%	3%	4%
DON'T KNOW	5	2	3	0	2	1	1	1	3	5	0	1	0	0	2	1	4
	1%	1%	2%		1%	1%	2%	1%	2%	2%		3%			3%	1%	2%
TOTAL VERY IMPORTANT/IMPORTANT	348	172	176	97	150	97	58	100	186	217	124	32	208	26	71	170	176
	95%	93%	97%	97%	95%	95%	94%	95%	95%	94%	96%	94%	96%	96%	95%	97%	94%

23. PLEASE TELL ME WHETHER PREVENTING FLOOD DAMAGE TO HOMES AND BUSINESSES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	218	101	117	96	122	34	68	17	99
	60%	59%	60%	71%	53%	63%	57%	61%	60%
IMPORTANT	130	62	68	36	94	17	47	10	56
	36%	36%	35%	26%	41%	31%	39%	36%	34%
NOT IMPORTANT	13	6	7	1	12	2	4	1	6
	4%	4%	4%	1%	5%	4%	3%	4%	4%
DON'T KNOW	5	1	4	3	2	1	1	0	3
	1%	1%	2%	2%	1%	2%	1%		2%
TOTAL VERY IMPORTANT/IMPORTANT	348	163	185	132	216	51	115	27	155
	95%	96%	94%	97%	94%	94%	96%	96%	95%

24. PLEASE TELL ME WHETHER PROTECTING STREAM HABITAT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	220	100	120	75	97	44	35	69	113	129	86	24	121	19	48	114	105
	60%	54%	66%	75%	61%	43%	56%	66%	58%	56%	67%	71%	56%	70%	64%	65%	56%
IMPORTANT	125	67	58	24	55	45	21	34	69	86	38	7	84	7	24	56	68
	34%	36%	32%	24%	35%	44%	34%	32%	35%	37%	29%	21%	39%	26%	32%	32%	36%
NOT IMPORTANT	18	17	1	1	6	11	4	2	12	13	4	2	12	1	2	5	13
	5%	9%	1%	1%	4%	11%	6%	2%	6%	6%	3%	6%	6%	4%	3%	3%	7%
DON'T KNOW	3	0	3	0	0	2	2	0	1	2	1	1	0	0	1	1	2
	1%		2%			2%	3%		1%	1%	1%	3%			1%	1%	1%
TOTAL VERY IMPORTANT/IMPORTANT	345	167	178	99	152	89	56	103	182	215	124	31	205	26	72	170	173
	94%	91%	98%	99%	96%	87%	90%	98%	93%	93%	96%	91%	94%	96%	96%	97%	92%

24. PLEASE TELL ME WHETHER PROTECTING STREAM HABITAT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	220	105	115	92	128	21	80	14	105
	60%	62%	59%	68%	56%	39%	67%	50%	64%
IMPORTANT	125	55	70	38	87	26	34	11	54
	34%	32%	36%	28%	38%	48%	28%	39%	33%
NOT IMPORTANT	18	9	9	5	13	6	6	3	3
	5%	5%	5%	4%	6%	11%	5%	11%	2%
DON'T KNOW	3	1	2	1	2	1	0	0	2
	1%	1%	1%	1%	1%	2%			1%
TOTAL VERY IMPORTANT/IMPORTANT	345	160	185	130	215	47	114	25	159
	94%	94%	94%	96%	93%	87%	95%	89%	97%

25. PLEASE TELL ME WHETHER CONTROLLING EROSION IS VERY IMPORTANT, IMPORTANT,
OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----				--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	196	86	110	58	86	47	32	58	103	118	73	22	109	17	40	102	93
	54%	47%	60%	58%	54%	46%	52%	55%	53%	51%	57%	65%	50%	63%	53%	58%	49%
IMPORTANT	154	86	68	39	66	49	27	42	84	100	52	11	101	9	31	68	86
	42%	47%	37%	39%	42%	48%	44%	40%	43%	43%	40%	32%	47%	33%	41%	39%	46%
NOT IMPORTANT	12	11	1	2	6	4	3	2	7	9	3	1	7	1	2	6	6
	3%	6%	1%	2%	4%	4%	5%	2%	4%	4%	2%	3%	3%	4%	3%	3%	3%
DON'T KNOW	4	1	3	1	0	2	0	3	1	3	1	0	0	0	2	0	3
	1%	1%	2%	1%		2%		3%	1%	1%	1%				3%		2%
TOTAL VERY IMPORTANT/IMPORTANT	350	172	178	97	152	96	59	100	187	218	125	33	210	26	71	170	179
	96%	93%	98%	97%	96%	94%	95%	95%	96%	95%	97%	97%	97%	96%	95%	97%	95%

25. PLEASE TELL ME WHETHER CONTROLLING EROSION IS VERY IMPORTANT, IMPORTANT,
OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	196	95	101	80	116	20	71	12	93
	54%	56%	52%	59%	50%	37%	59%	43%	57%
IMPORTANT	154	70	84	50	104	31	45	14	64
	42%	41%	43%	37%	45%	57%	38%	50%	39%
NOT IMPORTANT	12	3	9	3	9	3	3	2	4
	3%	2%	5%	2%	4%	6%	3%	7%	2%
DON'T KNOW	4	2	2	3	1	0	1	0	3
	1%	1%	1%	2%	*		1%		2%
TOTAL VERY IMPORTANT/IMPORTANT	350	165	185	130	220	51	116	26	157
	96%	97%	94%	96%	96%	94%	97%	93%	96%

26. PLEASE TELL ME WHETHER CONTROLLING DEVELOPMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	198	91	107	58	90	45	27	62	105	122	71	24	109	17	42	92	105
	54%	49%	59%	58%	57%	44%	44%	59%	54%	53%	55%	71%	50%	63%	56%	52%	56%
IMPORTANT	129	68	61	32	51	46	30	35	64	89	38	10	82	9	24	62	67
	35%	37%	34%	32%	32%	45%	48%	33%	33%	39%	29%	29%	38%	33%	32%	35%	36%
NOT IMPORTANT	30	21	9	9	16	5	5	6	19	13	17	0	22	1	7	20	10
	8%	11%	5%	9%	10%	5%	8%	6%	10%	6%	13%		10%	4%	9%	11%	5%
DON'T KNOW	9	4	5	1	1	6	0	2	7	6	3	0	4	0	2	2	6
	2%	2%	3%	1%	1%	6%		2%	4%	3%	2%		2%		3%	1%	3%
TOTAL VERY IMPORTANT/IMPORTANT	327	159	168	90	141	91	57	97	169	211	109	34	191	26	66	154	172
	89%	86%	92%	90%	89%	89%	92%	92%	87%	92%	84%	100%	88%	96%	88%	88%	91%

26. PLEASE TELL ME WHETHER CONTROLLING DEVELOPMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	198	103	95	91	107	23	75	19	81
	54%	61%	48%	67%	47%	43%	63%	68%	49%
IMPORTANT	129	53	76	36	93	25	32	7	65
	35%	31%	39%	26%	40%	46%	27%	25%	40%
NOT IMPORTANT	30	11	19	7	23	6	10	2	12
	8%	6%	10%	5%	10%	11%	8%	7%	7%
DON'T KNOW	9	3	6	2	7	0	3	0	6
	2%	2%	3%	1%	3%		3%		4%
TOTAL VERY IMPORTANT/IMPORTANT	327	156	171	127	200	48	107	26	146
	89%	92%	87%	93%	87%	89%	89%	93%	89%

27. PLEASE TELL ME WHETHER RETAINING STORMWATER ON-SITE FOR NEW DEVELOPMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	68	39	29	25	24	19	14	21	32	42	24	5	41	2	15	36	32
	19%	21%	16%	25%	15%	19%	23%	20%	16%	18%	19%	15%	19%	7%	20%	20%	17%
IMPORTANT	147	71	76	44	66	34	33	43	69	87	57	17	86	10	30	78	68
	40%	39%	42%	44%	42%	33%	53%	41%	35%	38%	44%	50%	40%	37%	40%	44%	36%
NOT IMPORTANT	43	29	14	16	18	9	3	10	30	22	19	1	30	3	8	24	19
	12%	16%	8%	16%	11%	9%	5%	10%	15%	10%	15%	3%	14%	11%	11%	14%	10%
DON'T KNOW	108	45	63	15	50	40	12	31	64	79	29	11	60	12	22	38	69
	30%	24%	35%	15%	32%	39%	19%	30%	33%	34%	22%	32%	28%	44%	29%	22%	37%
TOTAL VERY IMPORTANT/IMPORTANT	215	110	105	69	90	53	47	64	101	129	81	22	127	12	45	114	100
	59%	60%	58%	69%	57%	52%	76%	61%	52%	56%	63%	65%	59%	44%	60%	65%	53%

27. PLEASE TELL ME WHETHER RETAINING STORMWATER ON-SITE FOR NEW DEVELOPMENT IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	68	33	35	24	44	8	27	3	30
	19%	19%	18%	18%	19%	15%	23%	11%	18%
IMPORTANT	147	66	81	54	93	21	49	17	60
	40%	39%	41%	40%	40%	39%	41%	61%	37%
NOT IMPORTANT	43	24	19	15	28	9	10	4	20
	12%	14%	10%	11%	12%	17%	8%	14%	12%
DON'T KNOW	108	47	61	43	65	16	34	4	54
	30%	28%	31%	32%	28%	30%	28%	14%	33%
TOTAL VERY IMPORTANT/IMPORTANT	215	99	116	78	137	29	76	20	90
	59%	58%	59%	57%	60%	54%	63%	71%	55%

28. PLEASE TELL ME WHETHER REDUCING CITY MAINTENANCE COSTS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	61	36	25	25	21	13	13	25	22	27	29	12	29	4	14	35	26
	17%	20%	14%	25%	13%	13%	21%	24%	11%	12%	22%	35%	13%	15%	19%	20%	14%
IMPORTANT	200	102	98	53	89	57	31	60	108	137	62	12	131	14	38	93	107
	55%	55%	54%	53%	56%	56%	50%	57%	55%	60%	48%	35%	60%	52%	51%	53%	57%
NOT IMPORTANT	83	43	40	20	43	18	13	14	54	51	31	8	45	9	18	38	44
	23%	23%	22%	20%	27%	18%	21%	13%	28%	22%	24%	24%	21%	33%	24%	22%	23%
DON'T KNOW	22	3	19	2	5	14	5	6	11	15	7	2	12	0	5	10	11
	6%	2%	10%	2%	3%	14%	8%	6%	6%	7%	5%	6%	6%		7%	6%	6%
TOTAL VERY IMPORTANT/IMPORTANT	261	138	123	78	110	70	44	85	130	164	91	24	160	18	52	128	133
	71%	75%	68%	78%	70%	69%	71%	81%	67%	71%	71%	71%	74%	67%	69%	73%	71%

28. PLEASE TELL ME WHETHER REDUCING CITY MAINTENANCE COSTS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	61	22	39	23	38	9	16	3	33
	17%	13%	20%	17%	17%	17%	13%	11%	20%
IMPORTANT	200	91	109	70	130	35	69	16	80
	55%	54%	56%	51%	57%	65%	58%	57%	49%
NOT IMPORTANT	83	48	35	35	48	7	32	9	35
	23%	28%	18%	26%	21%	13%	27%	32%	21%
DON'T KNOW	22	9	13	8	14	3	3	0	16
	6%	5%	7%	6%	6%	6%	3%		10%
TOTAL VERY IMPORTANT/IMPORTANT	261	113	148	93	168	44	85	19	113
	71%	66%	76%	68%	73%	81%	71%	68%	69%

29. PLEASE TELL ME WHETHER MINIMIZING UTILITY RATES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	84	48	36	28	36	18	25	30	28	41	40	14	49	2	14	43	41
	23%	26%	20%	28%	23%	18%	40%	29%	14%	18%	31%	41%	23%	7%	19%	24%	22%
IMPORTANT	185	87	98	53	80	51	32	54	98	120	62	12	108	20	41	86	99
	51%	47%	54%	53%	51%	50%	52%	51%	50%	52%	48%	35%	50%	74%	55%	49%	53%
NOT IMPORTANT	80	43	37	17	38	24	4	15	59	56	23	5	52	5	16	41	38
	22%	23%	20%	17%	24%	24%	6%	14%	30%	24%	18%	15%	24%	19%	21%	23%	20%
DON'T KNOW	17	6	11	2	4	9	1	6	10	13	4	3	8	0	4	6	10
	5%	3%	6%	2%	3%	9%	2%	6%	5%	6%	3%	9%	4%		5%	3%	5%
TOTAL VERY IMPORTANT/IMPORTANT	269	135	134	81	116	69	57	84	126	161	102	26	157	22	55	129	140
	73%	73%	74%	81%	73%	68%	92%	80%	65%	70%	79%	76%	72%	81%	73%	73%	74%

29. PLEASE TELL ME WHETHER MINIMIZING UTILITY RATES IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	84	38	46	33	51	14	24	4	42
	23%	22%	23%	24%	22%	26%	20%	14%	26%
IMPORTANT	185	78	107	68	117	35	61	12	77
	51%	46%	55%	50%	51%	65%	51%	43%	47%
NOT IMPORTANT	80	43	37	30	50	3	33	12	32
	22%	25%	19%	22%	22%	6%	28%	43%	20%
DON'T KNOW	17	11	6	5	12	2	2	0	13
	5%	6%	3%	4%	5%	4%	2%		8%
TOTAL VERY IMPORTANT/IMPORTANT	269	116	153	101	168	49	85	16	119
	73%	68%	78%	74%	73%	91%	71%	57%	73%

30. PLEASE TELL ME WHETHER PROTECTING WETLANDS IS VERY IMPORTANT, IMPORTANT,
OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	204	98	106	68	92	39	29	62	110	120	79	26	114	15	42	108	95
	56%	53%	58%	68%	58%	38%	47%	59%	56%	52%	61%	76%	53%	56%	56%	61%	51%
IMPORTANT	119	58	61	27	50	42	25	31	63	81	37	5	79	9	24	53	66
	33%	32%	34%	27%	32%	41%	40%	30%	32%	35%	29%	15%	36%	33%	32%	30%	35%
NOT IMPORTANT	32	21	11	5	13	14	5	9	17	19	13	2	22	2	5	14	18
	9%	11%	6%	5%	8%	14%	8%	9%	9%	8%	10%	6%	10%	7%	7%	8%	10%
DON'T KNOW	11	7	4	0	3	7	3	3	5	10	0	1	2	1	4	1	9
	3%	4%	2%		2%	7%	5%	3%	3%	4%		3%	1%	4%	5%	1%	5%
TOTAL VERY IMPORTANT/IMPORTANT	323	156	167	95	142	81	54	93	173	201	116	31	193	24	66	161	161
	88%	85%	92%	95%	90%	79%	87%	89%	89%	87%	90%	91%	89%	89%	88%	91%	86%

30. PLEASE TELL ME WHETHER PROTECTING WETLANDS IS VERY IMPORTANT, IMPORTANT,
OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	TOTAL	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	204	103	101	83	121	24	65	19	96
	56%	61%	52%	61%	53%	44%	54%	68%	59%
IMPORTANT	119	52	67	41	78	22	42	6	49
	33%	31%	34%	30%	34%	41%	35%	21%	30%
NOT IMPORTANT	32	11	21	8	24	5	11	2	14
	9%	6%	11%	6%	10%	9%	9%	7%	9%
DON'T KNOW	11	4	7	4	7	3	2	1	5
	3%	2%	4%	3%	3%	6%	2%	4%	3%
TOTAL VERY IMPORTANT/IMPORTANT	323	155	168	124	199	46	107	25	145
	88%	91%	86%	91%	87%	85%	89%	89%	88%

31. PLEASE TELL ME WHETHER MEETING STATE-WIDE REGULATIONS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	148	62	86	49	68	30	18	51	77	92	54	14	90	13	28	73	75
	40%	34%	47%	49%	43%	29%	29%	49%	39%	40%	42%	41%	41%	48%	37%	41%	40%
IMPORTANT	185	99	86	49	74	59	39	45	100	112	69	18	112	13	37	90	95
	51%	54%	47%	49%	47%	58%	63%	43%	51%	49%	53%	53%	52%	48%	49%	51%	51%
NOT IMPORTANT	19	16	3	1	10	7	3	5	10	15	3	2	10	0	5	7	11
	5%	9%	2%	1%	6%	7%	5%	5%	5%	7%	2%	6%	5%		7%	4%	6%
DON'T KNOW	14	7	7	1	6	6	2	4	8	11	3	0	5	1	5	6	7
	4%	4%	4%	1%	4%	6%	3%	4%	4%	5%	2%		2%	4%	7%	3%	4%
TOTAL VERY IMPORTANT/IMPORTANT	333	161	172	98	142	89	57	96	177	204	123	32	202	26	65	163	170
	91%	88%	95%	98%	90%	87%	92%	91%	91%	89%	95%	94%	93%	96%	87%	93%	90%

31. PLEASE TELL ME WHETHER MEETING STATE-WIDE REGULATIONS IS VERY IMPORTANT, IMPORTANT, OR NOT IMPORTANT IN PLANNING FUTURE COMMUNITY STORMWATER MANAGEMENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
VERY IMPORTANT	148	75	73	62	86	18	49	13	68
	40%	44%	37%	46%	37%	33%	41%	46%	41%
IMPORTANT	185	79	106	62	123	29	60	13	83
	51%	46%	54%	46%	53%	54%	50%	46%	51%
NOT IMPORTANT	19	8	11	6	13	7	6	2	4
	5%	5%	6%	4%	6%	13%	5%	7%	2%
DON'T KNOW	14	8	6	6	8	0	5	0	9
	4%	5%	3%	4%	3%		4%		5%
TOTAL VERY IMPORTANT/IMPORTANT	333	154	179	124	209	47	109	26	151
	91%	91%	91%	91%	91%	87%	91%	93%	92%

32. WHO SHOULD BE PRIMARILY RESPONSIBLE FOR TAKING ACTIONS IN OUR COMMUNITY TO ENHANCE URBAN STREAMS OR BETTER MANAGE STORMWATER DRAINAGE PROBLEMS IN THE FUTURE? (MULTIPLE RESPONSE)

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEGE	COLLEGE GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CITY OF CORVALLIS	264	141	123	76	114	72	37	71	153	175	85	25	159	21	50	126	138
	72%	77%	68%	76%	72%	71%	60%	68%	78%	76%	66%	74%	73%	78%	67%	72%	73%
PRIVATE CITIZENS	109	52	57	36	48	24	22	39	46	61	45	10	62	11	24	54	54
	30%	28%	31%	36%	30%	24%	35%	37%	24%	27%	35%	29%	29%	41%	32%	31%	29%
DEVELOPERS	52	24	28	12	26	14	7	13	32	37	15	4	34	2	11	32	20
	14%	13%	15%	12%	16%	14%	11%	12%	16%	16%	12%	12%	16%	7%	15%	18%	11%
THE STATE/GOVERNMENT/AGENCY	34	23	11	13	12	9	4	6	23	17	17	3	18	4	8	20	14
	9%	13%	6%	13%	8%	9%	6%	6%	12%	7%	13%	9%	8%	15%	11%	11%	7%
COUNTY/GOVERNMENT/AGENCY	28	18	10	3	14	11	5	5	16	21	7	1	17	2	7	10	18
	8%	10%	5%	3%	9%	11%	8%	5%	8%	9%	5%	3%	8%	7%	9%	6%	10%
LOCAL COMMUNITY/COMMITTEE	22	11	11	12	6	4	1	8	12	11	11	0	13	2	6	13	9
	6%	6%	6%	12%	4%	4%	2%	8%	6%	5%	9%		6%	7%	8%	7%	5%
WATER SYSTEMS EXPERTS	12	4	8	2	5	4	0	1	10	7	4	0	5	0	6	6	6
	3%	2%	4%	2%	3%	4%		1%	5%	3%	3%		2%		8%	3%	3%
EVERYBODY	11	4	7	4	5	2	4	5	2	6	5	2	3	0	6	6	5
	3%	2%	4%	4%	3%	2%	6%	5%	1%	3%	4%	6%	1%		8%	3%	3%
BUSINESS/OWNERS	6	3	3	4	1	1	2	3	1	2	3	1	3	0	2	3	3
	2%	2%	2%	4%	1%	1%	3%	3%	1%	1%	2%	3%	1%		3%	2%	2%
ENVIRONMENTAL ACTIVISTS/ EXPERTS/GROUPS	6	3	3	1	5	0	0	2	4	3	2	0	3	0	3	4	2
	2%	2%	2%	1%	3%			2%	2%	1%	2%		1%		4%	2%	1%
OTHER	1	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1
	*	1%			1%				1%	*			*				1%

32. WHO SHOULD BE PRIMARILY RESPONSIBLE FOR TAKING ACTIONS IN OUR COMMUNITY TO ENHANCE URBAN STREAMS OR BETTER MANAGE STORMWATER DRAINAGE PROBLEMS IN THE FUTURE? (MULTIPLE RESPONSE)

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
CITY OF CORVALLIS	264	130	134	99	165	35	91	22	116
	72%	76%	68%	73%	72%	65%	76%	79%	71%
PRIVATE CITIZENS	109	43	66	45	64	14	34	11	50
	30%	25%	34%	33%	28%	26%	28%	39%	30%
DEVELOPERS	52	26	26	12	40	4	20	2	26
	14%	15%	13%	9%	17%	7%	17%	7%	16%
THE STATE/GOVERNMENT/AGENCY	34	14	20	14	20	4	10	2	18
	9%	8%	10%	10%	9%	7%	8%	7%	11%
COUNTY/GOVERNMENT/AGENCY	28	16	12	11	17	3	10	2	13
	8%	9%	6%	8%	7%	6%	8%	7%	8%
LOCAL COMMUNITY/COMMITTEE	22	8	14	12	10	6	3	2	11
	6%	5%	7%	9%	4%	11%	3%	7%	7%
WATER SYSTEMS EXPERTS	12	4	8	3	9	2	3	1	6
	3%	2%	4%	2%	4%	4%	3%	4%	4%
EVERYBODY	11	5	6	4	7	2	1	1	7
	3%	3%	3%	3%	3%	4%	1%	4%	4%
BUSINESS/OWNERS	6	2	4	3	3	0	1	0	5
	2%	1%	2%	2%	1%		1%		3%
ENVIRONMENTAL ACTIVISTS/ EXPERTS/GROUPS	6	3	3	3	3	0	2	0	4
	2%	2%	2%	2%	1%		2%		2%
OTHER	1	1	0	1	0	1	0	0	0
	*	1%		1%		2%			

32. WHO SHOULD BE PRIMARILY RESPONSIBLE FOR TAKING ACTIONS IN OUR COMMUNITY TO ENHANCE URBAN STREAMS OR BETTER MANAGE STORMWATER DRAINAGE PROBLEMS IN THE FUTURE? (MULTIPLE RESPONSE)

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
DON'T KNOW	41	12	29	10	11	18	13	13	15	22	18	6	25	2	6	21	19
	11%	7%	16%	10%	7%	18%	21%	12%	8%	10%	14%	18%	12%	7%	8%	12%	10%

32. WHO SHOULD BE PRIMARILY RESPONSIBLE FOR TAKING ACTIONS IN OUR COMMUNITY TO ENHANCE URBAN STREAMS OR BETTER MANAGE STORMWATER DRAINAGE PROBLEMS IN THE FUTURE? (MULTIPLE RESPONSE)

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
DON'T KNOW	41	16	25	13	28	6	15	2	18
	11%	9%	13%	10%	12%	11%	13%	7%	11%

33. CORVALLIS RESIDENTS AND PROPERTY OWNERS CURRENTLY PAY FOR STORMWATER MANAGEMENT SERVICES THROUGH A MONTHLY UTILITY FEE THAT IS INCLUDED WITH THE WATER AND SEWER BILL. HOW MUCH DOES YOUR HOUSEHOLD PAY PER MONTH?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	>10YRS
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LESS THAN \$1	5	4	1	0	5	0	1	1	3	4	1	2	1	0	2	1	4
	1%	2%	1%		3%		2%	1%	2%	2%	1%	6%	*		3%	1%	2%
\$1 TO \$2.99	12	9	3	2	5	5	2	1	9	10	1	1	5	2	4	5	7
	3%	5%	2%	2%	3%	5%	3%	1%	5%	4%	1%	3%	2%	7%	5%	3%	4%
\$3 TO \$10	27	12	15	6	16	5	2	10	15	23	4	3	14	3	7	9	18
	7%	7%	8%	6%	10%	5%	3%	10%	8%	10%	3%	9%	6%	11%	9%	5%	10%
OVER \$10	76	37	39	11	40	24	15	16	45	65	11	5	54	6	11	30	46
	21%	20%	21%	11%	25%	24%	24%	15%	23%	28%	9%	15%	25%	22%	15%	17%	24%
DON'T KNOW/NOT SURE	246	122	124	81	92	68	42	77	123	128	112	23	143	16	51	131	113
	67%	66%	68%	81%	58%	67%	68%	73%	63%	56%	87%	68%	66%	59%	68%	74%	60%

33. CORVALLIS RESIDENTS AND PROPERTY OWNERS CURRENTLY PAY FOR STORMWATER MANAGEMENT SERVICES THROUGH A MONTHLY UTILITY FEE THAT IS INCLUDED WITH THE WATER AND SEWER BILL. HOW MUCH DOES YOUR HOUSEHOLD PAY PER MONTH?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
LESS THAN \$1	5	4	1	2	3	0	0	1	4
	1%	2%	1%	1%	1%			4%	2%
\$1 TO \$2.99	12	3	9	3	9	1	8	2	1
	3%	2%	5%	2%	4%	2%	7%	7%	1%
\$3 TO \$10	27	16	11	15	12	6	12	5	4
	7%	9%	6%	11%	5%	11%	10%	18%	2%
OVER \$10	76	41	35	34	42	21	39	5	11
	21%	24%	18%	25%	18%	39%	33%	18%	7%
DON'T KNOW/NOT SURE	246	106	140	82	164	26	61	15	144
	67%	62%	71%	60%	71%	48%	51%	54%	88%

34. CURRENTLY, DO YOU FEEL THAT YOUR STORMWATER DRAINAGE BILLS ARE TOO HIGH FOR THE SERVICE PROVIDED, ABOUT RIGHT FOR THE SERVICE PROVIDED, OR RELATIVELY LOW FOR THE SERVICE PROVIDED?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOO HIGH FOR THE SERVICE PROVIDED	54	32	22	11	25	17	12	16	26	39	14	3	32	5	12	15	39
	15%	17%	12%	11%	16%	17%	19%	15%	13%	17%	11%	9%	15%	19%	16%	9%	21%
ABOUT RIGHT FOR THE SERVICE PROVIDED	120	58	62	24	54	41	18	25	75	88	29	4	86	10	17	51	67
	33%	32%	34%	24%	34%	40%	29%	24%	38%	38%	22%	12%	40%	37%	23%	29%	36%
RELATIVELY LOW FOR THE SERVICE PROVIDED	28	17	11	7	14	6	6	4	18	20	8	6	16	1	5	16	12
	8%	9%	6%	7%	9%	6%	10%	4%	9%	9%	6%	18%	7%	4%	7%	9%	6%
DON'T KNOW/NO OPINION	164	77	87	58	65	38	26	60	76	83	78	21	83	11	41	94	70
	45%	42%	48%	58%	41%	37%	42%	57%	39%	36%	60%	62%	38%	41%	55%	53%	37%

34. CURRENTLY, DO YOU FEEL THAT YOUR STORMWATER DRAINAGE BILLS ARE TOO HIGH FOR THE SERVICE PROVIDED, ABOUT RIGHT FOR THE SERVICE PROVIDED, OR RELATIVELY LOW FOR THE SERVICE PROVIDED?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
TOO HIGH FOR THE SERVICE PROVIDED	54	30	24	19	35	54	0	0	0
	15%	18%	12%	14%	15%	100%			
ABOUT RIGHT FOR THE SERVICE PROVIDED	120	56	64	48	72	0	120	0	0
	33%	33%	33%	35%	31%		100%		
RELATIVELY LOW FOR THE SERVICE PROVIDED	28	15	13	13	15	0	0	28	0
	8%	9%	7%	10%	7%			100%	
DON'T KNOW/NO OPINION	164	69	95	56	108	0	0	0	164
	45%	41%	48%	41%	47%				100%

35. AFTER I NAME THREE POSSIBLE WAYS OF PAYING FOR IMPROVED STORMWATER MANAGEMENT, PLEASE TELL ME WHICH YOU THINK IS THE BEST WAY FOR THE PEOPLE IN CORVALLIS?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
COLLECTING MONEY THROUGH A COMBINATION/MONTHLY UTILITY RATES/NEW DEVELOPMENT FEES	262 72%	130 71%	132 73%	72 72%	114 72%	73 72%	39 63%	78 74%	142 73%	162 70%	94 73%	21 62%	158 73%	20 74%	57 76%	126 72%	134 71%
COLLECTING MONEY EXCLUSIVELY BY CHARGING FEES FOR NEW DEVELOPMENT	45 12%	24 13%	21 12%	13 13%	19 12%	12 12%	5 8%	15 14%	25 13%	33 14%	11 9%	3 9%	31 14%	2 7%	7 9%	19 11%	26 14%
COLLECTING MONEY EXCLUSIVELY THROUGH MONTHLY UTILITY RATES PAID BY ALL CUSTOMERS	38 10%	19 10%	19 10%	15 15%	16 10%	7 7%	12 19%	8 8%	18 9%	20 9%	18 14%	6 18%	19 9%	5 19%	7 9%	26 15%	12 6%
NONE	11 3%	8 4%	3 2%	0	7 4%	4 4%	3 5%	3 3%	4 2%	9 4%	2 2%	1 3%	5 2%	0	4 5%	3 2%	8 4%
DON'T KNOW/NOT SURE	10 3%	3 2%	7 4%	0	2 1%	6 6%	3 5%	1 1%	6 3%	6 3%	4 3%	3 9%	4 2%	0	0	2 1%	8 4%

35. AFTER I NAME THREE POSSIBLE WAYS OF PAYING FOR IMPROVED STORMWATER MANAGEMENT, PLEASE TELL ME WHICH YOU THINK IS THE BEST WAY FOR THE PEOPLE IN CORVALLIS?

	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
COLLECTING MONEY THROUGH A COMBINATION/MONTHLY UTILITY RATES/NEW DEVELOPMENT FEES	262	124	138	105	157	32	90	25	115
	72%	73%	70%	77%	68%	59%	75%	89%	70%
COLLECTING MONEY EXCLUSIVELY BY CHARGING FEES FOR NEW DEVELOPMENT	45	23	22	17	28	15	18	1	11
	12%	14%	11%	13%	12%	28%	15%	4%	7%
COLLECTING MONEY EXCLUSIVELY THROUGH MONTHLY UTILITY RATES PAID BY ALL CUSTOMERS	38	17	21	10	28	1	11	2	24
	10%	10%	11%	7%	12%	2%	9%	7%	15%
NONE	11	6	5	0	11	6	1	0	4
	3%	4%	3%		5%	11%	1%		2%
DON'T KNOW/NOT SURE	10	0	10	4	6	0	0	0	10
	3%		5%	3%	3%				6%

36. FINALLY, FOR OUR ANALYSIS OF THIS SURVEY, WOULD YOU GIVE US A LITTLE INFORMATION ABOUT YOURSELF. ALL OF YOUR ANSWERS WILL BE CONFIDENTIAL. WHAT IS YOUR AGE?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
18-34	100	52	48	100	0	0	11	56	32	20	77	10	55	6	24	80	20
	27%	28%	26%	100%			18%	53%	16%	9%	60%	29%	25%	22%	32%	45%	11%
35-54	158	81	77	0	158	0	25	28	104	122	35	15	95	16	28	73	85
	43%	44%	42%		100%		40%	27%	53%	53%	27%	44%	44%	59%	37%	41%	45%
55 AND OVER	102	48	54	0	0	102	26	20	55	84	16	7	65	5	23	23	78
	28%	26%	30%			100%	42%	19%	28%	37%	12%	21%	30%	19%	31%	13%	41%
REFUSED	6	3	3	0	0	0	0	1	4	4	1	2	2	0	0	0	5
	2%	2%	2%					1%	2%	2%	1%	6%	1%				3%

36. FINALLY, FOR OUR ANALYSIS OF THIS SURVEY, WOULD YOU GIVE US A LITTLE INFORMATION ABOUT YOURSELF. ALL OF YOUR ANSWERS WILL BE CONFIDENTIAL. WHAT IS YOUR AGE?

	TOTAL	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366 100%	170 100%	196 100%	136 100%	230 100%	54 100%	120 100%	28 100%	164 100%
18-34	100 27%	47 28%	53 27%	40 29%	60 26%	11 20%	24 20%	7 25%	58 35%
35-54	158 43%	85 50%	73 37%	62 46%	96 42%	25 46%	54 45%	14 50%	65 40%
55 AND OVER	102 28%	35 21%	67 34%	29 21%	73 32%	17 31%	41 34%	6 21%	38 23%
REFUSED	6 2%	3 2%	3 2%	5 4%	1 *	1 2%	1 1%	1 4%	3 2%

37. WHAT IS THE FINAL YEAR OF SCHOOL YOU COMPLETED?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----				--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
LESS THAN 12 YEARS	10 3%	6 3%	4 2%	1 1%	3 2%	6 6%	10 16%	0	0	4 2%	6 5%	1 3%	7 3%	0	1 1%	5 3%	5 3%
HIGH SCHOOL GRADUATE	52 14%	25 14%	27 15%	10 10%	22 14%	20 20%	52 84%	0	0	32 14%	17 13%	9 26%	28 13%	6 22%	9 12%	25 14%	27 14%
SOME COLLEGE	105 29%	44 24%	61 34%	56 56%	28 18%	20 20%	0	105 100%	0	47 20%	56 43%	11 32%	55 25%	10 37%	24 32%	57 32%	47 25%
BACHELOR'S DEGREE	76 21%	38 21%	38 21%	19 19%	41 26%	14 14%	0	0	76 39%	51 22%	24 19%	4 12%	47 22%	5 19%	19 25%	34 19%	42 22%
POST-GRADUATE CLASSES	39 11%	26 14%	13 7%	7 7%	16 10%	15 15%	0	0	39 20%	28 12%	11 9%	3 9%	23 11%	2 7%	9 12%	19 11%	20 11%
POST-GRADUATE DEGREE	80 22%	42 23%	38 21%	6 6%	47 30%	26 25%	0	0	80 41%	65 28%	15 12%	6 18%	56 26%	4 15%	11 15%	33 19%	47 25%
REFUSED	4 1%	3 2%	1 1%	1 1%	1 1%	1 1%	0	0	0	3 1%	0	0	1 *	0	2 3%	3 2%	0

37. WHAT IS THE FINAL YEAR OF SCHOOL YOU COMPLETED?

	TOTAL	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366 100%	170 100%	196 100%	136 100%	230 100%	54 100%	120 100%	28 100%	164 100%
LESS THAN 12 YEARS	10 3%	4 2%	6 3%	2 1%	8 3%	1 2%	5 4%	0	4 2%
HIGH SCHOOL GRADUATE	52 14%	13 8%	39 20%	10 7%	42 18%	11 20%	13 11%	6 21%	22 13%
SOME COLLEGE	105 29%	47 28%	58 30%	51 38%	54 23%	16 30%	25 21%	4 14%	60 37%
BACHELOR'S DEGREE	76 21%	36 21%	40 20%	27 20%	49 21%	13 24%	34 28%	7 25%	22 13%
POST-GRADUATE CLASSES	39 11%	22 13%	17 9%	13 10%	26 11%	3 6%	14 12%	2 7%	20 12%
POST-GRADUATE DEGREE	80 22%	45 26%	35 18%	32 24%	48 21%	10 19%	27 23%	9 32%	34 21%
REFUSED	4 1%	3 2%	1 1%	1 1%	3 1%	0	2 2%	0	2 1%

38. DO YOU OWN YOUR OWN HOME OR ARE YOU RENTING?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
OWN	230 63%	117 64%	113 62%	20 20%	122 77%	84 82%	36 58%	47 45%	144 74%	230 100%	0	17 50%	138 64%	19 70%	48 64%	82 47%	147 78%
RENT	129 35%	61 33%	68 37%	77 77%	35 22%	16 16%	23 37%	56 53%	50 26%	0	129 100%	16 47%	77 35%	7 26%	25 33%	92 52%	37 20%
OTHER	4 1%	3 2%	1 1%	1 1%	1 1%	2 2%	2 3%	1 1%	1 1%	0	0	0	2 1%	1 4%	1 1%	2 1%	2 1%
REFUSED	3 1%	3 2%	0	2 2%	0	0	1 2%	1 1%	0	0	0	1 3%	0	0	1 1%	0	2 1%

38. DO YOU OWN YOUR OWN HOME OR ARE YOU RENTING?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
OWN	230	106	124	83	147	39	88	20	83
	63%	62%	63%	61%	64%	72%	73%	71%	51%
RENT	129	62	67	49	80	14	29	8	78
	35%	36%	34%	36%	35%	26%	24%	29%	48%
OTHER	4	1	3	2	2	1	2	0	1
	1%	1%	2%	1%	1%	2%	2%		1%
REFUSED	3	1	2	2	1	0	1	0	2
	1%	1%	1%	1%	*		1%		1%

39. IN WHAT AREA OF CORVALLIS DO YOU RESIDE?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NORTHEAST	34	13	21	10	15	7	10	11	13	17	16	34	0	0	0	19	15
	9%	7%	12%	10%	9%	7%	16%	10%	7%	7%	12%	100%				11%	8%
NORTHWEST	217	108	109	55	95	65	35	55	126	138	77	0	217	0	0	105	112
	59%	59%	60%	55%	60%	64%	56%	52%	65%	60%	60%		100%			60%	60%
SOUTHEAST	27	15	12	6	16	5	6	10	11	19	7	0	0	27	0	8	19
	7%	8%	7%	6%	10%	5%	10%	10%	6%	8%	5%			100%		5%	10%
SOUTHWEST	75	39	36	24	28	23	10	24	39	48	25	0	0	0	75	39	36
	20%	21%	20%	24%	18%	23%	16%	23%	20%	21%	19%				100%	22%	19%
REFUSED	13	9	4	5	4	2	1	5	6	8	4	0	0	0	0	5	6
	4%	5%	2%	5%	3%	2%	2%	5%	3%	3%	3%					3%	3%

39. IN WHAT AREA OF CORVALLIS DO YOU RESIDE?

	TOTAL	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/MOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
NORTHEAST	34	17	17	12	22	3	4	6	21
	9%	10%	9%	9%	10%	6%	3%	21%	13%
NORTHWEST	217	98	119	71	146	32	86	16	83
	59%	58%	61%	52%	63%	59%	72%	57%	51%
SOUTHEAST	27	15	12	21	6	5	10	1	11
	7%	9%	6%	15%	3%	9%	8%	4%	7%
SOUTHWEST	75	34	41	26	49	12	17	5	41
	20%	20%	21%	19%	21%	22%	14%	18%	25%
REFUSED	13	6	7	6	7	2	3	0	8
	4%	4%	4%	4%	3%	4%	3%		5%

40. FOR ABOUT HOW MANY YEARS HAVE YOU LIVED IN CORVALLIS?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
LESS THAN 10 YEARS	176 48%	83 45%	93 51%	80 80%	73 46%	23 23%	30 48%	57 54%	86 44%	82 36%	92 71%	19 56%	105 48%	8 30%	39 52%	176 100%	0
10 YEARS OR MORE	188 51%	100 54%	88 48%	20 20%	85 54%	78 76%	32 52%	47 45%	109 56%	147 64%	37 29%	15 44%	112 52%	19 70%	36 48%	0	188 100%
REFUSED	2 1%	1 1%	1 1%	0	0	1 1%	0	1 1%	0	1 *	0	0	0	0	0	0	0

40. FOR ABOUT HOW MANY YEARS HAVE YOU LIVED IN CORVALLIS?

	TOTAL	--UNRESOLVED--		-AFFEC FLOOD-		-----STORMWATER BILL-----			
		YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366 100%	170 100%	196 100%	136 100%	230 100%	54 100%	120 100%	28 100%	164 100%
LESS THAN 10 YEARS	176 48%	76 45%	100 51%	55 40%	121 53%	15 28%	51 43%	16 57%	94 57%
10 YEARS OR MORE	188 51%	93 55%	95 48%	80 59%	108 47%	39 72%	67 56%	12 43%	70 43%
REFUSED	2 1%	1 1%	1 1%	1 1%	1 *	0	2 2%	0	0

41. ARE YOU A FULL TIME COLLEGE STUDENT?

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----				--RESIDENCE--		-----AREA-----				--RESIDENCY--	
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366	184	182	100	158	102	62	105	195	230	129	34	217	27	75	176	188
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
YES	46	27	19	42	3	1	3	32	11	5	39	5	23	1	14	40	6
	13%	15%	10%	42%	2%	1%	5%	30%	6%	2%	30%	15%	11%	4%	19%	23%	3%
NO	320	157	163	58	155	101	59	73	184	225	90	29	194	26	61	136	182
	87%	85%	90%	58%	98%	99%	95%	70%	94%	98%	70%	85%	89%	96%	81%	77%	97%

41. ARE YOU A FULL TIME COLLEGE STUDENT?

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
YES	46	20	26	16	30	7	8	1	30
	13%	12%	13%	12%	13%	13%	7%	4%	18%
NO	320	150	170	120	200	47	112	27	134
	87%	88%	87%	88%	87%	87%	93%	96%	82%

42. GENDER:

CORVALLIS
STORMWATER SURVEY
JANUARY, 1998

	---GENDER---		-----AGE-----			-----EDUCATION-----			--RESIDENCE--		-----AREA-----				--RESIDENCY--		
	TOTAL	MALE	FEMALE	18-34	35-54	55PLUS	HIGH/ LESS	SOME COLLEG	COLLEG GRAD	OWN	RENT	NORTH EAST	NORTH WEST	SOUTH EAST	SOUTH WEST	<10YRS	10YRS>
TOTAL RESPONDENTS	366 100%	184 100%	182 100%	100 100%	158 100%	102 100%	62 100%	105 100%	195 100%	230 100%	129 100%	34 100%	217 100%	27 100%	75 100%	176 100%	188 100%
MALE	184 50%	184 100%	0	52 52%	81 51%	48 47%	31 50%	44 42%	106 54%	117 51%	61 47%	13 38%	108 50%	15 56%	39 52%	83 47%	100 53%
FEMALE	182 50%	0	182 100%	48 48%	77 49%	54 53%	31 50%	61 58%	89 46%	113 49%	68 53%	21 62%	109 50%	12 44%	36 48%	93 53%	88 47%

42. GENDER:

	--UNRESOLVED-		-AFFEC FLOOD-		-----STORMWATER BILL-----				
	TOTAL	YES	NO/DK	YES	NO	HIGH	RIGHT	LOW	DK/NOP
TOTAL RESPONDENTS	366	170	196	136	230	54	120	28	164
	100%	100%	100%	100%	100%	100%	100%	100%	100%
MALE	184	90	94	62	122	32	58	17	77
	50%	53%	48%	46%	53%	59%	48%	61%	47%
FEMALE	182	80	102	74	108	22	62	11	87
	50%	47%	52%	54%	47%	41%	52%	39%	53%

Corvallis Stormwater Master Plan
Summary of Stakeholder Interviews

Prepared for:

City of Corvallis
Stormwater Planning Committee

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Brown and Caldwell

January 1998

Table of Contents

	Page
I. Executive Summary	
Corvallis Stormwater Master Plan	1
Stakeholder Interviews	1
Summary of Findings	1
II. Stormwater Issues in Corvallis	
Familiarity with Area Streams.....	4
Personal Involvement with Stormwater Issues	4
Key Stormwater Issues and Their Importance.....	4
Personal Experience with Flooding	5
Origin of Flooding Problems; Contributing Factors	6
III. Possible Solutions to Stormwater Problems	
How to Manage Stormwater Problems	7
Who Should be Responsible for Stormwater Drainage?	7
Effectiveness of Possible Actions to Manage Stormwater.....	8
IV. Public Values for Stormwater Master Plan	
Values to Guide Decisionmaking	10
Stream Restoration vs. Protection from Future Damage	11
How Often Should Flooding Be Tolerated?	11
V. Cost	
Awareness of Current Stormwater Drainage Fees	13
Importance of Cost Factors.....	13
Best Methods to Pay for Future System Improvements.....	13
VI. Citizen Participation	
Past Public Outreach Efforts.....	15
Best Methods to Communicate With Citizens.....	15
Key Groups to Target for Involvement	15

VII. Other Advice

Barriers to Overcome 17
Additional Participants 17
Final Advice 18

VIII. Appendices

- List of Stakeholder Interviews (December 1997 - January 1998)
- Discussion Guide
- Results of Stormwater Planning Committee Interviews

I. Executive Summary

Corvallis Stormwater Master Plan

In 1997, the City of Corvallis engaged a multi-disciplinary consultant team headed by the engineering firm Brown and Caldwell to recommend how to control flooding and manage other stormwater problems. The Corvallis Stormwater Master Plan is scheduled to be completed, and recommendations presented to the Corvallis City Council in 1999.

Stakeholder Interviews

In December 1997 and January 1998, community leaders and other key "stakeholders" were surveyed to seek their views on many important issues linked to the Corvallis Stormwater Master Plan. Interviews were conducted in-person and by telephone with some 50 community leaders and other persons who are involved in community affairs or may be affected by stormwater issues. Participants were asked to share their views related to: stormwater issues; the nature and severity of flooding problems, causes and possible solutions; values and principles to guide decisionmaking; costs; and citizen participation (a list of interview questions is attached in an appendix).

The list of persons to be interviewed, along with the survey questions, were developed in collaboration with the Corvallis Stormwater Planning Committee.

Among the persons interviewed were representatives of Corvallis neighborhood associations, environmental/clean water advocates, developers and home-builders, business community leaders and large employers, regulatory / resource agency personnel, members of City Council, and area residents and property owners in affected watersheds (see attached list in an appendix). Members of the Corvallis Stormwater Planning Committee were also interviewed, with the results separated from other interviews. This report reflects the feelings and attitudes of those individuals interviewed, and is not intended to provide a scientifically valid profile of the community as a whole.

Summary of Findings

A summary of key points offered by the community leaders and other interested citizens who were interviewed regarding the Corvallis Stormwater Master Plan:

1. **Flooding is not the main problem.** The inundation of local homes and streets is rather a symptom of problems, according to most interview participants. Historic development patterns in Corvallis have produced substantial development in the floodplain, and in stream corridors which are also impacted by flooding on occasion. As Corvallis has grown, so has the amount of impervious surface, with high velocity storm flows channeled from pipes into urban streams, contributing further to the problem.
2. **Observers remain open to many options for addressing stormwater issues,** and want more information. Stakeholders say that in many cases, the right solution to stormwater problems must be tailored to the watershed or even site-specific. A

strong emphasis is placed on solutions which retain stormwater on-site and enhance water quality.

3. **Multiple-benefit and “natural” solutions are preferred.** Most community leaders interviewed aren’t ready to pinpoint the best solution. However, they prefer approaches that promise to fulfill multiple objectives: enhancing habitat and providing recreational opportunities, for example, while also improving stormwater management.
4. **Key stakeholders favor a basin-by-basin approach** to stormwater planning. Each stream, watershed and neighborhood is said to have its own unique characteristics. Designing the most effective stormwater system must respect and draw upon these differences. The basin-by-basin approach is also envisioned to boost citizen interest and participation, using a stormwater planning process that brings the issues “close to home” for Corvallis residents.
5. **The City of Corvallis and other public agencies should show the way.** Key parcels of land in Corvallis are in public ownership, it is noted. Stakeholders suggest that the City of Corvallis, OSU and other agencies should “set an example,” demonstrating good stewardship of their own properties, providing positive examples of urban stream protection and on-site stormwater management. The City is also in a unique leadership position, able to set and enforce development standards that protect streams.
6. **Costs of stormwater system improvements should be equitably shared** by existing ratepayers and new development. While cost is not yet a major concern, key stakeholders suspect that stormwater drainage fees will rise in the future. Consensus is that new development should contribute significantly, through SDCs or other methods, to offset or cover costs for new infrastructure serving newly developed areas.
7. **Public outreach for stormwater issues should target lay citizens.** Key stakeholders reason that stormwater issues affect everyone in the community. Citizens will also be counted on to pitch in and help implement solutions – so their understanding and involvement are crucial. There’s also a recognition that some groups are particularly important to involve, particularly developers. Other potentially interested and affected groups to target for outreach include: neighborhood associations, environmental groups, large landowners, farmers and other property owners upstream and downstream from Corvallis, and residents who live near streams. The best outreach methods are said to be those which reach wide audiences: direct mailings, newspaper, and City newsletter.
8. **Gaining broad-based citizen understanding of stormwater issues will require a long-term commitment to public education.** Stormwater is not a top-of-mind issue for the average citizen, key stakeholders say. While high water in recent years has brought more attention to stormwater problems, this hasn’t translated into broad-based understanding of the issues at stake or options for the future. The outstanding pool of scientists and other specialists who live in Corvallis represents a unique resource to be tapped for this ongoing community education process, local leaders observe.

9. **The Corvallis Stormwater Master Plan should provide solid guidance for managing stormwater while maintaining and enhancing livability.** There is a high expectation in the community that the Stormwater Master Plan will yield a strategy which balances well-planned urban growth with key livability issues including environmental protection and conservation, aesthetics, affordability, and economic vitality.

The next sections provide a more detailed discussion of the results of stakeholder interviews for the Corvallis Stormwater Master Plan.

II. Stormwater Issues in Corvallis

At the opening of each interview, participants were asked to describe their personal involvement and impressions of stormwater issues and problems.

Familiarity with Area Streams

Do key stakeholders live near a stream? Are they more familiar with certain streams?

Most interview participants report they live near streams, and say they are familiar with one or more streams:

- The streams which are *closest to homes* of most participants are the Mary's River, Oak Creek, and Dixon Creek. Other participants say they live near: the Willamette River, Sequoia Creek, Jackson / Frazier Creek, Squaw Creek, Muddy Creek, and Stewart Slough.
- The streams which are *most familiar* are Mary's River, Oak Creek, and Dixon Creek. Other streams familiar to several participants include Willamette River, Jackson / Frazier Creek and Squaw Creek.

Personal Involvement with Stormwater Issues

How have stakeholders been involved in Corvallis stormwater issues in the past, and what are their general impressions?

Most of the stakeholders interviewed say they have become more aware of stormwater issues in recent years. "My impression is that Corvallis is waking up to these issues, given what's been happening with flooding and increases in drainage rates," notes one participant.

A number of the persons interviewed have also become directly involved in stormwater, due to flooding on their property, through their participation in the CSO (combined sewer overflow) program, or other local watershed basin planning efforts.

Key Stormwater Issues and Their Importance

Stakeholders were asked whether they perceive a "problem" with stormwater in Corvallis, and which top issues are of most importance for the City of Corvallis to address in the Stormwater Master Plan. Most respondents agree there is a stormwater problem and suggest the plan needs to address:

- How to handle peak flows during heavy rainfall periods
- The appropriate role of urban streams in the city-wide drainage system: "the perception is that urban streams are ditches"
- The relationship between stormwater and Corvallis' CSO problem
- Impacts from increased development: greater stormwater quantity and velocity
- Future flooding potential and associated risks to public safety and property

- Stormwater quality
- Cost

Participants were also asked to evaluate whether a series of specific stormwater issues are important to address in the Master Plan. The most important issues, in the eyes of stakeholders, are water quality and erosion.

Other issues rated as “very important” or “important” by most participants include:

- Flooding of streets, homes and businesses
- Rapid runoff from development
- Loss of stream habitat

Stormwater issues deemed somewhat less important include:

- Development in floodplains
- Use of streams to drain urban runoff
- Cost, and equitable sharing of costs
- Development standards and enforcement
- Growth management

Other issues suggested by participants to be addressed in the Stormwater Master Plan:

- Cost-effectiveness
- Restoration of natural systems / waterways
- Need for basin-wide planning in each stream corridor, inside and outside the UGB
- Impacts on streams of pesticides and herbicides
- Public education

A number of observers believe that stormwater problems in Corvallis are not particularly unique. Serious stormwater problems in the community – such as the recent flooding – are said to be “occasional” or “unusual” or “not a real big problem.”

Personal Experience with Flooding

Interview participants were invited to share their personal experiences with flooding, and were asked for their opinions on what factors may contribute to the flooding.

Very few interview participants have experienced flooding in their own home or business. Several report flooding on their property, particularly those in agricultural areas or in the floodplain.

Nearly all stakeholders, however, say they are familiar with flooding problems in the Corvallis area. Most say they have had to change their travel routine to avoid flooded roads or bridges, or have friends who have experienced flooding in their homes.

Specific reports of flooding on public and private property include inundated and closed bridges and streets, flooded school yards, problem spots in the downtown and South Corvallis, damage to crops, and some flooded homes and businesses.

Interview participants, however, are more concerned about the threat of future flooding. They say that development continues in stream corridors, and higher water levels are encroaching more frequently on private property. Stakeholders observe that area citizens are “more worried about future flooding” if a long-term solution is not found.

Origin of Flooding Problems; Contributing Factors

The origin of flooding reported most frequently: streams overflowing their banks during periods of heavy rain. Other contributing factors mentioned include increased runoff from growing areas of impervious surface, sewage and stormwater backing up into basements, and artificial structures diverting flows out of streams.

New development in upstream areas of Corvallis is also suspected by many stakeholders to be a contributing factor. However, other observers – including some long-time area residents – debate this point. They recall that Corvallis experienced flooding before the recent development occurred.

III. Possible Solutions to Stormwater Problems

The stakeholder interviews also explored possible remedies to the community's stormwater problems.

How to Manage Stormwater Problems

Participants were asked to identify their preferred solutions, and to evaluate specific actions designed to enhance urban streams or better manage problems caused by stormwater. Preferred strategies suggested in the interviews for dealing with Corvallis' stormwater problems include:

- Detain stormwater on-site; introduce new technologies that handle water on-site: sumps; detention ponds; parking lots with landscaped, pervious areas; disconnected roof drains
- Strengthen and enforce development standards; require stormwater to be detained on-site
- Natural resource protection and enhancement, including stream setback requirements and native plantings along stream banks
- Develop basin-wide stormwater plans
- Increase public education and participation in stormwater management issues

Other strategies suggested in the interviews include:

- Concentrate in the upper reaches of stream basins where problems originate
- Increase plantings and reduce impervious surface in wetland areas
- Use best management practices; "hire a lot of engineers"
- Be cost-effective
- Adopt conservation guidelines along waterways
- Study the effects of human activity on runoff
- "Daylight" urban streams now in pipes
- Build dams

Who Should Be Responsible for Stormwater Drainage?

Interview participants were also asked who should be primarily responsible to enhance urban streams and better manage stormwater drainage problems in the future.

Nearly all participants want the City of Corvallis to take the lead in addressing stormwater problems, with urban stream protection and stormwater management remaining a partnership responsibility of all parties – agencies, landowners, developers, industries, and citizens.

Stakeholders say the City's role should include planning stormwater system improvements, adopting and enforcing effective development standards, coordinating with neighboring

jurisdictions ("Streams don't know political boundaries"), setting an example as a good steward of streams and watersheds, and educating and involving citizens in stormwater solutions.

Participants who suggest that leadership remain in other hands name as possible leaders: property owners, developers, Benton County or DEQ.

Effectiveness of Possible Actions to Manage Stormwater

The stakeholders interviewed were also asked about possible actions which could be very effective, somewhat effective, or not effective – to enhance urban streams or better manage problems caused by stormwater.

The following actions are rated as very effective by most participants:

- Establish trees and landscape along urban streams
- Prevent filling and development in stream floodplains
- Install ponds to detain stormwater so it enters streams more slowly
- Public education

Actions rated as effective by most participants include:

- Require better erosion and runoff control on construction sites
- Clean out sediments that restrict flows in stream channels
- Stabilize banks along streams
- Install larger culverts to allow greater stream flows to pass under roads

The only specific action rated by most participants as not effective is:

- Widen stream channels

Many of the persons interviewed caution that these actions should be implemented in an environmentally sensitive manner which preserves natural features, historic drainage patterns, and habitat. Concerns are specifically raised regarding actions to clean out sediments from stream beds, stabilize stream banks, and widen stream channels.

Other comments offered in the interviews regarding possible actions to enhance urban streams or better manage problems caused by stormwater:

- Address upstream contributions (volume and pollutants) through inter-jurisdictional dialogue and planning.
- Educate developers on stormwater management issues.
- Avoid filling remaining wetlands in Corvallis.
- Provide warnings to current and future property owners in floodplains regarding the risks of flooding.
- Build more wet weather treatment capacity to accommodate storm flows.
- Continue and improve maintenance of stormwater systems.

- Increase stream setback requirements.

IV. Public Values to Guide Decisionmaking

Participants were invited to identify key values which should guide decisions on how best to manage stormwater in Corvallis.

Values to Guide Decisionmaking

Overall, stakeholders say the primary public value to guide the Corvallis Stormwater Master Plan is to **maintain and enhance community livability**. The interview participants cite several stormwater-related factors that contribute to livability in their perception, including improving water quality, natural habitat and waterways, and protecting homes and businesses from flood damage. One community leader describes livability as “how we can best work with Mother Nature to use the existing natural landscape to manage stormwater.” Another participant emphasizes the crucial condition of watersheds: “There is no life without clean water.”

Other important values identified include:

- Protect the environment
- Find a long-term solution
- Protect public safety
- Protect wetlands
- Encourage public access to streams

There is also some support for several additional values:

- Improve stream habitat
- Prevent flood damage to streets and property
- Control development
- Preserve open space
- Provide educational opportunities for community
- Control erosion

Participants were also asked to rate the relative importance of several possible factors that could influence decisions about the stormwater plan for Corvallis. People were asked to rate the following factors on a scale of 1 (low) to 5 (high). A summary of the survey results is shown below:

Value	Average Score
Improve water quality	4.4
Protect public safety	4.3
Control erosion	4.1
Protect wetlands	4.0
Prevent flood damage to homes and businesses	4.0
Prevent flood damage to streets and property	3.7
Improve habitat for fish and wildlife	3.6
Control development	3.6
Retain water on-site for new development	3.6
Educate the community	3.4
Provide more open space	3.3
Ease City operations and maintenance	3.0
Encourage public access to streams	2.9
Minimize utility rates	2.2

Stream Restoration vs. Protection from Future Damage

Another issue explored in the interviews is whether improved stormwater management should place more emphasis on **restoring** streams and wetlands which have been damaged, or **protecting** streams from further damage.

Most participants say that the first priority should be to **protect** streams: "Try not to lose what you've got," in the words of one community leader. While both approaches are important, stream protection is considered as more cost-effective than restoring damaged stream corridors. There's still time, observers say, to effectively protect most streams: "There are not too many damaged streams now." And restoration is thought to be an iffy proposition: "Streams and wetlands can never be restored successfully."

How Often Should Flooding Be Tolerated?

In the interviews, participants were asked for their views on what would be an acceptable level (frequency) of flooding in the neighborhood: once every 10 years, 25 years, 50 years, or never.

Most observers are willing to accept some risk of flooding, particularly if it is on public or private property but does not damage homes. Area citizens recognize they live in a rainy climate and that some flooding is unavoidable. One stakeholder states, "Flooding will happen occasionally but it doesn't call for over-protection. You can't protect everybody all of the time."

That being said, most of the community leaders interviewed want flooding to be an infrequent occurrence: once every 10-25 years. Many others suggest a longer period of 50-100 years. Several observers want to focus on the severity of flooding, rather than frequency. In the words of one local leader: "Flooding magnitude in homes and businesses is the issue – not frequency. The key questions are: does it damage homes or businesses? Are critical services impeded?"

V. Cost

The interviews also explored the subject of cost. Is cost an important constraint in choosing the best solution? To what extent are stakeholders aware of existing stormwater drainage fees? What is the preferred method to pay for future stormwater system improvements in Corvallis? What share of the costs should be borne by existing Corvallis ratepayers – or future development?

Awareness of Current Stormwater Damage Fees

Are key stakeholders generally aware of how stormwater costs are funded in Corvallis? Do these observers know the current level of stormwater drainage utility fees?

Interview responses indicate that most community leaders don't have a clue about how much they are paying for stormwater drainage. Only a handful can correctly identify the current Corvallis stormwater charges, and most participants suspect that rates are significantly higher than today's actual monthly charges.

When asked if current stormwater drainage fees are too high – about right – or somewhat low for the services provided, most participants again say they “don't know.” Other respondents are divided, citing the current fees are “too low” or “about right.”

Importance of Cost Factors

Most observers say cost is an important, but not overriding, factor in reaching decisions about future stormwater system improvements. Many of the community leaders interviewed recognize improved stormwater management may cost more and the citizens will bear financial responsibility. As one stakeholder states, “Living in the big city isn't free.”

Two cost-related value statements were specifically tested with participants: “Minimize utility rates” and “reduce City maintenance costs.” These values are rated by most respondents as “2 or 3” on a scale of 5, or only somewhat important.

Cost-effectiveness is introduced as a theme in many interviews. Participants want to be assured that the City chooses the “right” solutions based on good technical data, but also recognize that a long-term solution needs to be cost-effective. Respondents tend to favor a solution that appears to be permanent, rather than a “quick fix.”

Best Methods to Pay for Future Facilities

Participants were invited to identify their preferred funding methods to pay for future stormwater system improvements. They were also asked to comment on several specific funding options: using existing monthly rates paid by all customers; charging fees for new development; or a combination.

Virtually all observers want stormwater system improvements to be funded through a combination of monthly utility rates paid by all customers, in addition to fees paid by new development. “Everyone benefits, and everyone should contribute,” one area leader summarizes.

Interview participants were also asked to what extent new development and future residents should bear the cost for improved stormwater management. Stakeholders expect new development to “pay its own way” – but not the entire cost. The City of Corvallis can use SDCs (system development charges) to collect contributions from developers. A number of observers point out that many developers are also required to construct on-site stormwater improvements at their own expense.

Several interview participants suggest a “tiered” utility or permit fee structure which charges more for developments which have more impervious surface or are located in areas contributing more stormwater to the system. These fees might be associated with elevation / slope or area of impervious surfaces.

VI. Citizen Participation

Stakeholders were also asked to contribute their suggestions on public outreach for the Corvallis Stormwater Master Plan.

Past Public Outreach Efforts

Stakeholders were queried if they have been aware of, or involved in, the City's public outreach efforts on stormwater issues. About half of the persons interviewed say they have been aware of the City's outreach, and a number of these participants have been involved themselves.

Among those who have been close observers of the City's outreach efforts, there are a few criticisms. Citizen panels have been overloaded with environmental advocates, some say, leaving out key interests such as affected property owners. Other problems cited in the interviews include limited public notice and poor citizen turnout for public meetings.

Best Methods to Communicate with Citizens

Those interviewed uniformly endorse and encourage the City of Corvallis' planned efforts to communicate with citizens regarding stormwater issues. Stakeholders observe that many citizens won't choose to become involved – but still need information. The flooding in recent years increased public awareness of stormwater issues, and has helped turn out citizens to some public meetings.

Participants were asked for their opinions on the best methods to involve area citizens more actively in community-wide stormwater planning. Observers generally support the public involvement approaches already underway or planned by the Stormwater Planning Committee and City of Corvallis. **These observers suggest that the City of Corvallis communicate with citizens on stormwater issues primarily through direct mailings, newspaper coverage and the City of Corvallis newsletter.**

Other suggested ways to get the word out could include:

- Hold public meetings
 - Collaborate with watershed councils
 - Develop school education programs
 - City's Web page
 - City Council or board meetings.

Key Groups to Target for Involvement

In the interviews, community leaders were invited to identify any key groups which should be specifically targeted to participate in Corvallis stormwater planning. Most observers suggest recruiting a cross-section of interests.

The following groups are named most often to participate in Corvallis stormwater planning:

- Benton County
- Environmental and clean water advocate groups
- Watershed councils and other citizen groups already active in planning for urban streams and stormwater
- OSU, Hewlett Packard and other large landowners
- Property owners and residents along streams
- Neighborhood associations
- Corvallis Environmental Learning Center
- Business groups: Chamber of Commerce, Corvallis Downtown Association
- Developers, homebuilders
- Flood victims
- Recreationalists and open space advocates
- Schools

Other interested groups mentioned to target for participation in stormwater planning:

- Agricultural interests
- State and Federal regulatory and resource agencies
- City staff
- Soil and water conservation groups
- Real estate brokers / associations
- Utilities
- Linn-Benton Community College
- Upstream property owners
- Garden clubs
- Senior citizens
- Citizens not represented by neighborhood or homeowners associations

VII. Other Advice

During the interviews, participants were invited to offer further advice for the Corvallis Stormwater Master Plan, and to members of the advisory Stormwater Planning Committee and the Corvallis City Council members who are ultimately responsible for reaching decisions. The following presents an overview of these final comments and suggestions offered by the persons interviewed.

Barriers to Overcome

Stakeholders were encouraged to identify the “most difficult barriers to overcome” in completing the Corvallis Stormwater Master Plan. The barriers mentioned most often are:

- Achieving community-wide consensus
- Finding solutions to accommodate planned development, while addressing a backlog of stormwater issues and maintaining natural urban waterways
- Cost vs. lack of funding; need for an affordable strategy

Other possible barriers identified by stakeholders:

- Citizen apathy
- A perception that the best thing to do with stormwater is get it off the land as soon as possible, and into the river
- Public hysteria: “People can overreact to small parts of the plan”
- Determining the appropriate level of water quality
- Gaining City Council support

Additional Participants

The stakeholders interviewed were invited to suggest other individuals or organizations to be contacted for advice at this stage of planning. The following groups were named most frequently:

- Residents of flooded neighborhoods
- Neighborhood associations
- Environmental and open space advocates: Audubon Society and others
- Developers, homebuilders
- OSU, Hewlett Packard, and other large landowners
- Corvallis Environmental Learning Center
- Recreation groups
- Business groups: Chamber of Commerce, Corvallis Downtown Association
- League of Women Voters

- Green Belt Land Trust
- State and Federal regulatory and resource agencies
- City stormwater officials
- Students

Final Advice

Participants were also invited to offer their “single most important piece of advice” to the City of Corvallis at this stage of planning to address community-wide stormwater issues. These themes are repeated by many stakeholders:

- Apply a comprehensive, basin-wide approach to stormwater management.
- Retain stormwater on-site, or as close as possible to where it falls.
- Involve and educate citizens in decisions on stormwater system improvements; “Listen really hard to what people have to say.”
- Don’t let flood victims, environmentalists, developers, or any other interest groups have a disproportionate say in the outcome.

Additional comments offered by one or more stakeholders:

- "Natural systems are important, too!"
- Be creative with possible solutions. Be open to new ideas and perceptions.
- Keep an eye on the need to achieve a higher level of water quality.
- If additional costs are required, show the benefits received.
- Make developers pay an equitable share (based on size of impervious surface), along with existing ratepayers.
- “Don’t mess around. Hire someone who cares about protecting streams, and give them authority to do it.”
- Start by establishing stormwater management practices on City property as a model.
- Do the best job you can. Don’t be deterred by lack of public support.
- Get it done soon.
- "Keep everything above board and don’t act like a government agency."

VIII. Appendices

Corvallis Storm Water Master Plan Stakeholder Interviews

Neighborhood Organizations

- Jennifer Ayotte, Northeast Corvallis
- Vida Krantz, West Corvallis Association
- Karen Mayo, South Corvallis Neighborhood Association

Residents/Property Owners in Affected Areas

- Dave Livingston, Dixon Creek
- Dr. Jean Mater, Mary's River
- Doug Parker, Dixon Creek
- Ed Radke, South Corvallis

Watershed Councils

- Mary Slabaugh, Mary's River Watershed Council

Environmental/Clean Water Advocates

- Sue Danver, Friends of the Upper Willamette River
- Michele Adams, First Alternative Co-op

Corvallis Environmental Center

- Chris Beatty

Homebuilders/Developers

- Dennis Hedges, Timber Hill Corporation
- Jay Sorgen, contractor/employer

Businesses/Business Associations

- Joe Malcom, Downtown Corvallis Assn.
- Melanie Fareneuch, Chamber of Commerce

Watershed System Professionals

- Stan Gregory, OSU fisheries specialist
- Bob Metzger, USFS fish biologist

Regulatory/Resource Agencies

- Chip Andrus, U.S. Environmental Protection Agency
- Peter Idema, ODOT
- Division of State Lands

Parks and Recreation Advocates

- Meg Campbell, Green Belt Land Trust
- Rene Moye, Corvallis Parks director

Agricultural Interests

- Greg Paulson, OSU Horticulture Dept.
- Larry Venell, Venell Farms
- Tim Winn, Benton Farm Bureau

Public Schools

- Dennis Jones, District 509-J

OSU

- Kathleen Mulligan, OSU campus facilities
- Margot Pearson, Asst. Prof. Of Ag. Chemistry
- George Taylor, Climatology Dept.

Large Employers

- Steve Jaspersen, Good Samaritan Hospital
- Jane Thomas, Hewlett Packard
- Ray Topping, CH2M Hill
- Brian Unwin, Evanite

Corvallis Stormwater Planning Committee

- Patricia Benner
- Mary Buckman
- Kelly Burnett
- Mary Christian *
- Gary Galovich
- Bob Grant
- Wayne Huber
- Steve King *
- Jim Minard
- Paula Minear
- Fred Wright

Other Committees and Commissions

- Patricia Daniels, Corvallis Planning Commission (DLDC staff)
- Frank DeMonte, Independent Committee for Citizen Involvement
- Mary Eichler, Benton Soil & Water Conservation District
- Jim Moorefield, Wastewater Infrastructure Committee chair

Benton County

- Jerry Davis, Planning Director
- Jim Blair, County Engineer

City of Corvallis

- Betty Griffiths, City Council
- Bruce Sorte, City Council

News Media

- Aaron Corvin (writer / environmental reporter), Gazette - Times

* Declined Interview

Corvallis Stormwater Master Plan Stakeholder Interviews (December 1997)

NAME: _____ PHONE: _____

ORGANIZATION: _____

ADDRESS: _____

Introduction

The City of Corvallis is beginning a community-wide master plan for managing stormwater. The master plan will include community input that will be guided by a citizen planning committee. One early step is conducting interviews with community stakeholders on key stormwater issues. The committee would appreciate you contributing your views to the Corvallis Stormwater Master Plan that will be kept confidential.

1. What has been your involvement in the past regarding stormwater planning or related issues in Corvallis? If you have been aware/involved in the planning, what is your general impression?

2. Do you live near a stream?

Yes: _____ No _____ Not sure _____
(Which stream?)

3. With which streams in the community are you more familiar?

___ Willamette River

___ Oak Creek

___ Dixon Creek

___ Jackson/Frazier Creek

___ Mary^os River

___ Squaw Creek

___ Sequoia Creek

___ Mill Race

___ Other: _____

4. In your view, what are the most important questions the Corvallis Stormwater Master Plan should answer?

Stormwater Issues

5. In your view, is there a problem with stormwater in Corvallis? What are a few of the top issues? (Describe)

6. Which of the following issues do you think are **very important** **somewhat important** or **not important** to address in the stormwater plan?

	Very Important	Important	Not Important	Not Sure
A. Erosion from construction sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Erosion along stream banks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Surface pollutants entering streams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Loss of stream habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Flooding of streets, homes and businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Rapid runoff from new development <input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Use of streams to drain urban runoff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
H. Development in floodplains	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G. Other: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

With which of these issues do you have the most concern? _____

7. Are you aware of flooding in your own neighborhood? Have you experienced flooding in your own home or work place? What were the impacts? (Describe)

8. What appeared to be the origin of the flooding?

- ___ Clogged street gutter or catch basin
- ___ Stream overflowing at culvert under street
- ___ Stream overflowing banks
- ___ Flow coming out of manhole
- ___ Water coming out of basement drain
- ___ Natural occurrence of heavy rainfall
- ___ Upstream development
- ___ Inadequate development standards / or not enforced
- ___ Development in flood plains
- ___ Other: _____
- ___ Not sure

Possible Solutions

9. What can be done about Corvallis stormwater management issues, in your view?

10. Which of the following possible actions do you think would be **very effective** **somewhat effective** or **not effective** to enhance urban streams or better manage problems caused by stormwater in our community?

A. Require better erosion and runoff control on construction sites

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

B. Clean out sediments that restrict flows in stream channels

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

C. Stabilize banks along streams

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

D. Establish trees and landscape along urban streams

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

E. Widen stream channels

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

F. Prevent filling and development in stream floodplains

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

G. Install larger culverts to allow greater stream flows to pass under roads

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

H. Install ponds to detain stormwater so it enters streams more slowly

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

I. Public education

___ Very effective ___ Somewhat effective ___ Not effective ___ Not sure

J. Other: _____

11. Who should be primarily responsible to enhance urban streams or better manage stormwater drainage problems in the future?

___ City of Corvallis ___ Private citizens ___ Developers ___ All of these ___ Not sure
 ___ Other: _____

Public Values

12. What key values or underlying principles should guide decisions on how best to address stormwater issues?

13. How would you rate the importance of the following factors in influencing decisions for the Stormwater Master Plan? (1 low to 5 high)

A. Improve stream habitat	1	2	3	4	5
B. Prevent flood damage to streets and property	1	2	3	4	5
C. Protect public safety	1	2	3	4	5
D. Control development	1	2	3	4	5
E. Minimize utility rates	1	2	3	4	5
F. Improve water quality	1	2	3	4	5
G. Provide more open space	1	2	3	4	5
H. Provide educational opportunities for community	1	2	3	4	5
I. Control erosion	1	2	3	4	5
J. Prevent flood damage to homes and businesses	1	2	3	4	5
K. Retain water on-site from new development	1	2	3	4	5
L. Reduce City maintenance costs	1	2	3	4	5
M. Protect wetlands	1	2	3	4	5
N. Encourage public access to streams	1	2	3	4	5

14. In planning for future improved stormwater management, is it more important to **restore streams and wetlands** which have been damaged or to **protect streams and wetlands** from further damage?

___ Restore ___ Protect ___ Both ___ Not sure

15. In your view, what is an acceptable level (frequency) of flooding in Corvallis neighborhoods? Once every year 10 years 50 years never?

Cost

16. Corvallis residents and property owners currently pay for stormwater management services through a monthly utility fee for drainage that is included with the water/sewer bill. Can you recall how much your household is currently paying per month for this service?

___ Less than \$1 ___ \$1 to \$3 ___ Over \$3 to \$10 ___ Over \$10 ___ Not sure

17. Currently, do you feel that your stormwater drainage bills are □ (read list)

- ___ Too high, for the service provided
- ___ About right, for the service provided
- ___ Relatively low, for the service provided
- ___ No opinion

18. After I name three possible ways of paying for improved stormwater management, please tell me which you think is the best way for the people in Corvallis (read list).

- A. Collect money exclusively through monthly utility rates paid by all customers
 - B. Collect money exclusively by charging fees for new development, or
 - C. Collect money through a combination of monthly utility rates and new development fees.
- ___ None of these ___ Not sure ___ Other: _____

19. Corvallis has been a growing community. To what extent should new development and future residents bear the cost for improved stormwater management? Would these charges be collected through existing fees or other methods?

Citizen Participation

- 20. Have you been aware of, or involved in any of the City's citizen participation efforts on stormwater issues? How would you evaluate their effectiveness? What outreach methods have been most (or least) effective? Do you feel that all key interests or points of view have been involved?
- 21. Are there any key groups which should be specifically targeted to participate in Corvallis stormwater planning? Are you concerned that any of these groups will not be reached?
- 22. What do you suggest as the best methods to communicate with area citizens and keep them informed about stormwater issues? What can be done to ensure that interested citizens such as yourself can continue to participate in the planning process?

Wrapup

- 23. What do you foresee as the most difficult barrier to overcome in completing the Corvallis Stormwater Master Plan?
- 24. If you were responsible for solving stormwater issues in Corvallis, what would you do?
- 25. What is the single most important advice you would offer to the City of Corvallis at this stage regarding the Master Plan?

26. Can you suggest other individuals or any organizations we should contact now to get their advice?
27. Any final comments?

Memorandum

To: Stormwater Planning Committee
From: Business Advocacy Committee
Date: July 24, 2001
RE: Stakeholder and Public Opinion Surveys
CC: Urban Services Committee
Corvallis Public Works



Among the justifications for policy recommendations in the draft Stormwater Master Plan are 'community values' demonstrated via citizen attitude surveys. It has come to our attention that the surveys in question are invalid because of poor data oversight, unexplained sampling methodology, or statistically insignificant results. The Chamber BAC recommends that all references to citizen input, community values and public opinion as supported by these surveys be removed from the SWMP.

The Stakeholder Interview Survey is fundamentally flawed for three reasons:

1. No clear definition of "stakeholder" is provided in the Executive Summary, nor was it provided upon formal request to Public Works.
2. The methodology used to determine how "stakeholder" would be defined, who would be identified as a "stakeholder," and other sampling methods are not explained in the Executive Summary, nor was this information provided upon formal request to Public Works.
3. According to Public Works, the raw data – the actual survey results – were destroyed by Barney & Worth, the research firm that compiled the data for the summary. There being no way for anyone to reexamine the results for the purposes of reinterpretation or substantiating the accuracy of the "Summary of Stakeholder Interviews," the survey itself must be considered invalid.

The telephone Public Opinion Survey results cannot be considered statistically significant because of a remarkably low response rate of under 17%. In order to be considered statistically significant, and therefore likely to generate valid results, a survey of this kind should have a minimum 70% response rate.¹ McArthur & Associates, et al attempted calls to 2,196 randomly generated phone numbers. Of those attempts, only 366 presumably resulted

¹ Bernard, Russell

1994 *Research Methods in Anthropology: Qualitative and Quantitative Approaches*. London: Sage Publications.

in a fully completed survey, making for a response rate of 16.7%. While some of the randomly generated calls can conceivably be factored out because they were not telephone numbers currently in service, approximately 1,674 of those numbers would have had to be out-of-service to make 366 completed surveys a potentially valid 70% response rate for a total sample of 522. It is highly unlikely that a random generation of 2,196 possible Corvallis telephone numbers generated only 522 actual Corvallis telephone numbers.

Low response rates result in serious distortions of results (response bias) and nonresponse bias is impossible to accurately measure. With high levels of nonresponse, all that can be determined is that the results are biased. At 16.7%, the results of the Public Opinion Survey are biased in the extreme and cannot under any circumstances be used to indicate Corvallis citizen attitudes. Continuing to refer to these results as substantiating a proclaimed "baseline public opinion" and "public sentiment toward the management of stormwater in Corvallis" (SWMP, 2.2) is inaccurate and misleading.

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PORTLAND, OREGON 97204

TEL: 503/222-0146 FAX: 503/274-7955

WEBSITE: www.barneyandworth.com

MEMORANDUM

September 5, 2001

To: Bruce Moser, Corvallis Public Works

From: Clark Worth

Re: Corvallis Stormwater Master Plan:
Response to Chamber of Commerce Correspondence

I would like to respond to key points offered in the July 24, 2001 memorandum addressed to the Stormwater Planning Committee by the Business Advocacy Committee of the Corvallis Chamber of Commerce.

Barney & Worth, Inc. participated in the early stages of the Corvallis Stormwater Master Plan, designing and implementing the public outreach program and conducting public opinion surveys.

The following responds to the questions and concerns in the Corvallis Chamber's July 24 memo.

Stakeholder Interviews

Barney & Worth interviewed about 50 key stakeholders in December 1997 – January 1998, and prepared a written summary. The list of persons to be interviewed, and questions for the interviews were selected in consultation with the Department of Public Works and the Stormwater Planning Committee. Interviews were conducted on a confidential basis, with no comments attributed to individual participants.

“Stakeholders” are generally defined as those having a “stake” – or an identifiable interest – in the outcome of a policy decision. Our attempt was to cover a broad cross-section of interested persons and organizations, including:

- Neighborhood associations
- Residents/property owners in flood prone areas
- Watershed councils
- Businesses and business associations (including the Chamber of Commerce)
- Environmental and clean water advocates
- Homebuilders/developers
- Large employers
- Agriculture representatives

- Elected officials and key staff from Corvallis and Benton County
- Regulatory/resource agencies
- Scientists and educators knowledgeable about stormwater issues
- News media
- Members of the Stormwater Planning Committee
- Other community leaders and citizens

Stakeholder interviews are not intended to provide a statistically reliable sample of Corvallis residents. Rather, they provide in-depth, *qualitative*, attitudinal data. The stakeholder interview results were not destroyed – they appear in an 18-page written report which is available to the Chamber. A list of interview participants and discussion questions accompanies the report.

Public Opinion Survey

To gather statistically reliable data on community values and opinions regarding stormwater, a public opinion survey was conducted in December 1997 – January 1998. Survey questions were developed in consultation with Corvallis Public Works and the Stormwater Planning Committee, and were pre-tested with a small number of surveys.

The public opinion research firm of McArthur & Associates supervised the telephone poll of 366 Corvallis residents age 18 and over. The sample size was established at 350, which yields a margin of error of 5 percent at the 95 percent confidence level for a target area population of 50,000.¹

The attached material from the Survey Research Center explains “*margin of error*”, and shows how little the margin of error changes as the target population increases – once the sample size reaches about 300. A larger sample size would be useful only if needed to assure that the results remain highly reliable for sub-groups of survey respondents – for example, examine differences among the city’s neighborhoods.

The actual number of completed surveys exceeded the 350 sample size somewhat due to the quota set for students. At the Stormwater Planning Committee’s request, the telephone survey methodology also established a quota for Oregon State University students to match their proportion of the Corvallis population. This ensured that students would not be over- or under-represented in the results. The quota required some extra phone calls to ensure the proportionate number of students were surveyed.

The telephone survey methodology used random digit dialing, a common and reliable method for gaining a random sample of community residents. Using this methodology, many calls do not result in completed surveys, due to:

- Phone numbers not in service
- Business/office phone/fax rather than residence
- No answer/voice mail

¹ I am oversimplifying the math a little. Strictly speaking, the target population included only Corvallis residents who are 18 years or older – so considerably fewer than 50,000. This drops the margin of error below 5%.

Experience has shown that the percentage of non-residential numbers alone reaches 50% to 70% for most random digit dialed surveys.² The recent proliferation of fax, cell phones, pagers, etc. further exacerbates this phenomenon. The actual completion rate for the Corvallis stormwater survey was about 17%, which is deemed to be within the acceptable range of response (ordinarily 10% to 30% for this type of survey.)

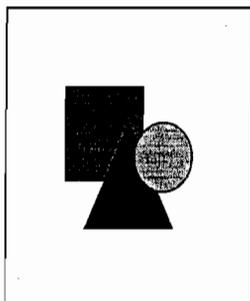
While we have not reviewed the authority cited in the memorandum that establishes a minimum 70% response (Bernard Russell, 1994), we note that it is entitled "*Research Methods in Anthropology*" – not a source on public opinion research methodology.

Summary

The survey tools employed by the Corvallis Department of Public Works and the Stormwater Planning Committee – stakeholder interviews and telephone poll – are common approaches to discern public opinion on a wide range of public policy issues. Standard methodologies were used to conduct these surveys. No unusual events occurred in the survey process. As a consequence, in our professional opinion the survey results should be considered as valid.

encl.

² See Paul Lavrakas, *Telephone Survey Methods*, Northwestern University, 1992.



Survey Research Center

Calculate a Sample

Valid Sample Size

The margin of error is a measure that determines the representativeness of a sample by comparing the number of respondents in the sample to the number of people in the population. The opinions expressed by respondents in a sample are an *estimate* of the opinions held by all people within the target population. The opinions expressed in a sample are estimates because the only way to truly measure the opinions of the whole population would be to interview each individual in the population. Generally, as sample size increases the margin of error decreases. Therefore, as the sample size increases, the opinions measured in the sample will be closer to those within the actual population.

Through accepted mathematical formulas, confidence level and margin of error are calculated. For example, a margin of error of +4.9 percent at the 95 percent confidence level means that if 40 percent of the respondents answer "yes" to a question, we can be 95 percent confident that the actual value in the population to this question is 4.9 percentage points higher or lower than 40 percent. In other words, the actual range falls between 35.1 percent and 44.9 percent. This range is referred to as the "confidence interval." Some other examples at the 95 percent confidence level are presented below:

Target Population	Sample Size	Margin of Error	Proportion of Population
100,000	800	± 3.5	0.8%
100,000	500	± 4.4	0.5%
1,000	400	± 3.8	40%

1,000	300	± 4.7	30%
800	300	± 4.5	38%
800	200	± 6.0	25%
500	300	± 3.6	60%
500	200	± 5.4	40%

95 percent confidence level

This level of confidence requires a sample size large enough that if the same survey were conducted 100 times with a random sample, only five of the surveys would be expected to yield results outside the margin of error.

[Home](#) [Mission](#) [Services](#) [Staff](#) [Methodologies](#) [Guest Book](#) [Links](#)

Evaluation Criteria for the Development of an Updated Corvallis Stormwater Master Plan

March 1, 1999

The following stormwater evaluation criteria have been developed by the Stormwater Planning Committee. These criteria are based on community values and objectives gathered through random telephone and stakeholder surveys, and input from citizens at several public meetings. Revisions to the draft evaluation criteria were made after collecting comments during the December, 1998 public meeting.

The evaluation criteria will be used by the Stormwater Planning Committee, other citizen participants, consultants and staff as the guide in developing and evaluating strategies and alternatives for the Stormwater Master Plan within the framework of the community's values. The criteria text also identifies a number of common stormwater issues that will be helpful background and discussion information.

The next step in the Stormwater process is to examine each of the city's stream basins. Please look for public meeting times for this basin work. The first meeting for Dixon and Squaw Creek basins will be March 30, 1999 at the City/County Public Library on Monroe. We would like to thank you for your involvement in this process,

What Is in the Boxes??

1. A stormwater evaluation criterion (◆) in large letters is found at the top of the box. These criteria were developed by the Stormwater Planning Committee based on community values and objectives. Though each criterion and its text is presented within its individual box, all of the criteria are interwoven and related to the others.

2. Questions (●) help to identify the intent and components of the evaluation criterion. The bullets may not be inclusive of all criterion elements, but they provide a framework for discussion and evaluation.

3. Information that might help illustrate a concept.

Evaluation Criteria
based on Community Values
for the Corvallis Stormwater Master Planning Process

March 1, 1999

- ◆ **Maintains and Accommodates Natural Hydrological Processes**
- ◆ **Protects and Improves Water Quality**
- ◆ **Controls Unwanted Erosion**
- ◆ **Protects and Restores Natural Resources and Ecosystem Functions**
- ◆ **Meets or Exceeds Current Regulations and Anticipated Future Regulations**
- ◆ **Cost Considerations are Inclusive**
- ◆ **Addresses Maintenance Requirements and Allows for Maintenance Access**
- ◆ **Incorporates Community Awareness and Information Exchange**
- ◆ **Addresses Cumulative Impacts and Off-site Impacts**
- ◆ **Is Designed and Managed to Avoid Public Health and Safety Hazards**
- ◆ **Incorporates Community Amenities**
- ◆ **Explores and Utilizes Innovative and Low-technology Approaches**
- ◆ **Implements Urban and Rural Land Use Objectives**

Stormwater Master Planning

Developing strategies to address issues such as water quality, flood damage, erosion and stream health.

Evaluation Criteria

based on Community Values

for the Corvallis Stormwater Master Planning Process

March 1, 1999

◆ Maintains and Accommodates Natural Hydrological Processes

- Is there protection or restoration, anticipation of, and allowance for natural disturbance events and outcomes such as flooding and stream bank erosion?

Information: Water's natural movement, both above and below ground, are generally beneficial to stream and other water-dominated systems and their associated resources. In addition, natural hydrological processes such as flooding are often expensive or nearly impossible to control or prevent.

- Is ground infiltration, detention, seasonal stream flow patterns, and other natural water movement maintained?

Information: What is "natural?" Webster's II New Riverside University Dictionary (1988) defines "natural" as, "Conforming to the usual or ordinary course of nature." Preserving natural hydrology in an urban setting is probably not possible. However, many landscape hydrological functions and processes can often be maintained or reestablished.

- Is mitigation a requirement for stormwater discharges?

Information: Urbanization without mitigating design features can alter the location and movement of stormwater (both above and below-ground) and decrease the land's ability to detain and manage stormwater. Pavement, hillside terracing, loss of vegetation that intercepts and then re-evaporates rain, and wetland and stream channel changes are among the urban features that can increase the amount and speed of stormwater run-off, and increase the number and size of floods. Careful urban design can reduce these changes and impacts.

◆ Protects and Improves Water Quality

- Is the contamination of surface and ground water by pollutants prevented?

Information: Contaminants that are found on streets and parking lots can contribute to stream, wetland, and ground water quality degradation. These pollutants are currently piped along with stormwater runoff to nearby streams. Lawn fertilizers, herbicides and pet waste can also pollute water. Increased stream flows can contribute to abnormal erosion and increased water turbidity.

- Are seasonal water temperatures protected or improved?

Information: Summer water temperatures usually increase when a stream channel is not shaded.

- Are landscape features such as wetlands and floodplains recognized for their ability to filter and process pollutants?

◆ Controls Unwanted Erosion

- Is natural erosion accommodated where possible?
- Is erosion that results from urbanization and its consequences minimized?

Information: Natural erosion is important for stream health and is a common ecological process. And, if a section of stream bank is protected from erosion, often the erosive energy of the water will only be transferred to another location. Additional human-caused bank erosion can occur, for example, when urbanization increases stream flows or bank vegetation is removed. Erosion can also occur at construction sites, and sediment can then enter city pipes and streams, increasing water turbidity.

◆ Protects and Restores Natural Resources and Ecosystem Functions

- Is there protection of existing wetlands, stream systems, and other significant natural features such as swales?

Information: Protection can deal with different issues. Maintaining a watercourse's hydrology to prevent abnormal erosion or provide summer stream flows is one example; setting aside a natural feature would be another form of protection. Some human-made features such as relocated stream channels might be considered to now provide functional habitat.

- Is there protection and enhancement of native fish communities?

Information: State regulations currently require protection of native fish populations, including fish passage past culverts, a common urban issue.

- Is there protection and enhancement of stream corridors and floodplains, riparian communities, and their ecological functions?
- Is there protection and enhancement of native vegetation and wildlife habitat?
- Does reclamation/restoration improve natural ecological functions and processes as well repair damaged natural features?

Information: Sustainable restoration of an ecosystem requires reestablishing the ecological "operations" of that system. That includes both the functions of the system such as providing fish habitat, and the processes such as nutrient exchange between the riparian corridor and stream channel.

- Does the plan utilize resource protection as a management approach as an alternative to focusing on restoration as a management tool?

Information: Resource managers and communities often choose projects that restore degraded parts of an ecosystem rather than protection of existing non-degraded areas. Yet it is often less expensive to protect rather than restore a system.

◆ Meets or Exceeds Current Regulations and Anticipated Future Regulations

- Are current Federal and State regulations that presently apply to the City addressed and implemented?
- Are regulations that are anticipated within the foreseeable future and the life of the stormwater plan dealt with?

Information: Current regulations are the rules that presently apply to the City according to state or federal laws. An anticipated regulation is one in the foreseeable future of the life of the plan. Anticipated regulations include, for example, regulations that are only applied when a community reaches a certain population size (Clean Water Act.) Another type of anticipated regulation is one that is likely to be enacted as a response to a problem or issue. The listing of Willamette River winter steelhead as a threatened or endangered species is a possible example (Endangered Species Act.)

◆ Cost Considerations are Inclusive

- Is there equitable cost allocation based on what generates the cost?
- Is cost analysis based on all costs, both direct (traditional economic) and indirect (ecological and social), immediate and long-term, and does it incorporate the other community stormwater evaluation criteria?

Information: Examples of direct costs are project-related expenditures such as materials and labor to put in a culvert or the cost of setting aside land for stormwater detention. Indirect costs might include impacts on a fisheries, flooding of homes downstream, water pollution, or ongoing maintenance costs. And, benefits can be both direct and indirect.

- Are costs reasonable in relation to the products and results, and does cost analysis include elements such as economies of scale and project timing efficiency?

◆ Addresses Maintenance Requirements and Allows for Maintenance Access

- Are maintenance requirements supported by existing community resources?
- Is maintenance access sufficient to allow for the sustainable management of the stormwater system to implement the community's values, multiple functions of those systems?

Information: Homes and other buildings constructed immediately abutting stormwater infrastructure such as a detention basin or wetland could block maintenance access. And, structures built abutting a stream channel may create the need for a larger and ongoing maintenance efforts for that watercourse to protect those structures.

- Are upper basin activities that affect downstream conditions, including the cumulative impacts of urbanization, considered with respect to their potential impact on downstream maintenance requirements?
- Are maintenance approaches selected in the context of other community stormwater values and objectives?

◆ Incorporates Community Awareness and Information Exchange

- Are community educational opportunities incorporated into the development and implementation of the Plan?
- Does the design and siting of projects contribute to public knowledge and awareness?

Information: Several schools are near a stream or wetland, and students use these systems as places to learn. Citizen surveys have shown a strong interest in the community being given the opportunity to be informed about stormwater-related topics. Stormwater restoration and other projects provide informational opportunities.

◆ Addresses Cumulative Impacts and Off-site Impacts

- Is the cumulative effect of urbanization estimated and addressed within the plan and at the time of each future development?

Explanation: For some urban-related impacts, evaluation is done only at the site level and not in context of multiple urban activities. Stormwater-type examples are filling within a floodplain, or grading of land that reduces water detention.

- Are upstream and downstream negative impacts, and off-site and on-site negative impacts minimized?
- Are quantitative correlations and goals made to address cumulative impacts on offsite locations?

Explanation: Negative water-related and other impacts can extend beyond the boundaries of an urbanized piece of property. Examples include increased downstream flooding, erosion or sedimentation, blocking fish passage, or a reduction in summer surface stream flows.

◆ Is Designed and Managed to Avoid Public Health and Safety Hazards

- Are community health and safety hazards related to stormwater addressed?
- Is the risk of flood damage to buildings minimized?
- Is the risk of damage to urban infrastructure such as streets and bridges minimized?

Information: Natural flooding is difficult to completely control, and engineered flood-control structures are often expensive and sometimes fallible. Stormwater management strategies and development standards can reduce the magnitude of increased urban runoff and significantly lessen the risk of damage from natural flooding.

◆ Incorporates Community Amenities

- Can recreational opportunities be provided?
- Is there protection of open space?

Information: Stormwater infrastructure can be multi-objective in function if supported by the community, including conserving urban space and improving community livability. However, recreational activities can cause significant damage to natural systems if not located and managed carefully.

- Are available City plans for trails, open space and parks incorporated into the stormwater planning process?
- Are the inherent values of natural features in urban areas being recognized?

Information: Urban natural features such as waterways can enhance the aesthetic and economic value of public and private lands.

◆ Explores and Utilizes Innovative and Low-technology Approaches

- Are innovative and low-technology approaches examined and used when applicable?

Information: Selection of technology involves a number of considerations, including short and long-term direct and indirect costs, maintenance, possibilities for amenities, and density transfer to maintain urban densities.

- Are present stormwater management methods evaluated to determine whether they are appropriate or effective?

Information: A recent stormwater practice has been to dispose of street runoff into streams and to put small creeks into underground pipes. In the past urban runoff was piped along with sewage to a plant to be treated for contaminants.

◆ Implements Urban and Rural Land Use Objectives

- Are significant resource lands within and outside of the urban growth boundary protected?
- Are urban lands efficiently developed to urban densities and other urban standards?
- Can redevelopment and infill opportunities be provided for in the Stormwater Master Plan and stormwater development standards?
- Are innovative development standards (such as density transfer) used to implement these urban and rural land use standards?

Information: Urban land use patterns that optimize the use of city lands for urban-type development protect resource lands outside of the current urban growth boundary. An example is that compact urban development postpones or prevents the expansion of the urban growth boundary onto farm and forest lands. Conversely, protection of significant resources within urban areas is also a concern for many citizens, and can be a part of the infrastructure that manages urban runoff. However, protection of natural features can contribute to "urban sprawl" if not balanced with adequate urban density." Both objectives listed above are reflected in the Corvallis Comprehensive Plan policies.

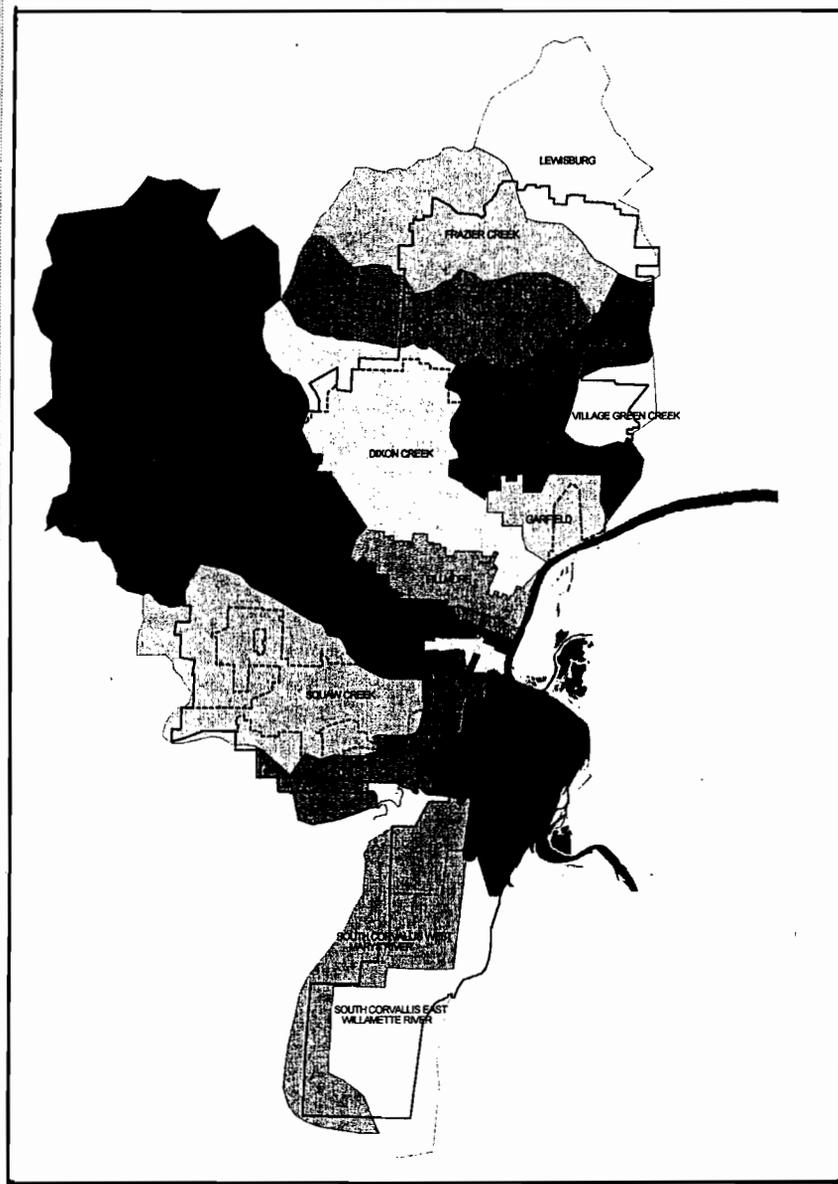
- Is land available to reserve and use for stormwater management, and what ownership status would adequately protect the land for future stormwater uses?

Information: For example, it can be difficult for a community to find and acquire a suitable site for a new school or fire station. Communities have sometimes set aside land prior to urban growth to prepare for future schools, parks or other urban requirements. Not all urban community needs are necessarily provided for through public ownership, however.

Stormwater Alternatives Public Workshops

March 16 and repeated on April 1, 2000

Citizen Input Workbook and Information Packet



Map of Corvallis Stream Basins

Sponsored by the City of Corvallis Public Works Department and the Stormwater Planning Committee
For more information, call 766-6916

Evaluation Criteria
based on Community Values
for the Corvallis Stormwater Master Planning Process

March 1, 1999

- ◆ **Maintains and Accommodates Natural Hydrological Processes**
- ◆ **Protects and Improves Water Quality**
- ◆ **Controls Unwanted Erosion**
- ◆ **Protects and Restores Natural Resources and Ecosystem Functions**
- ◆ **Meets or Exceeds Current Regulations and Anticipated Future Regulations**
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Stormwater Master Planning

Developing strategies to address issues such as water quality, flood damage, erosion and stream health.

**Evaluation Criteria
for the Corvallis Stormwater Master Planning Process
Developed from Community Input**

Please rate each ♦ evaluation criterion in terms of your view of its level of importance or your level of support in stormwater planning and management. Rate 0 (lowest) to 5 (high). For this exercise, the ● descriptions in the boxes should help frame and describe each criterion.

♦ Maintains and Accommodates Natural Hydrological Processes

Evaluation Criteria:

- Is there protection or restoration, anticipation of, and allowance for natural disturbance events and outcomes such as flooding and stream bank erosion?
- Is ground infiltration, detention, seasonal stream flow patterns, and other natural water movement maintained?
- Is mitigation a requirement for storm water discharges?

♦ Protects and Improves Water Quality

- Is the contamination of surface and ground water by pollutants prevented?
- Are seasonal water temperatures protected or improved?
- Are landscape features such as wetlands and floodplains recognized for their ability to filter and process pollutants?

♦ Controls Unwanted Erosion

- Is natural erosion accommodated where possible?
- Is erosion that results from urbanization and its consequences minimized?

♦ Protects and Restores Natural Resources and Ecosystem Functions

- Is there protection of existing wetlands, stream systems, and other significant natural features such as swales?
- Is there protection and enhancement of native fish communities?
- Is there protection and enhancement of stream corridors and floodplains, riparian communities, and their ecological functions?
- Is there protection and enhancement of native vegetation and wildlife habitat?
- Does reclamation/restoration improve natural ecological functions and processes as well repair damaged natural features?

♦ Meets or Exceeds Current Regulations and Anticipated Future Regulations

- Are current Federal and State regulations that presently apply to the City addressed and implemented?
- Are regulations that are anticipated within the foreseeable future and the life of the storm water plan dealt with?

♦ Cost Considerations are Inclusive

- Is there equitable cost allocation based on what generates the cost?
- Is cost analysis based on all costs, both direct (traditional economic) and indirect (ecological and social), immediate and long-term, and does it incorporate the other community stormwater evaluation criteria?
- Are costs reasonable in relation to the products and results, and does cost analysis include elements such as economies of scale and project timing efficiency?

◆ Addresses Maintenance Requirements and Allows for Maintenance Access

- Are maintenance requirements supported by existing community resources?
- Is maintenance access sufficient to allow for the sustainable management of the stormwater system to implement the community's values, multiple functions of those systems?
- Are upper basin activities that affect downstream conditions, including the cumulative impacts of urbanization, considered with respect to their potential impact on downstream maintenance requirements?
- Are maintenance approaches selected in the context of other community stormwater values and objectives?

◆ Incorporates Community Awareness and Information Exchange

- Are community educational opportunities incorporated into the development and implementation of the Plan?
- Does the design and siting of projects contribute to public knowledge and awareness?

◆ Addresses Cumulative Impacts and Off-site Impacts

- Is the cumulative effect of urbanization estimated and addressed within the plan and at the time of each future development?
- Are upstream and downstream negative impacts, and off-site and on-site negative impacts minimized?
- Are quantitative correlations and goals made to address cumulative impacts on offsite locations?

◆ Is Designed and Managed to Avoid Public Health and Safety Hazards

- Are community health and safety hazards related to stormwater addressed?
- Is the risk of flood damage to buildings minimized?
- Is the risk of damage to urban infrastructure such as streets and bridges minimized?

◆ Incorporates Community Amenities

- Can recreational opportunities be provided?
- Is there protection of open space?
- Are available City plans for trails, open space and parks incorporated into the storm water planning process?
- Are the inherent values of natural features in urban areas being recognized?

◆ Explores and Utilizes Innovative and Low-technology Approaches

- Are innovative and low-technology approaches examined and used when applicable?
- Are present stormwater management methods evaluated to determine whether they are appropriate or effective?

◆ Implements Urban and Rural Land Use Objectives

- Are significant resource lands within and outside of the urban growth boundary protected?
- Are urban lands efficiently developed to urban densities and other urban standards?
- Can redevelopment and infill opportunities be provided for in the Stormwater Master Plan and stormwater development standards?
- Are innovative development standards (such as density transfer) used to implement these urban and rural land use standards?
- Is land available to reserve and use for stormwater management, and what ownership status would adequately protect the land for future storm water uses?

Comments: _____

The Watershed

What development standards, land use practices, and protection should we propose for outside of the stream corridor and floodplain?

I. The Watershed: Water Quality and Water Detention

Background Information

Rain water falls within a basin, and gradually travels to a stream. The way in which we use land outside of the stream corridor and floodplain affects the quality of water, the rate of flow into urban streams. It also generally reduces the amount that returns to the groundwater. Impervious surfaces prevent stormwater from soaking into the soil, increasing runoff rates and reducing water quality. Streets, especially, create shortcuts for water to reach the stream. Recontouring the land and removal of vegetation also reduce the watershed's ability to detain and manage water. Other urban practices contribute pollutants and degrade water quality.

Solutions can be structural and non-structural. We can consider development standards that guide new construction towards methods that maintain water flow and quality. Additionally, we can consider programs that modify homeowner activities, such as pesticide use or vehicle cleaning and maintenance, to minimize the pollutants added to water flowing into streams. Protection and restoration of landscape features such as key wetlands are also important tools for water quality.

Some standards exist to guide development to protect water flow and quality. The *Corvallis Comprehensive Plan* adopted policies in 1998 that limit peak stream flows to the level that existed prior to development and protect water quality. Other standards provide for percentage of landscaped surfaces on developed property.

Common Residential Urban Stormwater Pollutants		
Pollutants (median concentrations)	Oregon Land use ^a	Nationwide ^b
Total suspended solids	43.2 mg/liter	101.0 mg/liter
Biological oxygen demand	5.8 mg/liter	10.0 mg/liter
Carbon oxygen demand	33.4 mg/liter	73.0 mg/liter
Total phosphorous	0.15 mg/liter	0.38 mg/liter
Dissolved phosphorus	0.03 mg/liter	0.14 mg/liter
Nitrate and nitrite	0.37 mg/liter	-----
Total copper	0.010 mg/liter	0.033 mg/liter
Total lead	0.010 mg/liter	0.144 mg/liter
Total zinc	0.069 mg/liter	0.135 mg/liter

^a Oregon data from Eugene, Gresham, Portland, Salem, Bell Station, Lake Oswego, Milwaukie, Oregon City, and Tualatin area (USA).

^b Nationwide Urban Runoff Program

The Combined Sewer Overflow

Another water quality issue in Corvallis is known as the Combined Sewer Overflow (CSO) Project. The sewer system for the older part of town collects rainfall runoff and sewage from homes and businesses into one pipe that goes to the sewage treatment plant. A heavy rainfall can overload the sewer system, causing a mix of rainwater and raw sewage to overflow the pipe system and discharge to the Willamette River.

Though this is also a stormwater issue, it is being dealt with separately. A \$32 million CSO Project is being constructed to address overflows from up to a 5-year rainfall event. Stormwater will receive primary-type water quality treatment from these improvements. This project will be completed this year (2000).



What is the City's Current Approach to Water Quality?

The City of Corvallis population recently reached 50,000, and cities of this size are required to meet additional federal stormwater regulations for water quality.

The City has management practices to improve runoff water quality. For example, the City regularly sweeps streets to collect debris and its associated contaminants from the roadways before they can be picked up by stormwater runoff. It also has an information outreach program that includes storm drain labeling and informational fliers (please see City stormwater program handout for additional information).

At this time, debris and larger sediment is removed from water that enters city street storm drains (catchment basins). Many commercial and industrial developments remove oil and debris from stormwater before discharging it into a creek, river, or the City's storm system. However, some older parking lots in the City drain directly to a creek without any form of water quality treatment.

What is the City's Current Approach to Stormwater Detention?

The purpose of detention is to delay the movement of water from a development because of impervious surfaces (concrete driveways, streets) to a stream or wetland to simulate pre-development peak runoff levels. The City now requests that new developments include detention facilities, but detention standards have not been formalized into Corvallis' *Land Development Code*. The *Corvallis Land Development Code* text gives specific guidelines for development.

Though detention is typically designed to manage the runoff from a development so that stream's peak flow is the same as before the development (for up to a 10-year storm event), the overall hydrology of a stream is often still changed after development.

Additional References for Water Quality and Detention

Please refer to attachments for information on these topics.

- *Corvallis Comprehensive Plan* policies that directly relate to water quality and detention.
- A sampling of *Benton County Comprehensive Plan* policies relating to basin-wide stormwater resources.
- Pending Federal Regulations that affect stormwater planning summary.

Additional Reference Material

- ✓ Portland Metro Water Quality & Floodplain Protection, called Title 3 website: <http://www.multnomah.lib.or.us/metro/growth/tfplan/funcplan.html>
- ✓ Phase II Stormwater Rules website: <http://www.epa.gov/owm/sw/phase2>
- ✓ American Forests website for information on urban forests, interception, etc: <http://www.americanforests.org>



Water Quality and Water Detention Alternatives

Watershed Water Quality and Detention	Strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (?) *If unsure, what information might help you decide? Please Write Comments Here, too
A. General Water Quality Alternatives	
Construction-related strategies: a range from local government practices, information outreach and incentives vs. to regulation/requiring.	
<p>A1. <u>Public Practices</u> - develop public infrastructure to provide for best management of stormwater quality and quantity (such as parking lots with pervious surfaces and public buildings that use innovative methods to clean stormwater), and implement "Best Management Practices" (<i>these are activities like construction erosion control and sweeping the streets to pick up contaminants</i>).</p> <p><u>Comments:</u> government practices can be a model for community, . Narrow street can impact emergency response</p>	
<p>A2. <u>Inform the public and encourage use</u> of building techniques that maintain water quality and flow rates, such as roof gutters that don't drain into the street, pervious or narrow driveways, and green space on lots.</p> <p><u>Comments:</u> A voluntary approach to stormwater management.</p>	
<p>A3. <u>Provide incentives</u> for private construction that promotes use of building techniques that maintain water quality and flow rates, such as disconnected gutters, pervious or narrow driveways and required green space on lots.</p> <p><u>Comments:</u> Examples include stormwater-innovative houses such as ones with disconnected gutters may have reduced stormwater monthly fees;</p>	
<p>A4. <u>Mandate standards</u> for all new construction that use building techniques that maintain water quality and flow rates, such as disconnected gutters, pervious or narrow driveways and required green space on lots.</p> <p><u>Comments:</u> Uniform expectations for each development; infrastructure can be expensive; connect environmental costs with sources.</p>	
Human Activity-related strategies: a range from local government practices, information outreach and incentives vs. to regulation/requiring.	
<p>A6. <u>The City to go beyond minimal Best Management Practices</u> mandated by the federal government for this sized city for runoff water quality (ongoing activities like construction erosion control and additional street cleaning).</p> <p><u>Comments:</u> Government practices can be a model for community; requires additional public funds from sources like increased utility rates..</p>	
<p>A7. <u>Inform the public about Best Management Practices</u> for maintaining water quality such as washing the car on the lawn, picking up dog feces, reduction of automobile use, vegetation management, and reduced use of pesticides and fertilizers.</p> <p><u>Comments:</u> Voluntary approach to stormwater management; everyday practices of individuals and businesses are to a great extent self-managed.</p>	
<p>A8. <u>Provide incentives and public/private partnerships</u> for using best management practices for maintaining water quality.</p> <p><u>Comments:</u> Example: work with service clubs and organizations for information outreach.</p>	
<p>A9. <u>Mandate and enforce best management practices</u> for maintaining water quality.</p> <p><u>Comments:</u> City staff to monitor private maintenance of stormwater-treating infrastructure and construction sites; will require increased stormwater rates.</p>	
Other activity-related strategies?	

B. Specific Water Quality and Detention Alternatives	
B1. Is it appropriate to require property owners to manage stormwater in a manner that it does not affect neighboring properties?	
B2. Should incentives be provided for the protection of sensitive areas such as wetlands and riparian areas on private property for water quality and natural detention?	
B3. Should the City perform additional monitoring of stream water quality pollutant indicators to determine if we are achieving water quality expectations? <i>Comments:</i> The City currently monitors for temperature, pH, dissolved oxygen, and bacterial contamination; additional monitoring would require additional funding.	
B4. Should the City monitor biological indicators of stream health such as fish or aquatic insect populations? <i>Comments:</i> would require additional funding	
B5. Should the City identify and acquire significant wetlands and other significant areas for water quality and natural detention? And, if so, how is it-funded?	<input type="checkbox"/> Storm water fees on utility bill <input type="checkbox"/> City bonds <input type="checkbox"/> Property taxes <input type="checkbox"/> Building permit for redevelopment in urbanized areas <input type="checkbox"/> Other _____
B6. Should the City do more to protect upland vegetation to maintain vegetation's stormwater function in the watershed? <i>Comments:</i> City land use policy currently protects "significant native plant communities" and significant hillside trees.	
B7. Should City development standards require parking structures for developments that require larger parking facilities?	
B8. Should the City establish, or encourage the formation of a local wetland bank for same-basin wetland mitigation?	
B9. Should streets and/or parking lots function as temporary storage areas for larger, infrequent floods if it doesn't compromise public safety? <i>Comment:</i> a less expensive way to manage larger flood events than in pipes or other flood water storage infrastructure; re-routing of traffic & travel inconveniences; street cleaning after a flood.	<u>If so, for how long should street or parking lot be flooded?</u>
B10. Should the City develop a local program of guidelines and enforcement for stormwater objectives to either reinforce or be a substitute for state regulations? <i>Comments:</i> implementation of state wetland regulations by state agencies, but with local guidance for protection and restoration; construction erosion control, etc). An example - standard state construction site sediment control methods aren't always site-functional.	Please give types of stormwater-related procedures and guidelines where this could work/or might not work.
C. Retrofitting City Infrastructure to Treat Runoff in Developed Parts of the City	
C1. As a general approach to stormwater disposal, is it appropriate to pipe untreated stormwater runoff into streams? <i>Comment:</i> Most parts of town send piped runoff to the stream with minimal treatment.	
Alternative C2. Continue or increase existing City practices such as street cleaning; continue to discharge stormwater runoff to local streams; City implement no additional infrastructure and practices (street storm drain catchment basins trap larger sediment and debris). Continue/increase pollution prevention public education and outreach.	
Alternative C3. Retrofit City-owned street catchment basins (storm drains) with water treatment devices to collect pollutants. <i>Comment:</i> Retrofitting infrastructure to improve water quality is expensive, so it is worth determining if the community would like to explore this option further as a possibility.	If you support this alternative, which way(s) could you support it being funded? <input type="checkbox"/> Storm water fees on utility bill <input type="checkbox"/> City bonds <input type="checkbox"/> Property taxes <input type="checkbox"/> Building permit for redevelopment in urbanized areas <input type="checkbox"/> Other _____
Other Approaches and Alternatives?	

II. Stormwater-related Community Involvement

Background Information

City staff are often called upon to work with the community in some stormwater capacity, especially with streams. Some recent examples are the Dixon Creek Corvallis High School project, an OSU graduate project at the Community Outreach site on Dixon Creek, flood mitigation in the area of Lancaster, and the riparian restoration work on Dixon Creek at Circle and Kings Boulevards. Staff are asked to give presentations at schools, and receive telephone calls from citizen groups looking for volunteer projects or activities that are often related to stormwater issues.

D. Community Involvement Alternatives	Strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (?) *If unsure, what information might help you decide? Please Write Comments Here, too
Assuming that there must be some management of urban streams to meet Federal and State regulations, and local codes, how should individual property owners (residential, commercial, etc) be helped to comply with stormwater standards?	
Alternative D1. <u>Individual citizens</u> : citizens/property owners take personal responsibility for preventing and minimizing pollution at the source.	
Alternative D2. <u>Private, voluntary organizations only</u> : independently trained; no relationship with City government for support. e.g the Corvallis Environmental Center, service clubs or neighborhood Stream Watch groups.	
Alternative D3. <u>Private-Public partnerships</u> : Volunteers from the community or volunteer organizations, with some City staff support and/or under staff supervision (training, equipment, project ideas, etc); would call for additional staff.	
Alternative D4. <u>Public only</u> : A new City department or a new branch of an existing department with enough staff for the tasks, funded by stormwater utility fees.	
Other(s):	
D4. Should the community provide opportunities for developer sponsored, publically managed demonstration systems - (restoration, water quality treatment, fish culvert passage, etc.)	
Other(s): Have we missed an option? Please give us your comments.	



III. Jurisdictional Boundaries and Stormwater Management

Background Information

Citizen comments, beginning early in this stormwater public meeting process, made it clear that addressing stormwater issues at a watershed scale was a significant issue for many participants. However, this means finding ways in which to work outside the city limits.

There are three political/land use areas that would be affected by this approach: the city proper, the urban fringe scheduled for urban development bounded by the Urban Growth Boundary (UGB), and the land outside of the urban growth boundary. The last two are under the County's jurisdiction. However, the City and County have together created guidelines for the urban fringe to meet special objectives. (Please also note that Oregon's Land Use Planning Program allows for expansion of the urban fringe by moving the UGB, so this resource land is not absolutely protected from future urbanization.)

Additional Information

- Benton County and Corvallis Comprehensive Plans policy excerpts.
- Citizen comments summary

Stormwater Jurisdictional Management Alternatives

E. Stormwater Jurisdictional Management Alternatives	Strongly support (SS), support (S), neutral (N), oppose (DS), strongly oppose (SO), or unsure (?) *If unsure, what information might help you decide? Please Write Comments Here, too
Alternative E1. City reviews and comments on County plans and development applications (this is what is currently done to some extent.) Property owners can receive guidance from state & federal agency local offices.	
Alternative E2. Develop a City-County agreement for storm water management in the Corvallis urban fringe portion of the urban growth boundary (UGB) area.	
Alternative E3. Identify County <i>Comprehensive Plan</i> policies that propose County action that would contribute to storm water management, and work with the County to implement these policies, including for watershed lands beyond the UGB area (see attachment for specific policies).	
Alternative E4. A watershed-wide education outreach to increase awareness regarding storm water management issues.	
Alternative E5. Annex, upon a majority public vote, all urban growth boundary (UGB) land promptly so that City land use policies and standards apply.	
Other:	

Multiple-Use of Urban Lands

Multiple objectives for the use of urban lands conserves urban area, and in turn protects resource lands outside of the city.

For example, several parks manage floodwater since they are in a floodplain. Several include wetlands that temporarily detain stormwater to reduce natural flooding. The special development policies that protect the tree-covered hillside views are also providing for stormwater management in the watershed. The trees intercept rainfall, and reduce slope erosion.

Being aware of this option and practice may increase the opportunity for urban strategies like these.

The Floodplain

To what extent should there be development in a 100-year floodplain?

I. Floodplain Functions and Issues

Floodplain strategies for managing stream basin water can be based on a number of objectives. Some of these objectives are reducing the risk of damage to buildings or preventing human injury, storing flood waters, or protecting fisheries resources.

Functions:

- * Transports flood waters; is an extension of the channel.
- * Is a temporary storage of flood water.
- * Is significant habitat for fish, including a refuge area during a flood, and high value feeding zone when flooded.
- * Collects sediment that is being transported in the floodwater; sediment settles out of the water onto the floodplain and so stays in the basin.
- * Reduces flood water velocity that cause erosion by allowing the water to spread out.
- * Location for recharging groundwater.

Issues:

- * Potential damage to structures and risk to life.
- * Isolation from emergency services, etc during a flood.
- * Other(s)? _____

What makes up the 100-year floodplain? The 100-year floodplain is divided into two zones, the floodway and floodway fringe. Development is allowed in the floodway fringe, and fairly restricted in the floodway for most structures. Table 1 describes these zones and a 100-year floodplain.

Table 1.

Floodplains. For FEMA regulatory purposes, a floodplain is divided into two areas:

Floodway -

A general description: The portion of the floodplain, typically the channel and the land adjacent to the channel, that is kept generally unobstructed to allow for water flow. It is where the bulk of the flood water is transported downstream and where the water velocities and flood forces are generally the greatest.

A technical definition: The stream channel or other watercourse and the adjacent land areas that must be reserved in order to accommodate and transport a 100-year flood without cumulatively increasing the water surface elevation more than 0.2 ft, as the rest of the floodplain is developed.

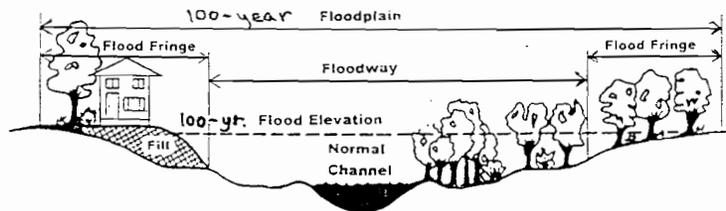
Floodway fringe - is the area outside of the floodway.

It is calculated to be the portion of the floodplain that could be completely filled without raising the 100-year flood by more than 0.2 ft. at any point. In its natural state, the floodway fringe stores flood waters, and has a water current that is generally slow or slack.

100-year flood - a flood that has a 1% chance of occurring each year.

100-year floodplain - spans the entire area of land that can be flooded during an average 100-year period. It includes the range of land that floods *annually* to the highest ground that has only a 1% chance of flooding each year.

Stream Corridor Section Showing the 100-year Floodplain and Floodway



II. The Current City Standards for Floodplain Development and General Floodplain Information

Floodplain Development Guidelines. Corvallis floodplain development standards generally follow the Federal Emergency Management Agency's (FEMA) Insurance Program.

Development, including fill, is currently allowed in Corvallis within the 100-year floodplain outside of the floodway (see Table 2 for a more complete explanation).

Table 2.

Current Development Standards for Floodplains
<p>Floodway development. New construction, substantial improvements, and other encroachments are generally prohibited in the 0.2 floodway. <i>Non-structural</i> development, such as parking lots, is permitted if it does not result in any increase in flood levels and/or flood hazards.</p>
<p>Floodway fringe development. (Land that is within the 100-year floodplain but outside of the floodway.)</p> <p>Residential structures and substantial improvements must have the lowest floor, including a basement, elevated to a minimum of 1 ft above the 100-year flood-water elevation. (Can be built either on fill or elevated so that water can flow under the house or apartment.)</p> <p>Non-residential structures and substantial improvements must have the lowest floor, including a basement, elevated to a minimum of 1 ft above the 100-year flood-water elevation, <i>or</i> be flood-proofed and capable of resisting flood-water forces.</p>

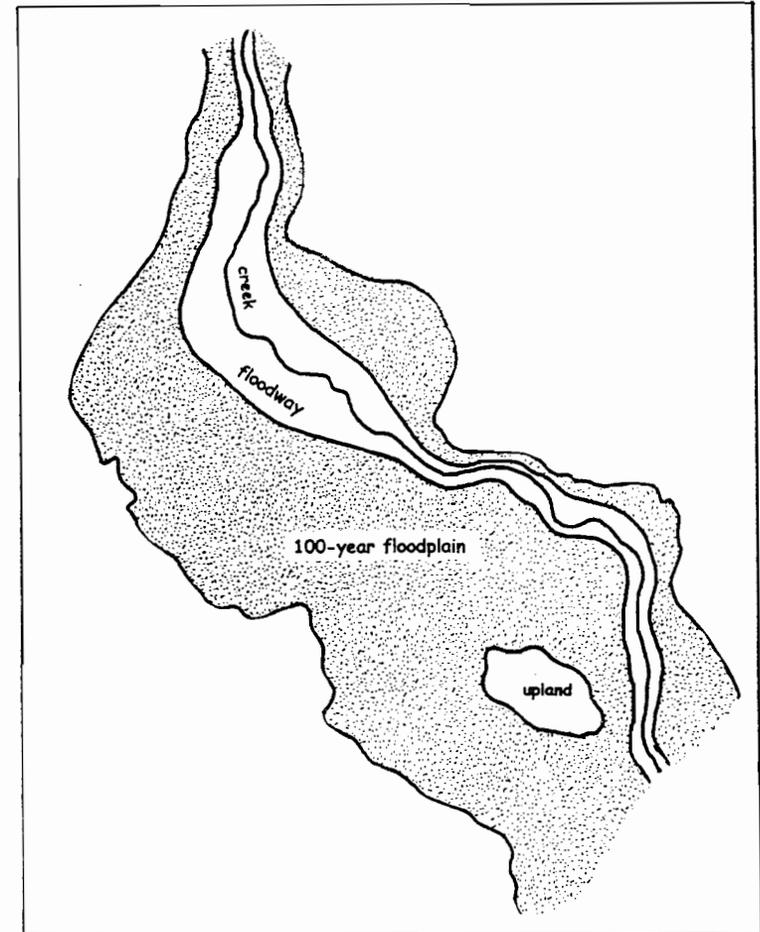
III. Additional Background Information

Please refer to attachments for information on these topics.

- Corvallis Comprehensive Plan (adopted 1998) policies related to floodplain development.
- Citizen comments at previous public meetings and surveys.

Additional Reference Material:

- ✓ FEMA (Federal Emergency Management Agency website: <http://www.fema.gov>)
- ✓ Portland Metro Water Quality & Floodplain Protection, called Title 3 website: <http://www.multnomah.lib.or.us/metro/growth/ffplan/funcplan.html>



An Example of a Floodplain and Floodway along a Creek.

The 100-year floodplain and the floodway can vary greatly in width, depending on the topography, how deeply the channel is ditched (channel incision), and the amount of water that comes from the watershed.

IV. FLOODPLAIN DEVELOPMENT ALTERNATIVES. With the Stormwater Evaluation Criteria in mind, which alternative(s) do you support?

Please use: strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SP), or unsure (?)*.

<p style="text-align: center;">100-Year Floodplain Development Alternatives</p> <p style="text-align: center;">For new development or substantial improvements, and with no structural development in floodway*</p> <p style="text-align: center;">* See Table 1 for floodway & floodplain explanations (Note: the 100-year floodplain includes lands that are flooded each year)</p>	<p style="text-align: center;">With the Storm Water Evaluation Criteria in Mind, which Alternative(s) Do You Support? Please use strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (?) (If you don't know, what information might help?)</p>	
	<p style="text-align: center;">Streams (Dixon, Squaw, Oak, Jackson, Frazier, Sequoia, & Ryan Creeks; Village Green/Stewart Slough)</p>	<p style="text-align: center;">Mary's River and Mill Race</p>
<p>Alternative A1. Keep existing development standards. May build in the 100- year floodplain outside of the floodway, if elevated (on fill or without restricting flow), or flood-proofed (see Table 2).</p> <p><u>Comments:</u> Filling, etc removes floodwater storage capacity, and can either cause flow velocities to increase (also possibly altering erosive forces), or transfer floodwaters to other areas. Slow-water portions of the floodplain are refuge and feeding areas for fish. However, urban areas may be where trade-offs are made with priorities towards development.</p>		
<p>Alternative A2. No net fill in the 100-year floodplain outside of the floodway. Allows development, but filling must be offset with excavation at site to maintain flood water capacity (a balanced cut & fill).</p> <p><u>Comments:</u> Allows development, while floodplain storage area is not lost; but in small creek systems, could sometimes alter how the water moves downstream, effecting erosion and deposition patterns.</p>		
<p>Alternative A3. Allow construction in the 100-year floodplain outside of the floodway, but structures must be elevated so as to not restrict flow - i.e. without fill or other water-displacing design.</p> <p><u>Comments:</u> Would minimize hydrological impacts to the water course; lattice, or other visual barrier could visually improve structure, or open parking could be under building; may be difficult to prevent owners from walling space in at later date.</p>		
<p>Alternative A4. No structural development within the 100-year floodplain. Can use density transfer to offset floodplain development constraints for residential areas.</p> <p><u>Comments:</u> Separates building land use from the hydrological function of the floodplain; Minimizes potential conflicts between flooding and urban land uses. some loss of land available for urban development. Density transfer is a residential development option, where if some land is set aside as open space to protect a significant resource, than that development can build houses at a higher density.</p>		
<p>Other:</p>		

How Much Land is in Corvallis is in the Mapped 100-year Floodplain?

The are approximately 900 acres of land in the FEMA-mapped 100-year floodplain within the urban growth boundary area that are zoned for urban development.* However, about *one-third* of this floodplain land is in the floodway, the area where most construction is prohibited.

The floodplain in most parts of town is already largely developed. However, the Jackson-Frazier basins have not been annexed and developed at urban levels.

There are approximately 120 acres of mapped 100-year floodplain in the urban growth boundary area in the Jackson-Frazier basins. However, over 60% of this floodplain is in the floodway, and is generally structurally undevelopable.

The remaining floodplain land in the urban growth boundary area (approximately another 900 acres) is in open space.

* Based on Federal Emergency Management Agency (FEMA) mapping.

V. FLOODPLAIN SUPPLEMENTAL QUESTIONS: With the Stormwater Evaluation Criteria in mind, which alternative(s) do you support? Please use, strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (?)*. *If unsure, what information might help you decide?

Additional Floodplain Management Questions	Strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (?)* *If unsure, what information might help you decide?	Comments
FLOODPLAIN PROTECTION AND RESTORATION:		
<p>B. Provide incentives for floodplain restoration and protection as a part of a development process.</p> <p>Possible benefits include: Provides other approaches to floodplain protection other than regulatory during the development process. May have more options for floodplain management.</p> <p>Possible costs include: Would require a more complex development review process.</p>		
<p>C. Create ongoing floodplain protection and restoration opportunities for private and public entities that are independent of development processes.</p> <p>Possible benefits include: Don't have to rely on a development process to enhance and protect floodplain functions.</p> <p>Possible costs include: contributing to urban sprawl that moves into forest & farm resource lands; local government must find funding source(s).</p>		
<p>Other(s) & Additional Comments:</p>		



South 3rd Street during the February, 1996 flood.

Stream Corridor Widths

What do you suggest for the management of lands along watercourses?

I. Stream Corridor Functions and Issues

The stream corridor is a key part of a stream system. The stream corridor plays many roles for the health of a stream system and the management of urban impacts on stream resources.

One way of determining how much land to protect along a stream channel is to identify a stream corridor's primary functions, including those created by the urban environment, and then estimate the width based on these functional objectives. This streamside land can be called the *functional corridor*. This functional corridor will vary in width depending on the variability of each stream and stream section. It will also vary in Corvallis depending on to what extent the community wishes to protect these functions,

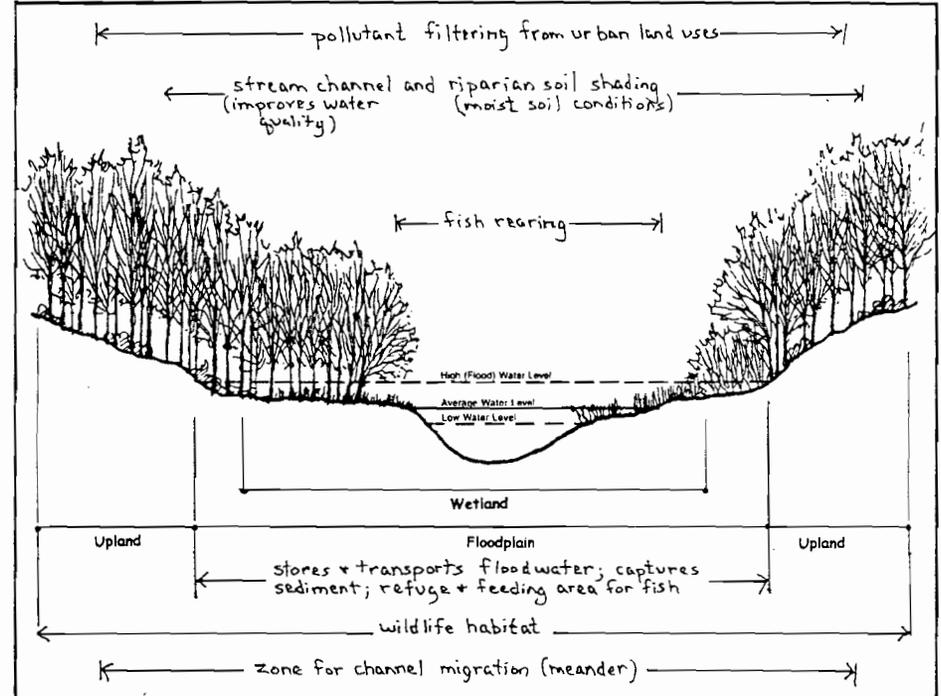
Functions

- * Improve and protect water quality, including shading stream waters, trapping sediments, and filtering pollutants.
- * Allow for natural channel movement and bank erosion; setbacks to minimize the chances of having to stabilize stream banks, sustain natural stability with vegetation.
- * Accommodate natural floods and protect floodplains, while reducing the risk of property damage from flooding through land use alternatives.
- * Protect wetlands adjacent to the stream channel.
- * Protect or reestablish biological resources associated with the stream channel and corridor such fish populations and trees.
- * Reduce drainageway maintenance costs with a system that is self-functioning.
- * Minimize conflicts between the functions of abutting land uses

Issues

- * Address possible costs of land to developers and/or the community.
- * Address the issue that setting aside open space in urban areas can create losses of rural resource lands through expansion of the Urban Growth Boundary, if compensating measures are not taken.
- * Address federal endangered species proposed rules for salmon and steelhead, and Phase II storm water quality rules.
- * Other(s)?

An Approximation of Some Functional Zones within a Stream Corridor



The corridor of land adjacent to a stream channel serves a number of functions. For example, within this stream corridor there is a zone for filtering pollutants in runoff, a zone to store flood waters, a meander zone for the stream channel natural movement, a zone for channel shade cover and leaf food source for stream organisms, and a habitat corridor for wildlife.

II. Current City Practice for Determining Stream Corridor Widths

When a segment of stream (that serves a drainageway function) is on a piece of urban land that is being developed, the stream and its corridor are dedicated (deeded) to the City. A formula that is based on the variables listed below determines the width of this stream corridor. In the older part of town, many individual property lines go to the center of the stream channel. In these areas easements might be obtained by the City to complete projects, such as flood mitigation.

- ⊗ stream channel width (up to 30 ft)
- ⊗ bank steepness (steeper = a wider corridor)
- ⊗ floodway width (floodway is the portion of the floodplain reserved [kept free of obstructions] to transport flood waters; and where high volumes of moving water flow)
- ⊗ floodplain width (up to 50 feet on each side of the channel)

(See attached informational sheet for details on the establishment of the dedicated stream corridor width)



Past land practices have placed urban and rural land uses immediately adjacent to the stream channel. This often created conflicts between the various uses.

drawing by Bruce Osen

Table 1. Stream Corridor Dedicated or Easement Widths on each side of the stream channel (based on the current *Corvallis Land Development Code [1993]* standards).

Channel Width from top of bank	* Current dedicated width on each side of the stream channel for:	
	a channel with sloping bank	a channel with steep, high bank
5 ft. wide	7 - 12 ft	12 - 17 ft
10 ft. wide	15 - 20 ft	24 - 29 ft
15 ft. wide	22 - 27 ft	36 - 41 ft
20 ft. wide	30 - 35 ft	48 - 53 ft
25 ft. wide	37 - 42 ft	60 - 65 ft
30 ft. wide +	45 - 50 ft	72 - 77 ft
any width channel	to include the entire floodway in the locations where greater than formula	
using the LDC riparian definition	Include all of the natural riparian vegetation	

* Exception: 5 ft. of the stream corridor dedication can be waived when the City Engineer finds that there is a minimal risk that impervious cover, compaction, or trenching activities will occur in the 5 ft area.* That is why there is a 5 ft range of widths in these two columns.

* Exception: If the 100-year floodplain extends beyond these widths, additional width shall be provided for flood management. *Such dedications shall not exceed 50 ft as measured from the top of the bank.*

III. For Additional Background Information

Please refer to attachments for information on these topics .

- Corvallis Comprehensive Plan policies that directly relate to stream corridor widths
- Citizen comments from public meetings
- Stream Corridor Width Dedication Calculation from the *Land Development Code*
- New federal and state regulations summary for stormwater and threatened salmonids

Additional Reference Material:

- ✓ For information on the threatened spring chinook salmon and winter steelhead listings proposed rules: <http://www.nwr.noaa.gov>
- ✓ For information on stream corridors and wetlands: <http://www.epa/owow>
- ✓ For information on Oregon's land use goals, including natural resources and flood hazard planning statutes: <http://www.lcd.state.or.us>
- ✓ For background information on FEMA: <http://www.fema.gov>

Willamette Salmonid Listing under the Endangered Species Act

The Federal government National Marine Fisheries Service (NMFS) has proposed the draft "4(d) Rules" for the protection of the recently listed chinook salmon and steelhead in the upper Willamette Basin under the Endangered Species Act. Because of the salmonids' threatened status, it is possible that Corvallis will need modify its stream corridor strategy to contribute to the conserving of the fish populations.

Stream Corridor Maintenance Effort

Narrow stream corridor widths create the potential for increased maintenance efforts and costs. Wider stream corridors generally reduce the amount of surveillance and maintenance work required. (City maintenance is usually funded by a monthly stormwater utility fee.)

For example, if there is bank erosion, bank stabilization work would be needed if a building were close to the channel.

Or, if a tree falls down in a narrow stream corridor and diverts flow, in a wider corridor it could be left to provide habitat for fish, but in a narrow corridor the tree would probably have to be removed to prevent flooding, bank erosion or other impacts on adjacent land uses.



IV. STREAM CORRIDOR WIDTH ALTERNATIVES: With the Stormwater Evaluation Criteria in mind, which alternative(s) do you support? Please use: strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (?)*. *Note: A method for stream width implementation such as a formula might need to be developed as an option, since site studies are expensive.*

<p style="text-align: center;">Alternatives for Stream Corridor Width on each Side of the Channel for New Development and Redevelopment (to extent possible with land ownership patterns and existing permitted structures)</p> <p style="text-align: center;">These alternatives would be for the local perennial and intermittent creeks; Marys River & Willamette to be addressed separately. Please see other alternatives section for connected issues, like how to fund.</p>	<p style="text-align: center;">Strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO) or unsure (??)*</p>	<p style="text-align: center;">Comments, and "If unsure, what information might help you decide? (Please use back of paper, too)</p>
<p>A1. EXISTING: Maintain existing standards of 7 ft to 77 ft on each side of the channel, depending on stream channel width (or floodway width, or riparian vegetation width, if greater). [From a 5 ft wide channel to a 30 ft or wider channel.]</p> <p><u>Advantages:</u> <i>Estimate of Functions Provided:</i> Provides minor to fair stream corridor function protection, depending on the channel, the location, and width. Minimizes loss of urban land for development.</p> <p><u>Disadvantages:</u> Especially for smaller streams, may not meet physical and biological objectives in stormwater evaluation criteria; potential for conflicts with abutting land uses.</p>		
<p>A2. UP to 100 FEET: Variable stream corridor widths to address stream corridor functions, with a minimum width on each side of stream of 50 feet, and up to a maximum width of 100 feet on each side of the channel, (or floodway width, or riparian vegetation width, if greater).</p> <p><u>Advantages:</u> <i>Estimate of Functions Provided:</i> Provides for stream shading, with partial pollutant filtering; depending on channel characteristics and floodplain size, accommodates some bank erosion and channel movement, maintenance cost reduction, partially protects stream habitat complexity and natural resources; protects some or all adjacent wetland, includes a substantial portion of the 100-year floodplain (hydrological function); flexible width to adapt to different stream segments; protects what is typically the most sensitive part of the stream corridor. The protection level of a function can vary based on other variables like soil type and surrounding topography.</p> <p><u>Disadvantages:</u> Possible increased land and development costs; minor urban sprawl potential if there are not offsetting measures like density transfer where significant resource land is protected in trade for higher density residential development; may fall short of addressing salmonid threatened species rules in some locations; parcel might be undevelopable unless exempted.</p>		
<p>A3. UP to 150 FEET: Variable stream corridor widths to address stream corridor functions, with a minimum width on each side of stream of 50 feet, and up to a maximum width of 150 feet on each side of the channel, (or floodway width, or riparian vegetation width, if greater).</p> <p><u>Advantages:</u> <i>Estimate of Functions Provided:</i> Provides for stream corridor functions to a greater degree than alternative A2 for pollutant filtering, reducing maintenance and bank stabilization needs, allowing for channel movement, riparian vegetation and natural resource protection, and hydrological function; would include much or all of the 100-year floodplain and wetland along most stream segments; probably minimize the risk of a threatened salmonid "take" if properly applied.</p> <p><u>Disadvantages:</u> Possible increased land and development costs; urban sprawl potential as in alternate "A2." possible need for a public funding source.</p>		
<p>A4. UP to 200 FEET: Variable stream corridor widths to address stream corridor functions, with a minimum width on each side of stream of 50 feet, and up to a maximum width of 200 feet on each side of the channel, (or floodway width, or riparian vegetation width, if greater).</p> <p><u>Advantages:</u> <i>Estimate of Functions Provided:</i> Under most circumstances would meet stream corridor functional objectives and contain most functional zones, with the possible exception of hydrological (floodplain) in a few areas. Would probably eliminate the risk of a "take" for the listed salmonids if properly applied: is a flexible width to adapt to different stream segments; Creates space for restoration of natural channel characteristics, if altered; Maximizes large wood inputs to riparian area and channel. Provides for virtually all stream corridor functions except for hydrological (floodplain) in a few areas. The protection level of a function can vary based on other variables.</p> <p><u>Disadvantages:</u> Similar increased land and development costs as A3; urban sprawl potential as in alternate "A3"; probable need for a public funding source.</p>		
<p>A5. Standard Set Widths of 50, 100 and 200 FEET: Set stream corridor width on each side of the channel, with each stream divided into three segments, upstream, midstream and lower; with the inner 50 ft most protected, (or floodway width, or riparian vegetation width, if greater).</p> <p><u>Advantages:</u> <i>Estimate of functions provided:</i> Easier to implement because of set widths; would hopefully capture a significant percentage of corridor functions addressed in A2 - A4.</p> <p><u>Disadvantages:</u> Is not adaptable to variable-width functional zones. Others similar to alternatives A2-A4.</p>		
<p>Other(s)? Please use space on back of sheet, too.</p>		

V. STREAM CORRIDOR SUPPLEMENTAL QUESTIONS: With the Stormwater Evaluation Criteria in Mind, which Alternative(s) do You Support? Please use: strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (??)*.

Additional Stream Corridor Alternatives and Associated Questions Please rate each idea or alternative independently		Strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (??)* *If unsure, what information might help you decide? Please Write Comments Here, too		
General Question: Does your home or business property border a stream?	(Circle one) Yes No			
B. Additional Stream Corridor Width Questions				
B1. Floodplain: Should the stream corridor width be wide enough to include the entire 100-year floodplain where the floodplain goes beyond your preferred width?				
B2. Minimum Width: Should the stream corridor minimum width on each side of a channel be different than 50 feet? If so, how much?	(Circle one) Yes No	Greater than 50 ft How much?	Fewer than 50 ft How much?	
C. Stream Corridor Protection, Enhancement and Restoration				
C1. The City should provide incentives for stream corridor restoration as a part of the urban development process.				
C2. The City should create ongoing stream corridor protection and restoration opportunities for private and public entities that are separate from development processes, on both publicly and privately-owned lands.				
C3. The City should create a land use ordinance and management guidelines for riparian communities along streams.				
C4. The City should develop a program for information outreach to citizens and provide support to streamside residents and others for stream and corridor protection, enhancement and restoration work.				
Other?				
D. Ownership of Stream Corridors				
D1. Should stream functional corridors be placed in public or private ownership at the time of urban development (please rate each one)?	City-owned	Privately owned	Ownership should vary, depending on situation	
D2. Should either a conservation easement or acquiring a stream functional corridor outright be the preferred method for City stream corridor acquisition (please rate each one)?	Acquire land	Acquire conservation easements, land remains in private ownership	A mix of both acquisition & conservation easements	
Other? Additional Comments:				



<p style="text-align: center;">Additional Stream Corridor Alternatives and Associated Questions (cont'd.) Please rate each idea or alternative independently</p>	<p style="text-align: center;">Strongly support (SS), support (S), neutral (N), oppose (O), strongly oppose (SO), or unsure (??)* *If unsure, what information might help you decide? Please Write Comments Here, too</p>
<p>E. How to Fund the Acquisition of Stream Corridor Land or Conservation Easements, if Acquired by City?</p>	
<p>Alternative E1. Existing approach - where land is dedicated to City by the development where the stream flows.</p>	
<p>Alternative E2. Shared acquisition costs between development and the community.</p>	
<p>Alternative E3. A Systems Development Charge where all new development contributes financially towards stream corridor acquisition as part of the urban stormwater infrastructure.</p>	
<p>Alternative E4. Shared acquisition costs between a systems development charge and the community.</p>	
<p>Alternative E5. In the absence of a development proposal, purchased entirely through public funds (stormwater utility fees, FEMA funds, bond money)</p>	
<p>Other?</p>	
<p>F. If your answer to Alternatives D2, D4, and/or D5 (above) was positive, how should the City fund these purchases (check every one that you think is appropriate)?</p>	
<p><input type="checkbox"/> Storm water fees on utility bill <input type="checkbox"/> FEMA (Federal Emergency Management Agency) Funds <input type="checkbox"/> Open space or other bond money <input type="checkbox"/> property taxes <input type="checkbox"/> Other <input type="checkbox"/> Unsure</p>	
<p>G. Swales: Should swales, smaller unchannelized watercourses with seasonally flowing water (subsurface a greater part of the year), be protected in some manner for stormwater functions? <u>Example:</u> Timberhill multiple swales in wooded area downslope of Arrowood Circle adjacent to bike path.</p>	
<p>H. Water Treatment Siting. Is it suitable to site runoff treatment infrastructure like constructed bioswales adjacent to the stream functional corridor?</p>	
<p>I. Recreational Access. Should public <i>recreational access</i> such as bike paths be placed within stream corridors to encourage recreational use? (Community comments include the feeling of intrusion into private areas, possible impacts on stream, to an urban passive recreational amenity.)</p>	
<p>J. Natural Vegetated Corridors. Should fallen trees be left and native vegetation be permitted to grow within stream corridors, for naturally functioning stream systems?</p>	

STORMWATER MASTER PLAN
CITIZEN INPUT FROM WORKBOOK & INFORMATION PACKET
MARCH 16, 2000 and APRIL 1, 2000

32 Exercises Turned in To-Date

5/2/00

EVALUATION CRITERIA	Ratings Total (0 = low, 5 = high)						Comments
	0	1	2	3	4	5	
1. Maintains & Accommodates Natural Hydrological Process				2	5	22	
2. Protects & Improves Water Quality				3	5	19	
3. Controls Unwanted Erosion				1	8	18	P20 - (circled unwanted and natural) Hard to identify.
4. Protects & Restores Natural Resources & Ecosystem Functions		1		2	2	22	P7 - This is the most important criterion.
5. Meets or Exceeds Current Regulations & Anticipated Future Regulations	1		2	3	5	16	
6. Cost Considerations are Inclusive			2	5	6	14	
7. Addresses Maintenance Requirements & Allows for Maintenance Access				6	9	13	P7 - ? P9 - second line item - future options? P20 - (circled supported) Possible with
8. Incorporates Community Awareness & Information Exchange			2	8	8	9	P20 - Not needed on all projects.
9. Address Cumulative Impacts & Off-Site Impacts				1	2	23	P7 - ? P20 - If the issues of page 3 have been addressed, many cumulative impacts will already be addressed.
10. Is Designed & Managed to Avoid Public Health & Safety Hazards	1	1		3	11	11	P9 - second line item - addressed, move the building? P9 -third line item - redesign considered?
11. Incorporates Community Amenities		1	5	3	5	12	P20 - Very important on some projects - not applicable to others. P21 - These don't seem to fit. Natural free stream systems are the amenity.
12. Explores & Utilizes Innovative & Low-Technology Approaches		1	2	4	7	14	P20 - At times, high tech may be the preferable approach and should be explored and utilized.
13. Implements Urban & Rural Land Use Objectives				5	9	12	P7 - (circled bullets 1 & 2) Are these compatible goals?

Comments	<p>P5 - All important issues!</p> <p>P6 - All of these criteria are very important. I think it is important to look at all of these aspects-many times only a few criteria are satisfied while the rest aren't even addressed. The Plan should be as holistic as possible.</p> <p>P9 - Diversity in uses increases options for funding, i.e. trails (commuting paths) in conjunction with green way stream corridors, increase chances of funding (ICT).</p> <p>P10 - All are important in the planning process. Hard to rank other than 5.</p> <p>P14 - Far too many of these criteria are focused on ecosystems, maintaining wetlands. The focus of the Plan ought to be on erosion control, property protection, flood control.</p> <p>P15 - Some of the bullets are very different from each other - I would want different numbers by different bullets within each (diamond, i.e. criteria). Why not set this exercise up so we can rate all of the ideas? For example, open space and natural features are <u>not</u> equal to recreation.</p> <p>P17 - Is it important that the Stormwater Master Plan address these criteria? (added at the end of the criteria list another bullet titled:) Need for improved connectivity not serious compromising water quality, etc., etc. Our table was struggling to understand just what we were rating.</p> <p>P18 - Is it important that the Stormwater Master Plan address these issues?</p> <p>P20 - It seems to me that the Stormwater Master Plan is a subject of land use objectives. No activity should happen unless it is compatible with those separate requirements.</p> <p>P22 - Good ideas for formulating action without objections.</p> <p>P24 - This could have been designed to fit on much less paper which also would have reduced mailing costs. These are great questions! I'm impressed we're <u>finally</u> asking ourselves these types of questions. Does this plan protect natural ecosystem functions? Whoa! There's a good question.</p> <p>P25 - I believe the City should inspect channels more frequently. Look for dams and debris.</p> <p>P27 - A very impressive piece of work. Thanks you all for taking this on.</p> <p>P28 - I found it difficult not to use all 5's. I realize that sort of defeats the purpose - but all of these seem important and defensible.</p> <p>P31 - Where conflicts between water quality, riparian function, etc. and recreational use occur, recreational use is secondary.</p>
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WATERSHED WATER QUALITY ALTERNATIVES							
General Water Quality Alternatives (page 3)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
A1 - Public Practices	16	11	2				<p>P7 - do "Best Management Practices" change with new research and information? They should.</p> <p>P9- parking lot redesign-infiltration, maintain ground water and "clean water quality</p> <p>P20 - Set example.</p> <p>P30 - But consider if pervious surface parking lots are better than collection and treatment. Public facilities need to set an example.</p> <p>P31 - Government should be held to the same standard as private interests (and vice-versa). This said, Corvallis acting as a model, I believe, is a low yield activity. LDC or Building Code serves all parties.</p>

General Water Quality Alternatives (page 3) cont'd.	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments:
	SS	S	N	O	SO	?	
A2 - Inform the public and encourage use...	17	8	3	1		1	<p>P20 - Educate.</p> <p>P23 - If roof gutters are directed to drain fields, this can create worse problems for individual home owners - flooding of neighbors, crawl space problems, etc.</p> <p>P30 - An interesting challenge. Especially when it comes to local building standards such as driveway requirements. Pervious surface could slow stream rates but (depending on what happens on your driveway) it may contribute to lower quality of ground water and soil.</p> <p>P31 - Although coaching and encouraging are exemplary, a legal framework is required to produce results.</p> <p>P32 - Especially for already developed areas.</p>
A3 - Provide incentives	13	12	2	3			<p>P12 - <u>incentives</u> for <u>required</u> green space?</p> <p>P20 - Entice.</p> <p>P23 - See A2.</p> <p>P26 - Must apply to rental property in meaningful way.</p> <p>P30 - Good. Provide clear guidelines. How do you deal with footing drains?</p> <p>P31 - See comments above.</p>
A4 - Mandate standards	17	5	3	4	1		<p>P9- for some people this is the only way they will comply</p> <p>P20 - Require.</p> <p>P23 - See A2 for examples of potential unexpected consequences of mandated techniques.</p> <p>P24 - I would love to mandate standards but developers have to come to these truths on their own. They have to see the beauty and value of protecting natural systems - mandating only makes their hearts harder.</p> <p>P28 - Work toward this as public becomes more educated. Maybe mandate standards in 5 or 10 years.</p> <p>P31 - Obviously, I think this direction produces the required results.</p> <p>P32 - The worst offenders probably won't do it unless <u>required</u>!</p>
A6 (Note no A5) - City to go beyond minimal best management practices	17	4	5	2		1	<p>P23 - Federal rules appear to be very weak on a drainage basin and area basis.</p> <p>P30 - City needs to set example. Recent CSO work has been pretty good.</p>
A7 - Inform the public about best management practices	20	8	2				<p>P7 - oppose <u>voluntary</u> only activities.</p> <p>P23 - Also encourage use of drop spreaders rather than rotary spreaders when applying pesticides/herbicides/fertilizers. Perhaps ban rotary spreaders.</p> <p>P30 - The best way to solve the non point source pollution issue is through public education. (vs. centralized systems are usually very expensive.)</p>
A8 - Provide incentives and public / private partnerships	17	6	6				<p>P6 - like Eugene "Stream Team".</p> <p>P19 - Love the idea of adopt a stream.</p> <p>P23 - Several schools have classes working on related issues. Encourage more science teachers (both OSU and 509J) to pick related topics and provide them with necessary support.</p> <p>P32 - Especially for residential already developed.</p>

General Water Quality Alternatives (page 3) cont'd.	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
A9 - Mandate and enforce best management practices	14	6	4	4		1	<p>P7 - together with informing the public.</p> <p>P23 - This can't be done without doing more routine monitoring of water issues and at a far greater number of sites. Perhaps save costs by encouraging schools to participate (see A8).</p> <p>P24 - See A4.</p> <p>P25 - Which best management practices minimal or stringent.</p> <p>P26 - This is critical for assuring goal attainment, i.e. assumed compliance must be ensured, not hoped for.</p> <p>P28 - Not sure if that would be the most effective use of funds.</p> <p>P30 - We need staff to enforce regulations but probably only on a complaint basis.</p> <p>P31 - See the above series of answers (A1-A4).</p> <p>P32 - For new construction and businesses.</p>
Other	<p>P9 - move into schools-create education programs starting in grade (primary) schools</p> <p>P10 - strong public education</p> <p>P15 - Probably need all four approaches combined for maximum effectiveness.</p> <p>P16 - I realize that some voluntary/enforcement items may be contradictory. Some basic standards will require monitoring and enforcement. Currently there is the backflow maintenance required by the state for irrigation systems. Further inspection and maintenance would be helpful in new construction.</p> <p>P27 - Involve citizens by tours of system, maintenance activities?? (Cleaning stream shores?)</p>						
Specific Water Quality & Detention Alternatives (page 4)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments:
	SS	S	N	O	SO	?	
B1- Require property owners to management stormwater	15	11	1	1			<p>P5 - There could be situations water could be managed cooperatively.</p> <p>P7 - Also developers of new areas around existing developments.</p> <p>P12 - minimal affects may be ok</p> <p>P21 - Complex issue - don't think I am qualified to answer.</p> <p>P23 - See A2 response.</p> <p>P26 - The #1 goal is steam health. If neighboring property is affected by restoration of natural flows, then this alternative would impede stream health.</p> <p>P28 - Seems impossible in some situations.</p> <p>P30 - Yes. And it is the law. City staff should learn Oregon law.</p> <p>P31 - Absolutely! Look what has happened to the Rennie Place folks.</p>
B2 - Provide incentives for sensitive areas	16	17		2			<p>P15 - or mandate/require.</p> <p>P23 - This is the lowest cost and most environmentally appropriate approach.</p> <p>P26 - Incentives imply that protection is optional. I believe protection need be mandatory but assisted.</p> <p>P30 - Incentives - yes.</p>

Specific Water Quality & Detention Alternatives (page 4)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
B3 - City perform additional monitoring	11	10	4	2		1	<p>P5 - monitor then act on results if needed.</p> <p>P13 - Nitrates and pesticides also</p> <p>P14 - No, that is not the City's job.</p> <p>P20 - Depends on density of present sampling. Oil and grease (visual) can be added at no cost.</p> <p>P23 - See A8 and A9. This is perhaps the <u>most crucial part</u> of the plan. Should also include flow rates, etc. Can't tell how well you're doing without adequate bench marks. See A8 and A9 as examples of ways to reduce costs.</p> <p>P28 - What else would be monitored and what would the cost be? Would the added information be worth the cost?</p> <p>P30 - Don't know what the benefits of additional information would be.</p>
B4 - City monitor biological indicators	10	10	4	3			<p>P4 - Could use students/classes to help monitor.</p> <p>P5 - monitor then act on results if needed.</p> <p>P6 - coordinate this with Watershed Council, ODF&W, and possibly a "stream team" - citizen involvement portion of the public and private ownership.</p> <p>P9 - contract with educational institute</p> <p>P10 - coordinate with other agencies and organizations</p> <p>P20 - Macro invertebrate sampling and fish counts add to one stream health database.</p> <p>P21 - Maybe - seems a bit excessive in day of reduced government funding.</p> <p>P23 - See B3.</p> <p>P24 - Yes - this is part of the cost of growth.</p> <p>P28 - Or perhaps build this into high school or middle school curriculum.</p> <p>P30 - Depends on the goals of such monitoring, e.g. do we try to re-establish fish population in certain reaches?</p>

Specific Water Quality & Detention Alternatives (page 4) cont'd.

B5 - City identify and acquire wetlands	Oppose = 3					
	Support	Other/Comments: 2 marked support but did not check any of the items listed below.				
Stormwater Fees on Utility Bill	19	P3 - nature conservancy, etc. P6 - grants.				
City Bonds	14	P15 - any are fine. P16 - all of the above. P18 - Federal grants.				
Property Taxes	15	P20 - Wetlands already have some protection. Unclear what this would do. P24 - Taxes on waste discharges. P26 - Auto registration fees, tire tax, gas tax. P28 - Maybe a combination of these.				
Building Permit for Redevelopment in Urbanized Area	9	P30 - Yes, it beats "taking". Also asked "why this" next to building permit section. Use open space funds. P31 - Utility bill rates should provide stormwater and water quality funding. The entire city needs to fund water quality remediation. The issues currently existing from past development. Other = SDC				
B6 - City do more to protect wetlands	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)					Comments:
	SS	S	N	O	SO	?
	11	13	4	1		
						<p>P4 - encourage further native plantings and maintain existing areas. P6 - coordinate with ODF&W, Mary's River Watershed Council, Benton SWCD P9 - why just upland? P14 - Probably, but the City should not take a "heavy handed" regulatory approach. Cooperation - public education, incentives would be a preferred approach. P17 - How will this work if uplands in urban fringe? P20 - This could be used to stop all growth. While supporting open space protection, development should be judged by runoff goal and quantity. P21 - Yes - soil erosion from developments should be enforced stringently. P23 - This is the easiest and most natural way to do it. P24 - Yes - These are the last remnants of the native ecosystems which have been almost totally destroyed around Corvallis. P30 - Depends. Could cost less than doing item B5. P31 - Yes - maybe another natural resource inventory?</p>

Specific Water Quality & Detention Alternatives (page 4) cont'd.	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
B7 - City develop standards for parking structures	4	11	7	4	1	3	<p>P7 - Multi-story or underground</p> <p>P9 - parking lot redesign</p> <p>P14 - No - that is going too far.</p> <p>P15 - Encourage alternative transportation.</p> <p>P20 - Pervious surfaces may be a cheaper, more effective alternative.</p> <p>P21 - Yes - we cannot repeat HP's sprawl</p> <p>P23 - This is not cost effective or politically feasible.</p> <p>P24 - No - we should require less parking and require use of alternative transportation.</p> <p>P27 - Rather than build structures, use pervious surfaces for parking, e.g. in England they use grass fields for parking.</p> <p>P30 - No necessarily - depends on surface parking mitigation measures. Should also consider reducing parking number requirements. Should discount parking numbers and spaces in infill developments.</p>
B8 - City establish formation of local wetland bank	7	7	3	4	1	6	<p>P7 - Not at the expense/risk of damaging an existing wetland</p> <p>P10 - I would prefer that developers avoid filling or destroying wetlands</p> <p>P14 - The City should encourage a wetland bank, but probably not spend tax dollars to set one up.</p> <p>P15 - protection always better than mitigation.</p> <p>P17 - Does this work?</p> <p>P21 - Not qualified to answer.</p> <p>P23 - See B6.</p> <p>P24 - Mitigation is too often unfair and creates a substantial environmental net loss.</p> <p>P26 - Wetland mitigation results in a <u>net loss</u> of functional wetland - this idea has failed!</p>

Specific Water Quality & Detention Alternatives (page 4) cont'd.	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strongly Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
B9 - Streets and/or parking lots function as temporary storage area	4	18	2	3		2	<p>P1 - No longer than necessary.</p> <p>P3 - 48-72 hours.</p> <p>P5 - Not all rainy season.</p> <p>P6 - as long as is necessary. You can't put timelines on nature - if there is a large problem, there's not much you can do anyhow.</p> <p>P7 - +-24 hours.</p> <p>P10 - 12 hours.</p> <p>P12 - Pervious areas should be maintained within the lots to slow runoff and allow percolation</p> <p>P14 - Yes - good idea - very innovative, I like this. 3-5 days would be ok!</p> <p>P15 - a week? e.g. for 100-year flood - depends on how long it lasts.</p> <p>P16 - parking lots and streets should have a maximum level to avoid flooding yards and basements - less than 1 week.</p> <p>P17 - Sidewalks exempt.</p> <p>P18 - 3 days.</p> <p>P20 - Interesting concept. Depends on storm size.</p> <p>P23 - Problem for water quality and not politically feasible.</p> <p>P24 - Yes - long as natural systems require.</p> <p>P25 - Max 3 days.</p> <p>P26 - No limit - take as long as it takes to return drainage to natural rates.</p> <p>P30 - 3 to 4 days. Depends on effects on adjacent users.</p> <p>P32 - As long as needed.</p>
B10 - City develop guidelines and enforcement for stormwater objectives	8	9	3	2		5	<p>P3 - change growth boundaries to BAN building on upstream areas.</p> <p>P7 - Much stricter preservation guidelines than DSL.</p> <p>P10 - local detention area requirements for developers based on before and after stream event</p> <p>P14 - I don't understand this question.</p> <p>P20 - I don't have enough data to answer this.</p> <p>P21 - Yes - I have seen ineffective techniques, i.e. Brooklane near City open space area.</p> <p>P22 - Keep soluble materials out of rain.</p> <p>P23 - State guidelines are weak. For instance, set aside lands can be interpreted to include far more than true wetlands.</p> <p>P26 - Local regulation and enforcement of: auto leaking of oil and gas and fail-safe industrial practices.</p> <p>P28 - If the City has different or more specific needs, then it makes sense to me to develop our own guidelines.</p> <p>P30 - Construction fill in floodplain, wetlands, near streams.</p>

Retrofitting City Infrastructure to Treat Runoff in Developed Parts of the City (page 4)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Comments:
	SS	S	N	O	SO	?	
C1 - Appropriate to pipe untreated stormwater runoff into streams	1	5	5	11	3		<p>P3 - Not best practice but ok.</p> <p>P13 - should be piped to bioswale.</p> <p>P14 - Yes, good idea.</p> <p>P15 - Need to move away from this. Prevention helps; reduction of impervious helps.</p> <p>P16 - not always. Sometimes it increases the runoff into streams beyond normal capacity. What's the percentage of pollutants?</p> <p>P18 - In some cases.</p> <p>P20 - No if it has been in contact with any potential pollutants.</p> <p>P21 - No - goes into Willamette.</p> <p>P22 - Ok where contaminants are not present.</p> <p>P23 - It's impossible to judge this without knowing the costs. Building a treatment plan capable of handling this is probably totally cost prohibitive.</p> <p>P27 - In general I would like to see less pipes and more bioswales/detention areas.</p>
Alternative C2 - Continue/increase City practice of street cleaning	4	12	2	4	1		<p>P3 - continue - increase where possible</p> <p>P7 - Status quo - Likes last sentence in C2 and would support that sentence.</p> <p>P9 - more education.</p> <p>P15 - Better than nothing.</p> <p>P17 - Opposes first ¼ of alternative but would support "Continue/increase pollution prevention public education and outreach."</p> <p>P20 - As an interim measure.</p> <p>P23 - See C1.</p> <p>P28 - I guess that I would be in favor of this alternative as long as it's monitored and increasingly effective. Otherwise I would opt for Alternative 3.</p> <p>P32 - (underlined last sentence) Try this first. If people don't change, go to Alternative C3.</p>

Alternative C3 - Retrofit City-owned street catchment basins	Oppose = 3	
	Support	Comments:
Stormwater Fees on Utility Bill	15	P6 - Support if people can find funding. P7 - Include installation and bioswales.
City Bonds	10	P14 - No, I don't think the problem is that bad and I don't think the retrofit would be that effective. P23 - See C1.
Property Taxes	7	P27 - I am not familiar with this technology but would be interested in seeing some testing of this device. P30 - Try on experimental basis. Establish before and after conditions and standards. See when it does most good vs. education or disconnecting gutters, etc.
Building Permit for Redevelopment in Urbanized Area	11	P31 - New growth would be required to utilize water treatment devices. P32 - Maybe can't do everything right away.

Other	<p>P6 - Grants from private foundations or corporations.</p> <p>P7 - Grants. With possible \$ mitigation if property owners disconnect gutters, etc.</p> <p>P9 - Federal programs-EPA funded TARP in Illinois. Redesign of parking lots-add French Sump Drains & trees. Parking lots should be at cost of owner</p> <p>P12 - Exempt new development that complies with quality standards from paying upgrade of existing facilities.</p> <p>P15 - any/all.</p> <p>P16 - any of above.</p> <p>P17 - Combined w/incentives for on-site implementation.</p> <p>P18 - Federal grants. Include installation of bioswale.</p> <p>P19 - If we are diligent about the other aspects of preserving water quality, treatment will not be necessary.</p> <p>P22 - Utilization of contaminants.</p> <p>P26 - Auto registration fees, tire tax, gas tax.</p> <p>P27 - Reduce dependance on automobiles to remove them as a major pollution source (a dream).</p>
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Community Involvement Alternatives (page 5)

Compliance	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
							<p>P1 - Make people aware of the fact that it floods in this general area and prepare/allow for it.</p> <p>P15 - Need combination of all.</p> <p>P17 - Multi-faceted approach would seem like it might be more effective.</p> <p>P18 - Retrieve tax dollars from the federal government.</p> <p>P22 - Keep bank intact.</p> <p>P28 - Education.</p>
D1 - Individual citizens take responsibility for preventing / minimizing pollution at source	12	5	1				<p>P1 - Here, hire.</p> <p>P4 - Supported through education.</p> <p>P7 - In part.</p> <p>P30 - This has to happen anyway - but need information with education/City contact.</p>

Community Involvement Alternatives (page 5) cont'd.	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
D2 - Private/voluntary organizations only	6	8	9	3	2		<p>P4 - we need all the help we can get.</p> <p>P9 - Could work at cross purposes should be coordinated</p> <p>P16 - Hard to get a large corps of regular volunteers. Hard to monitor.</p> <p>P18 - Especially stream watch groups.</p> <p>P20 - Unclear what I am responding to here.</p> <p>P26 - This is an option regardless of what becomes of the Stormwater Master Plan.</p> <p>P30 - Uncontrollable - could do more harm. Unaccountable.</p>
D3 - Private/public partnerships	17	7	4	3			<p>P6 - What about the City working with Watershed Council, Soil and Water Conservation District and other interested agencies and volunteer organizations to jointly support citizens' stream watch efforts?</p> <p>P26 - I would strongly support this if public monies were made available to support the private efforts (see D5).</p> <p>P30 - Best.</p> <p>P32 - Best!</p>
D4 - Public only	5	9	4	8	1	2	<p>P22 - This would not fly.</p> <p>P26 - This is the only alternative that suggests a commitment of resources. Resources are more important than who does it.</p> <p>P27 - You might get more ownership developing organizational relationships with existing departments.</p> <p>P30 - Uncontrollable, unapproachable, need citizen connection.</p>
D4 (Note two D4's) - Community provide opportunities for developer sponsored, publically managed systems	11	9	2	2	1	4	<p>P17 - Publically managed is important to maintain credibility.</p> <p>P24 - What does it mean - developer sponsored.</p> <p>P30 - Uncontrollable, unapproachable - need citizen connection.</p>

Other

P1-Let the flood waters have room to spread over large areas. Generally this would let higher water levels spread out and dissipate faster.

P4 - Why not involve "all of the above"?

P10-School based community service options

P12-Public Works assistance

P9-Permanent volunteer position with City, i.e. ombudsman for nursing homes or federal or state funded position

P10-More coordination and watershed groups and county-wide agencies

P14 - Yes, use existing staff - No Increases!

P15 - Need combination of all. Note "C" on page 4 and "D" on page 5 are formatted differently - these seem to want us to choose or preferred alternative. This could be more clear. (Choose 1? either/or?).

A&B are each a laundry list to react to (can react to each A or B alternative independently).

P18 - Adopt a stream programs.

P20 - The PWD is probably not the correct agency for public education or outreach.

P22 - I'm lost.

P23 - All of the above, in various forms and levels.

P26 - D4 comments: As non-profits utilize volunteers as standard practice, they can do the job for less money than the City while involving citizens in the process. Create a D5 = Non-profit organization or contracts: Contracting with public: Non-profit organizations bid to implement City defined citizen involvement goals and methods. Create another D5 : Commission an interactive watershed management computer model of Corvallis. Make available to Library, schools and citizens. (Create D6) Publish an EIS on the Master Plan and solicit citizen comments. If the EIS is given effort, it becomes instructional. Also solicit comments on what should be analyzed or considered in the EIS study.

Stormwater Jurisdiction Management Alternatives (page 6)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Other/Comments:
	SS	S	N	O	SO	?	
E1 - City reviews/comments on County plans and dev. applications	7	13	4	3			P20 - Not working well. P27 - One stop shopping is certainly more efficient, reduces confusion and insures compliance.
E2 - Develop City-County agreement for SW management	13	12		2	1		P6 - Create a comprehensive plan <u>and</u> agreement between City & County for management action planning. P7 - Asked how E2 and E3 were different? P10-Standards would be consistent for all of county development. More coordination between City and County. P17 - E5 - Can fringe development be controlled? P20 - E4 Should be coordinated w/Mary's River Watershed Council, SWCD, etc. P21 - Would this trigger faster development? Undesired. P23 - Be sure to include OSU Forest Plan in appropriate watersheds.
E3 - Identify County Comp. Plan policies	15	10	1	1			P26 - (create E6) Purchase fringe land as open space to safeguard future watershed health. SS - this is what Portland is doing. P27 - E5 - Sounds great if you could pull it off, probably lots of opposition?? Other = Develop a joint City/County review team. P30 - E5 - Could get an interesting collection of political "bedfellows" on this one!
E4 - Watershed-wide education outreach	12	13	1				E2 - P31 - But this is problematic - County not currently interested in close cooperation (e.g. latest Comp Plan review - Urban Fringe Management). E5 - P31 - This does not get basins outside of urban growth boundary.
E5 - Annex all UGB land promptly	4		2	8	7	4	Other - P31 - Work with Mary's River Watershed Council and County.

100-Year Floodplain Develop Alternatives (page 9)		Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)											
		Streams					Mary's River & Mill Race						
		SS	S	N	O	SO	?	SS	S	N	O	SO	?
A1 - Keep existing development standards		2	3	2	8	12		4	2	1	9	10	1
A2 - No net fill in the 100-year floodplain outside the floodway		1	3	4	10	5		1	4	3	10	4	1
A3 - Allow construction in the 100-year floodplain		4	7	7	6	2		4	10	5	5	1	1
A4 - No structural development within the 100-year floodplain		14	5	4	2			15	4	2	4		1
Other	<u>Streams:</u> P10-I think this will not be allowed in future due to new 4(d) Rules amounts to fish trapping. P15 - A2 & A 3 better than nothing. - What about Willamette? P16 - A1 depends on what "substantial improvements" are. P23 - The 100-year flood plain is a misnomer since we don't have the rainfall and stream flow data to back it. It is a statistical measure with many assumptions that are incorrect in current development conditions. P28 - Don't know enough about the specific areas to comment on each stream. In general, I support Alternative A3 and A4. I don't think that I support the transfer of density idea. P30 - Should be designed carefully. P31 - This is an unpopular position. I am tired of buildings being allowed in inappropriate areas and when a disaster strikes, those people ask government to bail them out of their mess!						<u>Mary's River and Mill Race:</u> P12-A1 north and east of Wake Robin P12-A2 north and east of Wake Robin P15 - A2 & A 3 better than nothing. P20 - A2 Must examine affect on hydrology of flood not simply balance cut and fill. P20 - A3 w/restrictions. Access must be addressed. P26 - create A5 - Same as A3 but allows no industrial development within the floodplain (chemical release hazard).						
Additional Floodplain Management Questions (page 10)		Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)					Comments						
		SS	S	N	O	SO		?					
B - Provide incentives for floodplain restoration/protection		11	14	2	2		1	P6 - (circled approaches) Such as? P7 - anything that protects & restores P26 - I believe we're referring to mitigation.					
C - Create on-going floodplain protection/restoration opportunities		7	8	3	7		5	P9 - change density P20 - What is envisioned? P23 - If done properly, the possible costs listed do not have to occur. Be sure to include OSU MacDonald Forest Plan, for example. P26 - I believe we're referring to easement acquisition. (Circled contributing to urban sprawl and noted:) False perspective - restoration and protection do not cause sprawl. This is exclusively the result of increased population and our resistance to live at greater density. Let us not try to shift the blame on to an entity that has no control over our activities, demands and politics.) P28 - What would be the incentive here?					

Other		P1-Hold our City and State governments and personal (sp?) responsible for decisions concerning flood related project liable for mistakes/blunders. P26 - Create D - Annex and purchase (by City) fringe property to swap for private lands in floodplain.					
D (page 11) - Would you support the purchase of buildings and land in the floodplain?						Oppose = 2	Oppose = 2 Neutral = 1
	Support	Comments:				Support Floodway	Support Floodway Fringe
Stormwater Fees on Utility Bill	11	P15 - use higher density!				22	16
FEMA (Federal Emergency Management Agency) Funds	15						
Open Space or Other Bond Money	14						
Other:	P6 - Grants/foundations P15 - Any/all. P18 - Get back some money from Feds and use it to purchase open space and floodplain. P20 - Habitat restoration grants. P23 - Write grants to conservation organizations, etc. P26 - Donations, grants, general fund revenue derived from increased property tax payment caused by increased real-estate values near to public floodway acquisition. P31 - Prioritizing land purchase based on floodplain.						
Comments:	P9 - not an option, increase density. P12-as long as willing sellers are not coerced into selling by withholding permits. P15 - Change zoning - encourage more compact/dense development everywhere! Need to decrease footprint of development on land. P17 - Would be more supportive if u. sprawl could be eliminated as possible result. P22 - Character of soil of area under consideration.						
E - Do you think the land outside of the 100-year floodplain be subject to guidelines?	SS	S	N	O	SO	?	
	5	11	4	2	2	1	
Comments	P9 - Isn't a 500-year event the whole City? P14 - Yes - there should be guidelines, but they should be less restrictive than development in the 100-year floodplain. P15 - I'd support this but most people wouldn't - not realistic. Guidelines like A2 would help. Flow big is (e.g.) 200-year floodplain? 500? P20 - Being off of the 100-year floodplain does not ensure no flooding. The capacity of soil to absorb water, slope stability and other factors come into play. Preparing for a 500-year event is a daunting task. P22 - With consideration of up stream dams on Willamette River. P23 - See IV, A4 comments. P27 - Focus on 100-year floodplain issues first. P32 - Let's work on 100-year floodway fringe first.						

F - (Page 11) Should yards in new residential development be located within the 100-year floodplain?	Floodway	Floodway Fringe	Comments
	SS/S = 7 N = 4 O/SO = 12 ? = 1	SS/S = 11 N = 6 O/SO = 4 ? =	<p>P7 - Yes if landscaping and filling is regulated so there aren't conflicts.</p> <p>P15 - if yes then have requirements for yards to maintain natural vegetation, channels, etc.</p> <p>P17 - Move to develop more natural aesthetic of domestic landscape that would accept naturalized riparian planting and topography.</p> <p>P20 - Floodway - small streams allow them. Floodway fringe - small streams ok.</p> <p>P20 - No new development should be allowed in the Mary's River floodway. Ok within fringe of Mary's River when it meets land use objective.</p> <p>P22 - Review of last 100 years weather data.</p> <p>P24 - Unless they are organically managed with native vegetation.</p> <p>P32 - Floodway fringe area - support if no chemicals are used on it.</p>

Stream Corridor Width Alternatives (page 15)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose SO = Strong Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
A1 - Existing	3		6	10	5		<p>P15 - Better than nothing.</p> <p>P23 - This techniques is totally inadequate for the very narrow, small channels that exist in the upper reaches of any of the basins. However, many of these represent the last opportunities for natural protection.</p>
A2 - Up to 100 feet	1	9	4	7	2	1	<p>P14 - Fairly high standard with some flexibility!</p> <p>P17 - I'm very concerned about sprawl issues and a walkable City and am concerned about gaps in the City form. Can stream corridor widths be reduced or require more specialized development with stricter out of corridor standards?</p>
A3 - Up to 150 feet	3	8	3	7	2		<p>P23 - See A5 comments.</p>
A4 - Up to 200 feet	14	1	1	5	3		<p>P15 - or just 200' no matter what? Don't have max. of 200' - need wider area than this to protect natural functions in some areas, e.g. the Willamette needs a stream corridor more like a mile (or 10!)</p> <p>P24 - I think the urban sprawl disadvantage is misleading. Wider corridors will not cause urban sprawl and we, as a community, can both protect ecological systems and stop sprawl.</p> <p>P27 - Prefer one standard 200' buffers with an except policy where development can be mitigated to support riparian area.</p> <p>P32 - Need to allow for stream migration.</p>

	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
A5 (Page 15) - Standard set widths of 50, 100 and 200 feet	4	5	5	8	2	1	P14 - Need more flexibility. P15 - Strongly support if 200' minimum everywhere. Important to keep these if greater. P23 - Probably is direction to head because addresses differences between stream segments. However, fixed rules based strictly on formula create significant potential to have too small or too large areas dedicated. See A1 for upper reaches concerns.

Other P6 - also for seasonal streams.

Stream Corridor Supplemental Questions (page 16)

General Question:	Yes	No	SS	S	N	O	SO	?	Comments:
	Does your home or business property border a stream?	12							
B1 - Floodplain - Should the stream corridor width be wide enough to include the entire 100-year floodplain?			10	7	2	2	2		P26 - But not for all cases. Include land outside boundary to make-up for land developed inside boundary. P30 - Depends on stream, location.
B2 - Minimum width different than 50 feet?	Yes	No	Greater Than 50'			Fewer than 50'			
	13	11	6	?	1	2	?	1	

Comments: P20 - Have you defined a stream? Perennial? P22 - Depends on slope. P24 - Pre-contact (development) corridor width.	Comments: P14 - 100' P15, P18 & P27 - 200' P19 - 100'? Depends on situation. P23 - 100' or more P26 - 70'	Comments: P6 - Additional 25' - 50' (total 75') P21 - at least 50' - dependent
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Stream Corridor Protection, Enhancement & Restoration (page 16)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Comments:
	SS	S	N	O	SO	?	
C1 - City should provide incentives for stream corridor restoration	13	12	1	2			P15 - Probably need all of these. P22 - Other - bridges are better than culverts for stream passages. P26 - Create C5 - Impose a limit on the watersheds effective impervious land cover of 15%. By "effective", a parking lot does not contribute if its run-off is delayed by some mitigative measure.
C2 - City should create ongoing stream corridor protection/restoration	13	11	1	3			
C3 - City should create a land use ordinance/guidelines for riparian comm.	11	13	4	1			
C4 - City should develop program for information outreach	15	11	2				

Ownership of Stream Corridors (page 16)			
D1 - Should stream functional corridors be placed in public or private ownership?	City-owned	Privately-owned	Ownership should vary depending on situation
	SS/S = 11 SO/O = 1 ? = 1	SS/S = 6 SO/O = 5 N = 2 ? = 1	SS/S = 17 SO/O = 3 N = 1 ? = 1
D2 - Should either a conservation easement or acquiring a stream functional corridor outright be the preferred method for stream acquisition?	Acquire land	Acquire conservation easements	A mix of both acquisition & conservation easements
	SS/S = 11 SO/O = 1 ? = 1	SS/S = 7 N = 5 SO/O = 2	SS/S = 19 SO/O = 1 N = 0 ? = 2
Other	P9 - size of stream critical location P15 - D1 - publically or non-profit owned would yes/ss. P31 - Greenbelt Land Trust understands this issue well.		

Additional Stream Corridor Alternatives & Associated Questions cont'd. (page 17)	Total Ratings (SS = strongly support, S = support, N = Neutral, O = oppose, SO = Strong Oppose, ? = Unsure)						Comments
	SS	S	N	O	SO	?	
E1 - Funding acquisition of stream corridor land	6	4	5	2	1	1	
E2 - Existing approach	4	7	5	3	1	2	
E3 - Shared acquisition costs	9	7	3	3	1	1	P12 - This would be an acceptable alternative if the costs only pertained to a facility that was acceptable to developers's needs.
E4 - Shared costs between SDC and community	6	7	3	4	1	2	
E5 - Purchase through public funds	5	13	1	2		2	P16 - I would not like to stifle any opportunity to acquire the land for this purpose.
Other	P1 - tax incentives/breaks P9 - Federal, state, other? P15 - Combination of all probably needed - support any/all. P22 - Bonds P23 - Write grants to conservation organizations and foundations.						
F - Stormwater Fees on Utility Bill	11	Other/Comments: P6 - Grants. P15 - any/all P16 - any/all P18 - Federal monies. (circled D2, D4 and/or D5) Where? P19 - Nature conservatory organization? P26 - Auto registration fee, tire tax, gas tax.					
FEMA (Federal Emergency Management Agency) Funds	16						
Open Space or Other Bond Money	16						
Property Taxes	6						
Unsure	2						

	SS	S	N	O	SO	?	Comments:
G (Page 17) - Swales	9	15	2				<p>P10 - More detention with delayed release.</p> <p>P12 - Only to the extent necessary to service the area.</p> <p>P16 - Yes, <u>there is currently year round stream flow</u> in this area - no dry out in any time period. This has changed since 1996.</p> <p>P23 - This is key to natural protection and least invasive.</p> <p>P26 - Absolutely. These areas perform an important hydrological and ecological role. Allowing their development or clearing will destroy this function.</p>
H - Water treatment siting	4	12	2			7	<p>P9 - possibly</p> <p>P15 - Not sure of pros and cons. Need to protect natural functions of stream and water quality in stream.</p> <p>P26 - Depending upon size and frequency of maintenance and equipment required to do maintenance. The bigger, more frequent and heavy equipment dependent systems should be located away.</p> <p>P27 - if it will not effect stream habitat.</p> <p>P30 - Need more information. How effective is it? Are they unsafe for kids?</p>
I - Recreational access	3	10	3	6	2	1	<p>P7 - not trails, but</p> <p>P9 - with appropriate protection of riparian zone.</p> <p>P14 - only if the stream corridor is publicly owned. Or if the private landowner is agreeable. No access forced on unwilling private landowners.</p> <p>P15 - Stream protection more important than recreation.</p> <p>P17 - If access precedes development is easier - but does it serve riparian function?</p> <p>P19 - Would increase public support and appreciation of your effort.</p> <p>P20 - Where appropriate.</p> <p>P26 - We need this connection to the ecosystem. We have ability to destroy by lack of thought.</p> <p>P27 - if it will not impact stream habitat/functionality.</p> <p>P30 - Probably inappropriate where riparian habitat preservation is major goal.</p> <p>P32 - At a distance from stream so there isn't much development (i.e. narrow paths, etc.) for walking, etc.</p>
J - Natural vegetated corridors	11	9	2	4			<p>P19 - Depends on impact potential flooding.</p> <p>P20 - Some management will always be required.</p> <p>P23 - With the exception of locations where this would probably lead to localized flooding of property.</p> <p>P24 - Of course.</p> <p>P26 - Absolutely!</p> <p>P30 - Yes, as long as meets fish mitigation and other environmental goals - and do not increase erosion where existing structures are threatened.</p> <p>P31 - Trees should be removed if they take away from stream function, course, etc.</p> <p>P32 - <u>Yes.</u></p>
Comments	P24 - Natural systems are the cheapest (long term) most lasting systems. Let's stop fighting natural systems.						

Water Quality Management

Stormwater quality management addresses storm water quality, including pollutants in streams, wetlands and ground water, sediment transport, and water temperature. Existing federal regulations (1999) will require greater levels of stormwater pollution control and prevention in Corvallis in the near future.

Policy No.	Policy	Comments
*QL-1	Sediment removal using Best Management Practices shall be used prior to discharge of all runoff from both public and private impervious areas.	<ol style="list-style-type: none"> 1. Define Best Management Practices 2. What is the exact definition you are using for "Best Management Practices"? What are the "measures"? How is the problem to be quantified and monitored?
*QL-2	Lands set aside for water quality improvement such as vegetated swales, detention facilities and open channels, shall be maintained to function properly. Responsibility for maintenance shall be determined at the time these facilities are reviewed by the City for approval.	
QL-3	The City shall determine beneficial uses for streams within the Urban Growth Boundary and monitoring them to assess if streams support beneficial uses or are water-quality limited.	<ol style="list-style-type: none"> 1. What specifically are "beneficial uses"?
QL-4	Investigate the feasibility of ensuring that stormwater is not discharged directly into streams.	<ol style="list-style-type: none"> 1. Should this policy be rewritten to..."The City shall ensure that stormwater is not discharged directly into streams without pretreatment/filter." 2. Does this mean prior to some type of pretreatment, if so, what type of pretreatment?
*QL-5	The City shall develop programs and policies that preserve and enhance stream corridor vegetation on both public and private lands.	
*QL-6	The City shall develop policies and programs to limit stormwater pollutants from entering streams from sources such as pet waste, vehicle wash water, household and business chemicals, and other community waste products.	
*QL-7	<p>The City shall develop policies and programs to control construction site erosion that:</p> <ol style="list-style-type: none"> a. Require an erosion control plan for all construction activity that can potentially cause erosion. b. Prevent construction site erosion through proper construction techniques. c. Provide erosion control guidance to the development community in the form of an erosion control handbook. d. Require sediment removal (to the maximum extent practicable) from construction sites runoff prior to discharge to stormwater systems or streams. e. Enforce erosion control measures through an active enforcement program by educating the public and the building inspectors on the importance of erosion control. f. Develop community specific standards that limit sediment discharge into receiving water bodies. 	<ol style="list-style-type: none"> 1. Please go look at the house on the corner of Glenwood Drive and Fair Oaks in Skyline West (6370 Fair Oaks Drive). That should <u>never</u> be allowed.
*QL-8	The City shall continue and expand monitoring for bacteria in streams as well as source-water to develop a better understanding of the conditions and sources of bacteria.	<ol style="list-style-type: none"> 1. Why only monitor bacteria?

* Policies that the City is currently doing, at least in part

Policy No.	Water Quality Management continued.... Policy	Comments
*QL-9	The City shall develop chemical use guidelines (for both public agencies, private property owners, and landscape maintenance specialists) involving pesticides, herbicides, and fertilizers that minimize the flow of chemicals into the stream system	<ol style="list-style-type: none"> 2. I hope the city will be very active and through in implementing policy QL-9, the chemical use guidelines. This policy should also be expanded to include reporting of what chemicals are used that could enter our stream systems. 3. The guidelines for pesticides, herbicide and lawn chemical use should not be limited to the public sector. They are only guidelines not rules.
*QL-10	The City shall develop a program to sweep public parking lots.	<ol style="list-style-type: none"> 1. These aren't all bad policies, by any means, but money is an issue - how much will it cost to sweep public parking lots, if it is not already being done?
QL-11	The City shall develop requirements for cleaning surface parking lots and private catch basins.	<ol style="list-style-type: none"> 1. What does this mean? What will it entail? Will it be prohibitively expensive? Am I going to have to go out and scrub my driveway every week? Is this going to amount to nothing or is it going to translated into something draconian? 2. Should the word surface be "private"? 3. Policy QL-11 should be adopted because private parking lots degrade streams and rivers just as much as public parking lots.
QL-12	The City shall protect key areas of exchange between ground and surface waters, such as springs, unconstrained reaches of streams and drainages upstream.	<ol style="list-style-type: none"> 1. Very important to the issues raised with respect to Jackson-Frazier Wetland.
QL-13	The City shall prohibit installation of overhead utility lines along streams that are in conflict with management of vegetation that provides shading.	<ol style="list-style-type: none"> 1. It is often desirable to maintain tall vegetation to provide shade for temperature control.
*QL-14	The City shall create opportunities to protect and enhance stream channel structure for deeper pool habitat that provides cooler water refuge areas at times of low stream flows.	

Floodplain Management

Floodplain management addresses the functional roles of floodplains for storm water in urban areas, and the implications of, and guidance for activities within the floodplain. A major purpose of floodplain is to temporarily store excess water. Current city regulations allows filling and flood water-displacing structures in the floodplain. In small streams, this can increase flow velocities and erosion, and conflicts with its hydrological role.

Policy No.	Policy	Comments
FP-1	The City shall acknowledge and accommodate natural flooding within the floodplain, and avoid or minimize urban-created flooding patterns.	<ol style="list-style-type: none"> 1. (Minimize urban-created flooding was underlined) How do you do that without eradicating the urban environment? 2. It is very important to ensure that the Floodplain functions properly to protect water quality. To this end I think it is appropriate to adopt all of the policies listed under Floodplain Management: FP-1 through FP-12. I think it is particularly important to control and minimize development within the 100-year floodplains of local streams. This kind of Floodplain management does have economic consequences that should be the responsibility of the entire community rather than falling on a few individuals. Therefore, it is important to adopt Policy FP-5 so that development restrictions will effect public land rather than private land to the greatest extent possible.

* Policies that the City is currently doing, at least in part

Policy No.	Floodplain Management continued.... Policy	Comments
FP-2	The City shall complete mapping and inventory of floodplains and the 0.2-foot floodway within the Urban Growth Boundary.	1. The limits of the 100-year floodplain and the 0.2 foot floodway should be updated as new technologies and methodologies for determining the extent of those features become available.
FP-3	Development of new buildings on green field sites shall be prohibited in the 100-year floodplain of local streams.	1. "Local streams" - where along those local streams does the local stream 100-yr. floodplain end and the Willamette and Mary's floodplains begin? 2. Too restrictive given other development policies and the extreme shortage of affordable housing. If we don't want sprawl, we can't also have this policy. 3. Define local streams. 4. Floodplain acreage in local stream is not great. Need to define "green fields" in glossary.
FP-4	Infill and redevelopment in the 100-year floodplain shall not alter the pre-existing stormwater functions and shall be constructed in a manner that does not restrict or otherwise alter proper floodplain functions using techniques such as elevated structures, flow-through designs, more pervious surface area, and reduced building footprints.	1. You should look at the cost of using this policy and throwing out FP-3 and FP-5. 2. Isn't clear that this is for small streams.
FP-5	The City shall develop a program for acquiring land and easements that become available within the floodplain.	1. <u>At least</u> \$2 to \$3 million, this policy has to go. We can't afford it and it could never be implemented. 2. Concerning the buy-up of 100-yr. floodplain lands - you <u>cannot</u> calculate the approximate percent within the 0.2 ft. floodway out of the costs. If the land purchase has floodway in it, landowners <u>do not</u> sell only the land outside of the floodway, thereby making the purchase price less. If a piece of property goes for \$100,000 per acre with floodway in it, this means that land without a stream running through it is likely going to cost substantially <u>more</u> than \$100,000. Quit trying to pretend that policy number FP-5 is not really going to be expensive. I don't know if it's willful stubbornness or a conscious attempt to hide the problem, but this back peddling on the cost of floodplain purchase policy is beginning to be silly. Just get rid of FP-5. 3. Purchase of land in the floodplain by the City is a cost-effective approach to minimization of loss of expensive, but poorly located, development and possible loss of lives during flood events. 4. Often productive uses of these lands are available other than for structural development.
FP-6	The City shall protect hydrological processes to support self-sustaining levels of native fish, aquatic species, and wildlife populations.	
FP-7	City infrastructure, including sanitary sewers, should be located outside the 100-year floodplain and wetlands unless it can be demonstrated that they will cause no harm to the properly functioning condition of the stream and that no other reasonable option is available.	1. What is the reason they are currently located in the 100-yr. floodplain? It <u>seems</u> like a reasonable policy, but what's being left unsaid? What's wrong with using FP-4 for <u>any</u> development in the 100-yr. floodplain, whether infill, redevelopment, or new development on "green field" sites? 2. For example a storm sewer across Jackson-Frazier Wetland would be hydrologically disruptive.
FP-8	Area-specific development standards for the Marys and Willamette Rivers should be instituted to maintain stormwater functions that are proportional to their effect on the receiving water bodies.	1. Leave this to FEMA standards, as FEMA considers the whole drainage basin not just our local streams. 2. Should not such standards be applicable to all streams?
FP-9	The City shall develop and implement incentives for floodplain protection, enhancement, and restoration as part of the development process.	
FP-10	Developers shall provide accurate floodplain mapping with their development applications.	
FP-11	The City shall allow for a variety of low impact activities on public and privately owned floodplain lands (such as parks and sports fields) so long as it can be demonstrated to protect floodplain functions.	

* Policies that the City is currently doing, at least in part

Policy No.	Policy	Comments
FP-12	Floodplain Management continued.... The City shall develop strategies that accommodate housing and other development opportunities that are displaced by floodplain protection measures to ensure a compact development pattern.	<ol style="list-style-type: none"> How? If you make all your more “affordable” lands unavailable for development, how and <u>where</u> are you going to put “poor” people, which around here means families earning less than about \$50,000 per year? Density transfers, which one property owner can transfer to another?

Stream System Management

Stream system management addresses various techniques that are available for managing streams and riparian areas for storm water objectives, while maintaining or reestablishing the ecological properly functioning condition of the systems. Urban stream corridors are also of value to reduce the need for ongoing stream corridor maintenance costs, and to allow for channel changes without putting homes in jeopardy.

Policy No.	Policy	Comments
SS-1	The City shall inventory and identify intermittent streams within the Corvallis Urban Growth Boundary that provide important hydrological and habitat functions. Those found to be significant shall be protected using mechanisms such as drainageway dedications and easements.	<ol style="list-style-type: none"> Are intermittent streams found to be significant included in the rest of the stream policies? Policy SS-1 is a very important part of overall stormwater management because intermittent streams are a very large part of natural water holding. We need a good inventory of intermittent streams and we also need the inventory of stream conditions that would be provided by SS-6. Too little attention is paid to these minor systems, yet they account for much sediment that adversely effects water quality.
*SS-2	The City shall provide urban stormwater management practices that utilize the streams natural features and processes without conflicting with or degrading the stream systems other ecological functions.	
*SS-3	On public projects, the City shall incorporate stream habitat improvement and shading.	
*SS-4	Identify all City-owned land, including dedicated stream corridors and parks and open space, in order to prioritize opportunities for stream and riparian habitat improvement.	
SS-5	The City shall develop standards for stream corridor widths in order to protect stormwater functions. The width shall be determined based on the following stormwater functional objectives: <ol style="list-style-type: none"> Preserve the hydrologic conveyance and storage capacity; Allow for natural channel lateral migration and bank failure; Allow for channel widening and other channel modification that result from changes in hydrology from future urban development; Properly shade the stream to maintain or improve water quality; Allow for a vegetative management strategy that deters unwanted species; Provide for a pollutant filtering zone for surface runoff; Allow for natural stream processes to minimize stream channel, bank, and corridor maintenance needs; Buffer urban uses from stream processes; and Provide for a source and delivery of large wood. 	<ol style="list-style-type: none"> 5b, not sure about consistency through all the policies regarding “erosion”. Criteria say “unwanted” erosion should be controlled. Here bank failure is allowed. Some bank stabilization actually causes other bank destabilization. What’s “unwanted” erosion? When is bank stabilization necessary? How we develop near streams is crucial to create and maintain effective stormwater management. Therefore, I hope both SS-5, SS-7 and SS-8 are adopted, but it seems like they could be combined into one policy. Present calculation of corridor width to be protected is too narrow and does not provide adequate shade for fish and buffer for sediment and pollutants entering the stream. Reasons listed are all important. It may be necessary to accompany the corridor-widening program with a compensation program.
SS-6	The City shall prepare and maintain a citywide inventory of stream conditions based on stream reaches.	

Policy No.	Stream System Management continued... Policy	Comments
SS-7	The City shall develop and implement standards and programs that preserve the properly functioning condition of the stream including habitat, hydrologic function, historical stream meander, and avoid hardening of stream banks.	
SS-8	The City shall ensure that shading is provided along streams to maintain or improve water quality. Where stream shading is not adequate, development should include planting of trees to provide shading.	
SS-9	The City shall develop policies and standards that enhance or restore degraded channels, riparian areas and floodplains.	1. Delete "develop polices and" 2. SS-9 is an important policy to include because we have plenty of degraded floodplains.
SS-10	The City shall inventory and prioritize the viability of replacing culverts with bridges to improve stream function and fish passage.	1. Delete "and prioritize the viability of replacing" and substitute replace.
*SS-11	The City shall develop programs and policies to protect and restore native riparian vegetation along drainageways.	
*SS-12	The City shall consider minimizing stream crossings from roads, utilities, and other development activities.	
SS-13	The City shall develop policies that encourage the use of natural areas adjacent to stream corridors for enhanced stormwater functions, such as bioswales.	1. Especially important for water quality improvement and to permit a linear system of trails connecting other open space units.
SS-14	Public access to and along stream corridors shall support the properly functioning condition of the streams.	1. How about: "Public access shall only be allowed along stream corridors if they do not impact the property function condition of the streams".
*SS-15	The City shall modify maintenance practices to enhance and protect stream conditions.	

Water Quantity Management

Water quantity management addresses how rainfall and other water is managed when it enters and travels through the Corvallis urban landscape. Natural movement of water involves both surface and underground storage and transport. Urban development alters water movement patterns within the urban area, including stream flows and wetland hydrology.

Policy No.	Policy	Comments
*QN-1	Through rational engineering analysis, the City shall establish stormwater detention and release standards for new development that preserves or restores the properly functioning conditions of the receiving waters	1. Can you do this without spending millions? 2. What is "rational"? Is there irrational engineering analysis? 3. The word rational! should be changed. There is a rational design method for storm drainage that may not be what is intended.

* Policies that the City is currently doing, at least in part.

Policy No.	Water Quantity Management continued.... Policy	Comments
QN-2	<p>In order to reduce peak runoff from impervious areas and maintain pre-development flow regimes, the City shall consider adopting the following standards:</p> <ol style="list-style-type: none"> Minimize the proportion of each development site allocated to surface parking and circulation. Minimize the average dimensions of parking stalls. Use pervious materials and alternative designs where applicable. Modify setback requirements to reduce the length of driveways. Promote the use of shared driveways to reduce impervious surface in residential development. Promote disconnection of roof down spouts to reduce runoff going into a piped collection system or the street. Retain a larger percentage of vegetated area within all types of development to increase rainfall interception. Pursue the use of retention and infiltration facilities where the soils are suitable to control runoff volume, peak flow and promote dry season base flows in streams. Develop sub-surface storage as well as surface detention facilities. Evaluate additional restrictions on cuts in hillsides, especially in areas with near-surface groundwater. 	<ol style="list-style-type: none"> Be realistic; you aren't going to "go back" to actual pre-development conditions without eliminating development, and this is not something that can be done in a city where people live. What's the goal...make Corvallis go away? Our soil is <u>dense-clay</u> but it <u>accepts drain water</u> - holds a lot of it. On nearly level sites, such as 1525, 1535 SW Brooklane Drive, well constructed gravel (under lain with landscape cloth) drives & parking spaces will drain adequately without storm sewer access. A 6' deep 18" diameter dry well functions to satisfactorily drain an asphalt drive at 1535. A horizontal perforated pipe approx. 100' long adequately drains impervious driveway at 1525. Code should be changed to allow pervious surfaces for new driveways & parking lots. Dry wells about 12' deep, 18" diameter with vertical perforated pipes can be retrofitted to drain parking lots in need of improvements. Change codes to put stormwater in ground. Bob Stebbins, 754-8039. 2d, needs to be coordinated with Land Development Code requirements. 2j, this should be based upon site specific geotechnical investigations. Since I live in the house closest to the confluence of the Willamette and Marys rivers, minimizing the rate of peak runoff is <i>very</i> important to me. Therefore, I hope QN-2, QN-3, QN-7, QN-9, QN-10, QN-11, QN-12, QN-14, QN-15 and QN-16 will be adopted. I like the policies allowing pervious materials for parking lots and disconnection of down spouts where appropriate. Care in wording of the policy and in implementation is needed to avoid increased infiltration in areas where this will cause increased slope instability. Innovation should be encourage. Consider soils retention/capacity and infiltration, use dry wells, increase pervious/OT coverage. See above discussion of Jackson-Frazier Wetland.
QN-3	The City shall develop public infrastructure that provides for temporary detention in areas primarily dedicated to other uses, such as parks and open space, parking, and streets.	
QN-4	The City shall encourage practices that enhance groundwater recharge to maintain or increase stream flow during dry periods.	
QN-5	The City shall differentiate between natural flooding and urban-created flooding regimes and allow for natural flooding to occur while minimizing urban-created flooding regimes.	Reference FP-1: These two policies, along with QN-2.
*QN-6	The City shall develop standards for detention facilities, including location, slope, and vegetation. Detention facilities shall not be constructed within existing stream corridors, but may discharge into streams.	1. See above discussion of Jackson-Frazier Wetland.
QN-7	The City shall consider the amount of impervious surface when evaluating detention requirements and develop a policy to encourage recharge opportunities.	1. Recharge what? Groundwater?
*QN-8	The City shall develop water quantity maintenance practices that protect, enhance and restore the vegetative canopy along drainageways.	
QN-9	The City shall use maintenance policies that enhance the natural detention capacity and upstream storage capacity of urban streams, such as retaining vegetation and wood and allowing beaver dams to remain in-stream.	1. There are many natural processes that can work for our benefit without excessive cost.

* Policies that the City is currently doing, at least in part.

Policy No.	Water Quantity Management continued... Policy	Comments
QN-10	The City shall provide incentives to developers for incorporating existing vegetation and open spaces into permanent stormwater facilities.	1. What type of incentives, need some definition (i.e. density transfers)?
QN-11	The City shall consider incorporating detention capacity in existing pipes and open channels when replacing or retrofitting the storm drainage system.	
QN-12	The City shall consider acquisition of land and easements for future detention facilities.	
QN-13	The City shall develop standards for managing urban runoff to allow for innovative building/landscape designs if it can be demonstrated that existing building standard consistency can be maintained.	
QN-14	The City shall develop standards to manage surface flows on developed sites to increase the time it takes for the water to reach the stream.	
QN-15	The City shall incorporate detention and water quality features into street and parking lot rehabilitation projects.	1. Public or private projects? Or both?
QN-16	To manage stormwater drainage and provide direction for developing standards, the City shall establish parameters and/or objectives for allowing new development to use vegetated swales or open channels.	1. Yes!

Uplands Natural Resource and Wetlands Management

Uplands natural resource and wetlands management addresses the roles of uplands natural features and wetlands to storm water management, and the implications of urban activities in these areas. Uplands natural features that provide for storm water management include rainfall-storing vegetation, ground water, and natural swales that are the upstream sections of stream systems.

Policy No.	Policy	Comments
*UP-1	The City shall modify its operation and maintenance practices to protect, enhance, and restore upland natural resource areas and their functions and processes.	
UP-2	The City shall identify upland natural areas and significant natural swales within the Corvallis Urban Growth Boundary that provide important hydrological and habitat functions.	1. Since I live in the house closest to the confluence of the Willamette and Marys rivers, minimizing the rate of peak runoff is <i>very</i> important to me. Therefore, I support adoption of policies UP-2 through UP-10.
UP-3	The City shall develop stewardship guidelines that protect natural stormwater functions and processes associated with wetlands, natural swales, and vegetation.	
UP-4	The City shall encourage the Division of State Lands to fully implement and enforce wetland protection goals and regulations within the City of Corvallis and the Urban Growth Boundary to maintain hydrological and natural resource functions.	
UP-5	The City shall develop and implement incentives for developers and property owners to protect, enhance, and reestablish wetlands, natural swales, vegetation, and groundwater for stormwater functions.	

* Policies that the City is currently doing, at least in part.

Policy No.	Uplands Natural Resource and Wetland Management continued.... Policy	Comments
UP-6	The City shall explore opportunities to acquire lands to preserve stormwater functions through outright purchase, conservation easements, and partnerships.	
UP-7	The City shall consider applying hydrological and habitat function-related policies to natural swales.	
UP-8	The City shall encourage wetland mitigation to occur in the same basin, unless it can be proved that other wetland functions outweigh the lost functions.	<ol style="list-style-type: none"> 1. Wetland mitigation outside the basin in which the wetland is lost, except in extraordinary circumstances, is not giving the public the benefit of the lost wetland. Each wetland serves a different function, has a different value. 2. Clarity intent. 3. "Basin" needs defined. 4. Currently most wetland mitigation takes place away from watersheds in which wetlands are impacted, e.g. mitigation for a Corvallis development in Lebanon! The City might consider developing its own mitigation bank, or better yet, a mitigation bank in each watershed.
UP-9	Wetland mitigation should not compromise the existing stormwater functions of the land being used for the mitigation.	
UP-10	New development and redevelopment should not inhibit the quantity and quality of water reaching wetlands.	<ol style="list-style-type: none"> 1. See above discussion of Jackson-Frazier Wetland.
*UP-11	The City shall place a high level of significance on wetlands that are adjacent to streams.	

Cross-Jurisdictional Basin Storm Water Management

Cross-jurisdictional basin storm water management addresses watershed stormwater issues that cross jurisdictional boundaries, including flow, water quality, wetlands, and the vitality of streams. All of Corvallis' local streams and their watersheds extend beyond the current city's limits and the urban growth boundary into Benton County jurisdiction.

Policy No.	Policy	Comments
CJ-1	Governing agencies shall work to develop a basin-wide stormwater management approach with common goals and objectives.	
CJ-2	The City shall develop cooperative agreements with surrounding jurisdictions to protect streams and habitat throughout the entire watershed.	<ol style="list-style-type: none"> 1. There is especially a need for the county to work together with the city.
CJ-3	The City shall work with Benton County to update the Corvallis Urban Fringe Management Agreement to adequately address stormwater management. Surrounding Counties may also be part of the basin-wide management strategy.	
*CJ-4	The City and County shall encourage public participation and information outreach activities for all citizens within the watershed.	

* Policies that the City is currently doing, at least in part.

Public Participation and Information Outreach

Public participation and information outreach to meet storm water objectives can occur in a number of arenas, including improving or protecting water quality, stream and wetland health, and storm water detention. Citizen involvement can range from watershed programs to backyard practices.

Policy No.	Policy	Comments
PP-1	The City shall evaluate and seek funding for the resources required to meet public participation and information outreach objectives.	1. Don't do that if you're going to rely on scandalously bogus surveys, like you did for the SWMP project. I don't know how anybody can trust you when it comes to the citizen input stuff.
PP-2	The City shall establish information outreach programs that target what individuals can do to take personal responsibility for controlling sources of stormwater pollution and the health of streams.	
PP-3	The City shall provide stream stewardship guidelines for stream-side property owners.	
PP-4	The City shall develop incentives that maintain and enhance the health of the stream systems.	
PP-5	The City shall develop and support stewardship programs such as "adopt a stream" and neighborhood association "stream watch" to monitor and enhance stream and riparian habitat. Resources from other agencies and programs should be used in this effort.	1. The Benton County Soil and Water Conservation District is currently working (informally now) with the City of Corvallis Public Works Dept. (Water Utility) in the <u>beginning</u> stages of starting this very program. Grants from agencies and private foundations are pending and a decision should be available from the potential funders by the end of September, 2001. If we are successful, then we can start the very beginning steps....The Benton SWCD will assist with watershed education-service-learning projects with local schools and neighborhood associations. For more info., contact Director Mary Eichler of Benton SWCD staff at 753-7208. The Benton SWCD can help with jurisdiction concerns - as an education and tech. assistance agency.

Suggested Follow-Up Actions

Suggested Follow-Up Action		Comments
Water Quality	The City shall investigate other stormwater quality management techniques that are used by other agencies and implement as appropriate.	
	The City shall retrofit catch basins to improve water quality.	
Floodplain	The City shall investigate the feasibility of constructing bridges to span the 100-year or a portion of the 100-year floodplain of permanent stream corridors or otherwise maintain connections in the floodplain (such as multiple culverts). It is recommended that this investigation look at whether to develop different stream-crossing standards for stream floodplains and the Willamette and Marys Rivers floodplain and backwater areas.	
Stream System	The City shall investigate ways to restore natural stream habitat function and other methods to mitigate high stream temperature.	
	The City shall investigate ways to protect existing stream systems, including channel, riparian area, and floodplain for both permanent and intermittent streams.	
	The City shall identify intermittent streams within the Corvallis Urban Growth Boundary that provide important environmental functions.	

Suggested Follow-Up Action		Comments
Stream System continued...	As part of the current land development code update, revise stream-width dedication formula to meet identified stormwater management needs.	
Water Quantity	Recognize that the best efforts to mimic "natural" peak flood volumes and frequencies will probably not entirely maintain pre-development flooding regimes. Therefore, we should design appropriate stormwater infrastructure, such as stream corridor widths, to accommodate those changes, including destabilized and widening channels, changes in the erosion and deposition patterns, etc.	
	The City shall identify steep terrain and consider implementing development standards for reducing impervious surfaces in these areas.	
	The City shall identify the maximum runoff from impervious upland areas that is necessary to protect hydrological and habitat functions of areas downstream and consider development standards that maintain flows below the maximum.	
Upland Natural Resources	The City shall consider exceeding existing state and federal requirements for wetland protection.	
Cross-Jurisdictional	The City and County shall identify watershed protection and restoration opportunities that involve multiple agency and/or property owner partnerships.	

General Cost Questions/Comments:

1. Look for \$\$ from private sources where budget shortfalls occur (foundation).
2. A citizen mentioned that if a cost benefit analysis was done, it would show that the storm water plan is worth carrying out. If you decide to do such an analysis, be careful. All too often these analyses are attempts to convert costs to specific land owners into costs to the general public. This transfer attempt is done by being fuzzy on who bears the cost and who reaps the benefits implying that the all costs and benefits accrue to the general public. Therefore, if you decide to do a cost benefit analysis of the storm water master plan, be very explicit about who bears the costs and who reaps the benefits. Specifically, list the parcels affected and their owners.
3. As I read the executive summary, this program is going to be funded by monthly fees on our utility bills. If a cost benefit analysis is done, we might find that this program should be funded by specific land owners rather than the public at large. Considering our needs for a jail, earthquake resistant schools, the city general budget short fall, and Corvallis being the most expensive place to live in Oregon, we ought to hesitate before tacking more fees -- taxes -- on to our utility bills.
4. As I remember from the presentation, the short term program extends for the next ten years and the long term program extends from ten years out to twenty years out. The cost estimates are stated in, I assume, current year (2001) dollars. If so, please so state because the dollars for the out year projects will be much higher than the figures in the documentation. The cost estimates seem to be very round numbers indicating that a range is in order -- at least for the larger projects.
5. What is cost of flooding?
6. Mitigation should use a cost/benefit analysis to justify.
7. Who bears costs of policies?
8. Keep cost down.
9. Develop continuum of costs from mandates "Cadillac to PT Cruiser"
10. More overland flow can result in cost savings.
11. Concerned about utility rate impacts.
12. Surprised cost memo to Public Works not included \$263,000.00 for one policy!
13. Where will payments come from?
14. Adopting plan before we know cost is a concern.
15. Population not growing at rate to support these alternatives.
16. What is cost of lesser implementation levels, say 90% rather than 100%. May be considerably less \$\$.
17. Does \$250,000,000 include City buying land? Buy early!
18. When did we last have 75-100 year storm? What is \$ cost & extent of damage for various storm events?
19. Geographer: cost of damage to community must be compared to cost of protection to decide direction to take
20. How will Bruce get cost under control in next 3 weeks?
21. Look at how much is necessary & who is going to pay for it? We are already the most expensive City. We need more taxpayers? Have to look at economic picture of Corvallis. What if HP changes employment #?
22. The SWPC and City needs to present a more thorough and realistic analysis of the estimated short and long run costs of SWMP to rate payers and to SDC payers. Costs covered by grants and the EPA and DEQ requirements should be identified. In addition, the draft SWMP lacks an adequate summary of benefits accruing from the plan. It would be useful also to provide a rationale for exceeding requirements both in terms of flood control and water quality. I recognize that capital costs are presented in the SWMP. Potential costs of permissive and mandated regulation are not given. I personally do not question the need for an exemplary stormwater abatement system nor costs of such a system but I recognize that a segment of our community wants an explanation for it. In short, the SWMP needs a sensitive public relations framework. To carry through on economic issues will probably delay the Council decision but that is necessary in my opinion.

General Cost Questions/Comments continued:

23. Reviewing page 5-42 of the SWPC draft proposal, I see a very expensive future for the 35,000 full-time residents of Corvallis.
- Alternative D - "no structural development within the 100 year floodplain". Allow me to cite two parcels of land located on south 3rd Street and within the 100 year floodplain. The first parcel is immediately north of Corvallis Rental South and the second parcel fronts on SE Crystal Lake immediately east of Corvallis Rental South. I gather that Alternative D stops all structural development. Should this become law, the two owners of these lands have but one alternative, turn to the citizens of Corvallis for payment (\$300,000) of the loss they would suffer from Alternative D or similar laws.
- Two routes of collection of the owners loss are available, one Ballot Measure 7 (or its revision) and two, the Right of Eminent Domain. Both of these avenues share the same thesis, "you took the total value of my land", would say the owners along with countless other landowners, now my fellow citizens of Corvallis, pay me the prior value of my land.
- The above draft review is not the invention of the wheel. The US Army Corps of Engineers, in conjunction with the Federal Emergency Management Authority, have done extensive floodplain studies of Corvallis and Benton County. These studies and recommendations are a part of Building and Development Codes of Corvallis. Compliance with the Corps and FEMA recommendations are a prerequisite in issuance of federal flood insurance. These studies carry dates two decades past.
- My question is obvious, "we have controls covering structural development within the 100 year floodplain so why incur massive financial liability for the taxpayers of Corvallis by defacto buying the undeveloped land within the 100 year floodplain?"
24. I believe that I have a useful perspective from which to comment on the proposed Stormwater Master Plan that is being developed for the city. From 1993 to 1995 I served on a National Academy of Sciences Committee on Flood Control Alternatives in the American River Basin. We produced a book, *Flood Risk Management and the American River Basin: an Evaluation*, published by the National Academy Press in 1995. In that committee experience I got to see first-hand the many sorts of problems caused by inadequate planning, zoning, and preparation for management of stormwater. Of course, the flood risk to Corvallis does not compare to that of Sacramento, but nonetheless the scope of problems is similar.
- I attended the public meeting on August 14 and have reviewed in a general way the text of Chapter 5. I believe that the Committee that developed this plan has done an excellent job. They have produced an extremely comprehensive and forward-thinking document that will serve the city well into the future. I am particularly pleased at the watershed perspective of the plan and the way in which it incorporates natural ecological functions into stormwater management. The breadth of concerns addressed by the plan is truly exceptional.
- Concerns have been raised about the cost of the plan, and perhaps some additional evaluation is required in that area. However, all around the country there are countless examples where cities and public agencies have looked to short-term economies and ended up paying many times more over the long term. Flood management is certainly one of the most concrete examples of the old adage: "Pay now or pay a lot more later". I strongly support adoption of the proposed City of Corvallis, Stormwater Master Plan.
25. Costs depend on policy being implemented. Yet creating policy requires some idea of proposed costs of policy choices. What can staff do to assist in determining ball park costs for various policies?
26. See memo from Business Advocacy Committee, Corvallis Area Chamber of Commerce dated 7/24/01, "Stormwater Master Plan Cost Estimate".

General Public Process Questions/Comments:

1. Can raw data be placed on web or be more accessible?
2. Some policy work can be by volunteers.
3. Telephone survey based on 360 some residents - small # in 50k town.
4. Flood plain alternative choice - concerned about survey of 30 people for conclusion.
5. Are home owners adjacent to streams aware of these policies that affect them?
6. How can we reach public better? Anyone in audience have ideas?
7. To inform public, language & info are key, keep words to minimum & simple - readable to general public. Put cost on notifications - it gets attention.
8. Are grants available? OWEB?, etc. Adopt-a-stream, private foundations, FM, Ballet Foundation, etc.
9. See memo from Business Advocacy Committee, Corvallis Area Chamber of Commerce dated 7/24/01, "Stormwater Master Plan Cost Estimate".

General Regulatory Questions/Comments:

1. Which of these are required by state and federal mandates?
2. Which are likely to be mandated by the feds and state soon?
3. Which are demonstrated by actual scientific studies to be needed?
4. Which are no more or no less than someone's idealized vision of what could be conceivable in the best of all possible worlds, such as one in which money is not an issue and there isn't a severe shortage of affordable housing?
5. Is SWMP mandated by State or Federal Government?
6. Working with EPA on non-point sources?
7. Request to break policies down into: State & Fed mandate now and State & Fed mandate likely
8. See memo from Business Advocacy Committee, Corvallis Area Chamber of Commerce dated 7/24/01, "Stormwater Master Plan Cost Estimate".

General Questions/Comments:

1. Is there conflict of interest involved in the Chair of the SWPC being the wife of one of the Urban Services Councilors?
2. What is the difference between "bank stabilization" and "channel improvement"? (related to maps)
3. Soils analysis is not specific enough. Soils vary from site to site and affect both run-off as well as ground water recharge. Probably each project needs a separate analysis.
4. Bioswales likely only function as planned if there is a maximum gradient. This needs to be noted at the policy and planning stage. Definition should be amended.
5. I support the Stormwater Master Plan.
6. I would like to express my support for the work of the Storm Water Master Plan Commission. The improvement projects in the local stream basins and the policies developed by the committee will in the long-term, improve habitat for fish and other species, reduce the effect of flooding on our public and private property, and put us in compliance with state and federal regulation. The implementation of these policies will help bring our development code and regulations in alignment with good storm water management practices. I understand there is cost associated with this program but believe the cost to make these changes now will be lower than the cost to fix bad designs later. In fact, some of the policies such as those allowing more pervious surfaces and fewer pipes in our developments will probably reduce first cost. Lastly these policies will integrate well with the Endangered Species response plans and

General Questions/Comments continued:

Natural Features Inventory project to create holistic solutions that will maintain and restore our environment. Our earth provides us with services (clean water and air, fish, habitat) that we do not know how to reproduce at any cost. It is time to take another step forward to insure these services continue to exist for us and our children.

7. I would like to express my support for the work of the Storm Water Master Plan Commission. The improvement projects in the local stream basins and the policies developed by the committee will, in the long-term, improve habitat for fish and other species, reduce the effect of flooding on our public and private property, and put us in compliance with state and federal regulations. The implementation of these policies will help bring our development code and regulations in alignment with good storm water management practices. I understand there is cost associated with this program but believe the cost to make these changes now will be lower than the cost to fix bad designs later. In fact, some of the policies, such as those allowing more pervious surfaces and fewer pipes in our developments, will probably reduce first-cost. Lastly, these policies will integrate well with the Endangered Species Act response plans and the Natural Features Inventory project to create holistic solutions that will maintain and restore our environment. Our earth provides us with services (clean water and air, fish, habitat) that we do not know how to reproduce at any costs. It is time to take another step forward to ensure these services continue to exist for us and our children.
8. I was quite impressed with the quality of work that your team presented. Unfortunately, I have another evening engagement and I was unable to add my comments to the public dialog. For the record, I would like to say "terrific job"! One thing that I enjoyed hearing was the attitude that our city's streams are not ditches but habitat corridors. Additionally, that a few pennies spent today will save the city big money in the future in avoiding erosion and intermittent flooding while improving the quality of life within the city. A very practical goal. As a Corvallis citizen for over 25 years—I'm very proud that our city continually tries to better itself. In closing, please keep up the good work!
9. References to the Natural Features Technical Advisory Committee work should perhaps be made so that the findings of that project could be incorporated into the stormwater management plan.
10. I have attended several NFTAC meetings and the public forum held by the SWPC. At the SWPC public forum things were discussed that were also discussed at the NFTAC meetings. At the SWPC forum I obtained a "project coordination matrix" displaying, amongst other things, the activities of three projects: Significant Natural Features, ESA Salmon Listing Response Plan, and Stormwater Master Plan. Looking at the activities of the three projects, there could be some overlap and duplication. And as a taxpayer, I would hate to pay for an activity more than once. I would hope that you are coordinating your activities and following each other's work very closely. By doing so I would expect that you would learn from each other and not find yourselves in a situation where your notions conflict. Examining the matrix, I would expect the data collection and modeling by the storm water project to be very useful to the other two projects. I would also expect that the review of regulations affecting natural resource management by the storm water project to be useful to the other two projects.
11. I suggest you put documentation supporting your work on the web.
12. I was intrigued by the assumption that the soils, once saturated, act as though they are paved in the before and after development scenarios that were run with the hydrologic models. The soils prior to development have some sort of vegetation (trees, shrubs, grass and herbaceous cover) which intercept rainfall (thus increase evaporation) and can delay runoff travel time across the landscape. Travel time in an urbanized landscape can be changed significantly due to changes in slope by channelizing flow paths, terracing lot areas, leveling depression/storage areas, adding roads, parking areas, and storm sewers. How have the consultants incorporated the removal of vegetation and alteration of flow paths in the hydrologic models? It is well known that the effects of urbanization on a watershed are reduced infiltration and decreased travel time. This results in significantly higher peak rates of runoff. I would think this would be true in the case of larger storm events, as well.

General Questions/Comments continued:

13. Enclosed are copies of tables and charts of basic hydrogeology. Most approaches now recognize the impact of urbanization on land. The premise that because some of the soils are clay and therefore have the same factor for runoff as urbanization, just doesn't agree with the literature (and experience). I am admittedly just on the edge of learning about all there is to know about hydrogeology, but the consultant is suggesting something that is contrary to current thought. The basic equation - runoff = precipitation - (minus) [Evaporation + Δ Storage] - seems to be the one needed, but where have [ET and Δ S] been factored in? Soils are not the only thing to consider when dealing with rain in the open. This is not a simple "pipe" situation. There are many variables that need to be considered - not just soils. Even clay soils are variable and discontinuous, with storage capacity that changes over time. There might be a short period of total saturation - 5 min. to 1 hour, but water is dynamic and in a dynamic system. Evaporation and transpiration are major factors in dealing with stormwater. With urbanization, the native vegetation and therefore root connectivity are disrupted. It is generally accepted that there is considerable storage potential in vegetation - through capture, evaporation and transpiration. Taking the native vegetation out removes storage in the immediate and over time. I hope that you, the consultants and Fred Wright, get together and discuss this in depth. This is information that many people have, not just little ole me. It seems like a difficult position to defend. Besides, it's not ecologically sound.
14. Coordination of ESA, Stormwater Plan & National Resource Inventories is needed
15. How are policies implemented?
16. Don't encourage streets/parking lots in inappropriate place for detention's sake.
17. Bioswales could eliminate large diameter pipe (Venell swale).
18. Check stream flow in SW study area
19. Policy should result in pervious surface parking lots.
20. Concerned that we aren't planning for today's needs.
21. Stream maintenance policy needed
22. How do 1996 rains fit in flood severity?
23. Request to break policies down into: Committee discretion - community values and need for informed decisions from public.
24. How many committee members & employees will be affected? Water forced across his property when 3rd Street worked on - made a dam near his property City will not allow fill - Feds say City responsibility & vice versa (he gets run around) Can't use 3 lots. Is plan from Fed or from citizens on committee? People writing the plan are not affected.
25. Thank you for meetings, used material, web, 2 nights of meetings (first one for orientation)
26. Commend committee, first step in ongoing process:
 - Hydrologic systems complex in urban environment.
 - Provide means to prioritize \$, rational basis for cooperative ventures
27. Lived on Dixon Creek for 30 years. Building rock wall (we already have brick terraces) - will unlikely do better job than what's there (\$120k / 520)
 - It will damage trees
 - How is this different than 1981 plan?
 - What is Fed, State & optimal?
 - How will this plan change what creek side landowners can do within stream? (remove wood & fallen limbs prevents mosquitos)
 - Cite Fed law, number will assist citizens
28. Flooding development is restricted Fed permits building in floodplain? Why go that far? Part of his property is in floodplain in S. Corvallis.
29. What is most susceptible areas to flooding? Start with those.
30. Need to consider efficiency of bacteria studies.

General Questions/Comments continued:

31. I appreciated being able to participate in the August 16 Open House discussion of the draft Stormwater Master Plan (SWMP). I submit these comments for the record. Particularly, I wish to commend the Stormwater Planning Committee, its Chair and City Public Works Department staff coordinator for the assembling the detailed material representing an incredible amount of hard work. The draft document is a tribute to citizen's role in dealing with complex issues and represents a high level of professionalism. In general, I support the draft plan and hope that the following comments will help improve the document. I support the principle that development should be limited or carefully restricted by code in FEMA floodplain areas. I further support prohibiting development in floodway and 0.2-ft floodway fringe areas. The document of 8/13/01 presenting data for floodplain and floodway fringe lands within the UG. needs clarification. In recent years consensus developed among engineers and resource specialists concerned with flooding that the least expensive and most efficient way of reducing flooding is by non-structural projects such as zoning. Traditional means by dams and river revetments, etc. are regarded today as too expensive. Allowing Oregon's large rivers to occupy the remaining floodplain fragments is becoming more widely accepted in state policy.
32. Modeling stormwater runoff within the City UG. based on soil type, especially on slopes, is a questionable procedure. I am wetlands specialist familiar with the generalization in our soils maps regardless of updating underway. The maps in themselves can not be used to formulate a meaningful policy. I understand that Public Works staff proposed that soils in the Corvallis area are mostly clay and that impacts of development in the short and long run would be negligible. First, slope soils are not mostly clay. Most stream-associated clay-based soils such as the Bashaw Series are confined to the drainage ways, particularly where slopes have a low gradient. Surrounding hillsides often have soils that are more permeable. Many of our floodplains or historic floodplains are dominated by Dayton Series. Second, many of our undeveloped slopes are forested. The role of forest canopy in diminishing runoff is important. With development, there will be increased clearance and increased impervious surface. Both will increase the flashiness of our streams. It is probable that within the short time frame of 10 years there will not be major changes in runoff due to development. However, in a longer time frame of 20 or more years, I do not believe this is a valid projection. I serve as chair of the Benton County Jackson-Frazier Wetland Management Advisory Committee. Although this technical committee appointed by the commissioners has not studied the SWMP, plan policies are of critical concern to our committee. The committee has responsibility for advising the Parks Director in protecting the wetland. Parks Director Jerry Davis submitted written comments to the SWPC summarizing County Park's concerns to which I wish to add some detail. Benton County is mandated by LCC to protect the wetland. Protection extends beyond strict county jurisdiction to the Jackson and Frazier Creek watersheds. Our concerns relate to maintaining the ground water regime, minimizing changes in the surface water hydrograph especially during low flow periods, and maintain water quality.

Research by David D'Amore and Professor Herb Huddleston (D'Amore et al. 2000) demonstrated the importance of ground water in recharging the wetland. Precipitation enters the watershed soils on slopes and flats and flows downslope in permeable silts about 40 inches below the surface forming an independent hydrological system from the surface water regime. From the standpoint of maintaining the wetland, the stormwater system and its policies should protect the groundwater regime and minimize runoff.

Surface flow is also important to the biological welfare of the wetland, especially in late spring and early summer. The stream system of combined Jackson and Frazier Creek enters the wetland at a single point at the US 99W bridge. Even the rather sparse development in the watersheds is threatening water input in spring and early summer. We have initiated a surface water hydrological study. Earlier research suggests the wetland has some capacity to reduce down stream flooding in the fall but once the wetland becomes saturated in January, this benefit diminishes.

General Questions/Comments continued:

A study conducted over two years by Crescent Valley High School students under the direction of Bob Madar in 1998 and 1999 showed that dissolved ammonium and nitrate ions and dissolved oxygen collected at nine sample sites in the watershed were lower than EPA acceptable background level (108 samples). Agricultural sites tended to have higher concentrations of nitrate. Nutrient concentrations measured within the wetland were less than in the watershed suggesting that the wetland had a capacity to reduce dissolved pollutant concentrations. While water quality within the watershed is presently in relatively good condition, we are concerned about future deterioration with future development (roads, impervious surfaces and lawn irrigation). It is important for the stormwater system to be able to minimize pollutants in watershed streams.

With respect to Jackson-Frazier Wetland, we recognize a dilemma. While it is advantageous to minimize untreated stormwater flow into streams, it is important to provide that some of this water treated and allowed to infiltrate into the groundwater system as well as be routed into the stream network, especially at lower flows.

33. The North Corvallis Area Plan, now underway by the city, needs to be coordinated with the SWMP and vice versa. The same is true for the South Corvallis Area Plan and West Corvallis Plan completed in recent years.
34. A system of gauging stations and water quality sampling sites needs to be established data collected. A hydrological study conducted within the Corvallis UGB should be initiated. It should be useful in assessing future trends in water quantity and quality in Corvallis.
35. A policy is needed to minimize downstream water flow by paying attention to road orientation.
36. See memo from Business Advocacy Committee, Corvallis Area Chamber of Commerce dated 7/24/01, "Stormwater Master Plan Cost Estimate".

Table 6-4. Dixon Creek Short Term Program

Figure No.	Reach	Recommended Activity and Table 6-3 Observation Reference Number	Capital Cost (\$)	Annual O&M (\$)	Project Type ¹	Comments
S-1	3 rd Street to Railroad tracks	1) Stabilize streambank and provide a more natural stream configuration.	60,000	3,000		
S-2		2) Provide vegetation to improve canopy cover.	2,800	140	Orange line	
S-3		3) Work with ODOT and ODFW to address fish passage issues at Highway 99.	1,920	360		
S-4	Railroad tracks to 9 th Street	1) Provide plantings on south side of stream to increase shading.	3,200	160		
S-5		2) Stabilize streambank and provide a more natural stream configuration.	14,000	700	Green line	
S-6	9 th Street to Buchanan Avenue	1) Monitor streambank and house elevations.	NA	250	<input checked="" type="checkbox"/>	
S-7		2) Create a slot in the concrete cap of the sanitary sewer downstream of 11 th Street to reduce water surface elevation of water backing up behind blockage or provide stream channel improvements to allow fish to pass blockage.	2,000	360		
S-8		3) Work with high school to modify groundskeeping and create buffer strip along stream.	1,920	NA		
S-9		4) Improve riparian area through establishment of native vegetation as part of streambank stabilization projects.	12,000	600		
S-10		5) Replace demolition debris downstream of 10 th Street with vegetative streambank stabilization.	30,000	1,500	Green line	
S-11		6) Stabilize streambank and provide a more natural stream configuration.	7,000	350	Yellow line	
S-12		7) Remove sediment upstream of 9 th Street and monitor to determine source.	NA	250		
S-13		9) Replace undersized pipes along Buchanan Avenue, Kings Boulevard, and Grant Avenue.	757,000	NA	Red line	
S-14		Buchanan Avenue to Grant Avenue	2) Remove obstruction near 15 th Street and Lincoln Avenue.	5,000	NA	
S-15	Grant Avenue to Garfield Avenue	1) Monitor stream levels at 13 th Street and Greeley Avenue to determine extent and duration of reported flooding.	NA	750	<input checked="" type="checkbox"/>	
S-16		2) Monitor stream levels at Vista Place (near 15 th and Grant) to confirm success of flood mitigation project.	NA	750	<input checked="" type="checkbox"/>	
S-17	Garfield Avenue to Kings Boulevard	1) Monitor stream levels at Arthur Circle to confirm success of flood mitigation project.	NA	750	<input checked="" type="checkbox"/>	
S-18	Kings Boulevard to Circle Boulevard	4) Construct multi-use riparian facility to provide water quality/detention benefits in cooperation with the school district.	226,000	2,260		
S-19	Circle Boulevard to 29 th Street	4) Monitor situation to determine if pinch point near 29 th Street is contributing to local flooding problems.	NA	750	<input checked="" type="checkbox"/>	
S-20		5) Remove encroaching structures, widen channel, and install rock walls where necessary to increase channel cross-section and capacity.	120,000	6,000	Yellow line	1. Recommendations not necessary. Be cost efficient. Could the resources be spend towards people impacted by flooding?

Table 6-5. Dixon Creek Long Term Program

Figure No.	Reach	Recommended activity and Table 6-3 observation reference number	Capital cost (\$)	Annual O&M (\$)	Project type ¹	Comments
L-1	Willamette River to 3 rd Street	1) Stabilize streambank slopes using matting and vegetation.	28,000	1,400	Green line	
L-2		2) Adjust culvert elevations to address fish passage and stagnant pool issues or install low flow culvert.	17,000	1,700		
L-3	Railroad tracks to 9 th Street	3) Install structural stormwater treatment facilities to treat water from Avery Square parking lot.	20,000	2,200		
L-4	9 th Street to Buchanan Avenue	3) Install structural stormwater treatment facilities to treat runoff from high school.	15,000	1,650		
L-5		8) Install end of pipe technology for treating stormwater from Buchanan Avenue.	15,000	1,650		
L-6	Buchanan Avenue to Grant Avenue	1) Coordinate with private property owners on stream restoration to stabilize streambanks.	2,400	180	Green line	
L-7		3) Coordinate with private property owners to improve habitat.	1,200	NA		
L-8		4) Remove sediment from culvert at Buchanan Avenue and monitor to determine source.	NA	275		
L-9	Grant Avenue to Garfield Avenue	3) Improve riparian area with native plantings throughout reach.	21,000	1,050		
L-10	Garfield Avenue to Kings Boulevard	2) Extend habitat upstream of Porter Park by placement of large wood debris.	6,000	300		
L-11		3) Replace undersized pipe along Kings Boulevard and install end of pipe technology for treating storm water.	158,000	1,650	Red line	
L-12	Kings Boulevard to Circle Boulevard	1) Replace undersized pipe along Circle Boulevard and install end of pipe technology for treating storm water.	106,000	1,650	Red line	
L-13		2) Remove sediment from culvert at Circle Boulevard and monitor effectiveness of upstream erosion controls.	NA	275		
L-14	Circle Boulevard to 29 th Street	2) Stabilize streambanks with log cribs and vegetative techniques where walls not required.	7,000	350	Green line	
L-15		3) Improve culverts at 27 th Street to allow fish passage past blockage.	3,800	190		
L-16	Walnut Boulevard to Headwaters (West Branch)	4) Stabilize channel along Glenridge Drive using vegetative means.	49,000	2,450	Green line	
Total			449,400	16,970		

¹Project types are found in the Figure 6-4 map legend.

NA = Not applicable

General Comments/Questions:

1. Dam shouldn't be allowed at Circle Boulevard.
2. More interested in cost effective improvement that are required rather than selective.

Table 8-4. Jackson-Frazier-Village Green Creeks Short-term Program

Figure No.	Reach	Recommended Activity	Capital Cost (\$)	Annual O&M (\$)	Project Type ¹	Comments
S-1	Sequoia Confluence to Conifer Blvd	1) Plant trees at top of bank for shade.	22,000	NA	Orange line	
S-2		2) As part of a comprehensive analysis of stream corridor issues, including Jackson-Frazier Wetlands hydraulics, determine extent of flooding and ways to deal with source of blockages.	30,000	NA		
S-3	Conifer Blvd to Jackson-Frazier Wetland	1) Plant trees/shrubs as part of community involvement program. Use dense or thorny shrubs or other ground cover to limit heavy foot traffic in eroded areas.	2,100	100	Orange line	
S-4	Jackson-Frazier Wetlands	1) Coordinate with County and OSU studies to determine storage potential and flow regime of wetland, especially flow split between Village Green and drainage ditch to northeast. Coordinate with Jackson-Frazier Friends group.	19,200	NA		
S-5	Jackson-Frazier Wetlands to	1) Establish conservation easements with willing property owners	4,000	NA		
S-6	Highland Drive (Jackson Creek)	2) Remove non-native vegetation, widen stream and stabilize with willow plantings. Work in conjunction with long-term Projects.	60,000	3,000		<ol style="list-style-type: none"> 1. Coordinate with GLT, JF Advisory group. It is the site of an enhancement project. 2. Conflict restoration effort from OWEB – coordinate with Greenbelt Land Trust and Jackson-Frazier Wetland Advisory Committee.
S-7	Crescent Valley HS (Highland Drive to Crescent Valley Drive-Jackson Creek)	1) Reroute water pipe along roadway.	28,000	NA		
S-8		2) Community stewardship opportunity to work with school to remove non-native invasive species like blackberry and ivy.	400	NA		
S-9		3) Call potential flooding problem to school's attention.	200	NA		
S-10		4) Coordinate with school district to install end of pipe treatment before discharge to stream from parking lots and cut back pipe to allow vegetative treatment for playing field underdrains.	800	NA		
S-11	Crescent Valley Drive to McDonald State Forest (Jackson Creek)	1) Develop conservation easements/ stewardship programs in conjunction with property owners and county.	4,000	NA		
S-12		2) Work with county to confirm hydraulic analysis of the replacement bridge at Crescent Valley Drive.	800	NA		
S-13	Jackson Creek Headwaters (McDonald State Forest)	1) Coordinate with Oregon State University Forestry Department and other property owners.	800	NA		
S-14	Highway 99 to Highland Drive (Frazier Creek)	1) Develop conservation easements/ stewardship programs in conjunction with property owners and county.	4,000	NA		

Table 8-5. Jackson-Frazier-Village Green Creeks General Comments:

1. I would like to go on record in support of the draft Stormwater Master Plan. The Benton County Parks Department is responsible for the management of Jackson-Frazier Wetland. Much of the Jackson-Frazier Wetland watershed is in the City urban fringe and therefore, a successful Stormwater Master Plan is of critical interest to us. The draft Plan submitted by the Stormwater Master Plan Commission will provide the mechanism to improve fish habitat, reduce the effect of flooding and lesson non-point pollution impacts on public resources such as the Jackson-Frazier Wetland. The Jackson-Frazier Wetland Technical Advisory Committee, and many community volunteers, are committed to managing the Wetland resource for its intrinsic values. The current draft Plan submitted by the Stormwater Master Plan Commission provides the policies necessary to assist our efforts in managing for a healthy functioning Jackson-Frazier Wetland. Thank you for allowing me the opportunity to give input on this important planning document.

Table 9-5. Sequoia Creek Long-term Program

Figure No.	Reach	Recommended Activity	Capital Cost (\$)	Annual O&M (\$)	Project Type ¹	Comments
L-1	Highway 99W to Highland Drive	1) Determine if undersized pipes along Highland Drive need to be replaced after the downstream capacity is increased.	166,000	NA	~	
L-2		2) Coordinate with ODOT to remove existing berm located between two ditches and replace culverts along Highway 99 to increase carrying capacity of channels.	75,000	3,750	~	
L-3		3) Lay back the streambank to improve flow regime and provide for greater flood storage.	120,000	6,000	~	
L-4	Walnut Boulevard to Headwaters (North Branch)	1) Provide channel and stream improvements to control erosion near Sundance Circle where streambed or streambank have not already been armored with riprap.	35,000	1,750	Green line	1. Infested with blackberries and metal debris. Told it was going to be dredged. When?
L-5		2) Raise elevation of Chipmunk Place and Antelope Place to continue to allow ponding behind culvert without flooding road.	25,000	NA	~	
L-6		3) Increase storage capacity of channel directly upstream of Chipmunk Place and Antelope Place culverts.	40,000	2,000	~	
	Total		461,000	13,500		

NA – Not applicable

¹Project types are found in the Figure 9-4 map legend.

General Comments/Questions:

1. Sequoia Creek along Sequoia Avenue overgrown with brush and debris, needs work!
2. Why does Sequoia Creek (on the map) stop at Highland? There is a significant ½ mile channel and 2-3 acre wetland upstream of Highland Drive. Developer of Highland Dell Estates put large dam structure and water control structure in channel. Is this currently allowed?

Table 13-4. South Corvallis Long-term Program

Figure No.	Reach	Recommended Activity	Capital Cost (\$)	Annual O&M (\$)	Project Type ¹	Comments
L-1	Goodnight Avenue Basin	3) Investigate sale to trailer court.	2,000	NA		
L-2	Millrace Basin – Evanite Culvert to Highway 99	4) Stabilize banks with structures along banks that also provide habitat value.	63,000	3,150	Green line	
L-3		6) Anchor large woody debris in channel to improve habitat and stabilize channel bottom.	20,000	1,000		
L-4	Millrace Basin – Highway 99 to Allen Street	6) Stabilize banks with structures that also provide habitat value.	70,000	3,500	Green line	
L-5		8) Anchor large woody debris in channel to improve habitat and stabilize channel bottom.	12,000	600		
L-6	Millrace Basin – Allen Street to Marys River	3) Work with Benton County to stabilize with structures that also provide habitat value. These can be worked in with large woody debris already in this stream reach.	2,000	NA	Green line	
L-7		4) Conduct feasibility study to identify regulatory (environmental and water rights) and engineering issues with reconnection of the Millrace to Marys River.	30,000	NA		
Total			199,000	8,250		

¹Project types are found in the Figure 13-5 map legend.

NA=Not Applicable

General Questions/Comments:

- Chapter 13 of the SWMP assumes that the SCDMP will be implemented for the future scenario. We are asking that some wording be added to Chapter 13 which will allow some flexibility in design specifically for the property discussed above. It is our intention that the principals of both the SCDMP and the SWMP would be followed, but we would like to have the option of draining this property to the north and ultimately to the Mary's River, should it be practical to do so. The topography of this area naturally slopes to the north and northwest. If this area could be drained to the north, it would help limit the impacts on Dry Creek, a stated goal of the SCDMP, and it would reduce the size of the water quality feature needed in service area 7. This would help to reduce the potential of attracting birds to the airport vicinity which is also a concern in the SCDMP. The SCDMP contemplates some flexibility in design for service areas 1 through 6. We believe that flexibility should also be extended to service area 7.
- Missing Ryan Creek on map.
- Foundation collapsing south of Alexander in former Ryan Creek because natural drainage was not respected.

**EXCERPTS OF MEETING MINUTES
URBAN SERVICES COMMITTEE
AUGUST 14, 2001**

Bob Stebbins stated that he and his neighbors on SW Brooklane Drive (Brooklane) have practical experience with flood water, noting that at times he has left his house via canoe because the street to the north was six feet under water. He explained that Brooklane extends along the top of a ridge between the Marys River and a branch of Squaw Creek. He expects that the area soils are present because they are dense clay, otherwise they would have eroded during earlier flooding events. He referenced Water Quantity Management Policy QN-2. He said the driveway and parking area in front of his house are level and drops only a few inches from the street. He recently installed a manufactured house on his property; City staff determined there was insufficient drop to drain storm water to the street and approved installing a storm water drainage pipe to the nearby floodplain. During the past five or six years, he has watched the storm water on his property, which seeps into the soil before it reaches the end of the four-inch perforated pipe he installed to the floodplain. He added that the soil on his property is clay and observed that clay holds more water than sand but absorbs water more slowly. His adjacent property has an asphalt driveway that always had a puddle during heavy rain events. He drilled a hole in the center of the puddle, installed a four-inch pipe, topped the pipe with screen, and held the pipe in place with gravel and an asphalt patch. He now rarely has a puddle in the driveway. His neighbor has a level gravel driveway, which drains during heavy rain events. He questioned the appropriateness of smaller lots with large houses and driveways that have only small landscaped areas of pervious surfaces. He said establishment of codes that require impervious surfaces create water quantity problems because the only place for the water to escape is via the storm sewer system. He noted that placing landscape cloth under gravel keeps the gravel from sinking into the dirt, so the ground continues to drain. He said the First Congregational Church was told that, if it repaves the parking lot, the storm water must drain into the storm sewer. He noted that a small stream on the property drains to Squaw Creek. He expects that drainage from the parking lot during a heavy rain event would double the volume of the stream, which he doubts will pass through the culvert. He considered it "silly" to have a code requiring management of excess storm water runoff.

Liz Frenkel said she looked at all the maps on display and observed a green line representing stream bank stabilization. In some cases the stabilization actions are listed as short-term projects, while, in other cases, they are listed as long-term projects. She said the action apparently involves riprap but could have different types of alternatives. She inquired about the criteria for determining short-term and long-term projects.

Scott Mater said he grew up with the flooding events along Brooklane. He concurred with Mr. Stebbins regarding the issues of soil capacity and impervious lot coverage. He said he had not seen indication of the actual costs of flooding events in terms of the floodplain, but not water quality. He inquired about the cost of damage as a result of flooding. He suggested that the USC and the SWPC consider a cost-benefit analysis regarding floodplain mitigation. He believes the 1996 flood would have been worse, if not for flood controls installed by the United States Army Corps of Engineers in the Willamette and Columbia Basins. Before the City spends money, he suggested discussion of a cost-benefit analysis and what is being mitigated by pursuing the activities proposed in the SWMP. He referenced Floodplain Management Policies FP-4 FP-8 and said he did not see in the policies an indication that they addressed only small or large streams. He suggested that, if Policy FP-4 is intended only for small stream basins, it should so state.

John Detweiler suggested that the first action should involve determining the cost of the proposed activities and who would pay for them. He said he attended two recent meetings of the Natural Features Technical Advisory Committee (NFTAC). He noted that the SWPC and the NFTAC seemed to address many similar issues.

Bruce Hecht said it seemed that many of the proposed SWMP policies must be implemented in the LDC. He inquired how the different plans will be implemented.

Dave Steele inquired whether the SWMP was mandated by the State or Federal Government.

Tom Jensen referenced questions in the alternatives workshops questionnaire regarding using streets and parking lots for water detention and retention. He noted that this issue was addressed in Water Quantity Management Policy QN-1. He said he did not want the idea of using streets and parking lots for water detention and retention to be construed as an invitation for construction in these areas. He requested clarification of Uplands Natural Resource and Wetlands Management Policy UP-8 and the phrase "other wetland functions outweighing lost functions." He believes that all functions are necessary. He referenced Stream System Management Policy SS-5i and inquired whether the phrase "large wood" meant logging. Removing fallen trees would remove the natural environment. He observed that all new development must be plumped into the storm drain. The City collects fees for the water using storm drains. He inquired how this policy would affect the City's revenue. He questioned whether a citizen who developed a "grey water" system would receive a break on their utility bill.

Mr. Jensen observed that the policy implies that the City would not mitigate lost wetland if the remaining wetland has a more important function.

Councilor Butcher suggested indicating on the SWMP continuum what is mandated, what is an ideal situation, and where the proposed activities will take the community. She expects that not doing so will cause the City to encounter further concerns from citizens.

Joan Noyce said she gathered information concerning storm water, including information from Bellevue, Washington, which developed a SWMP during the 1970s. The Bellevue plan began similarly to the Corvallis plan and incorporated all three of the issues questioned. Bellevue found that, besides protecting streams and the city, it was more cost effective to have overland flow from streams, adding that it is very expensive to install pipes, curbs, and gutters. Bellevue experienced significant savings by implementing a stream protection program that had more overland flow than the proposed Corvallis plan.

Don Herbert referenced the South Corvallis Drainage Master Plan and inquired whether the SWMP could include a policy to eliminate large pipes and put water into bioswales for treatment. He believes that this procedure could help and would provide opportunity to eliminate the Venell Swale. He suggested that staff review the parcel north of Airport Road between the railroad tracks and Oregon State Highway 99 West in the Southwest Study Area. He said the study has the flow moving south; it currently flows north. He said it may be better to include the property in the Northwest Study Area.

Lyle Brown questioned the quality of the data gathered during the surveys and inventories and inquired whether the data could be made available for public review in terms of the bases for decisions regarding the SWMP.

Scott Mater referenced Uplands Natural Resource and Wetlands Management Policy UP-8 and noted that the policy does not define the term "basin." He stated that the Corvallis community is within the larger Willamette River Basin. He noted that the policy should define the size of a basin. He added that other details should be given similar treatment.

Bruce Hecht suggested that a great deal of the proposed policy activities could be accomplished by volunteers, noting many volunteers available through the Corvallis Environmental Center. He added that the SWMP presented a large opportunity for volunteers to be involved in the community. He reiterated the comment regarding impervious surfaces. He noted that his friends wanted to develop a restaurant without a paved parking lot; the LDC did not allow this type of development, but the proposed SWMP would allow the development at a lower cost. Ms. Benner verified that Mr. Hecht was referencing Water Quantity Management Policy QN-2c.

Don Brown expressed disappointment that more homeowners from the floodplains were not in attendance. He said he did not see any mention in the policies concerning maintaining streams in the immediate future. He said \$400,000 was spent on Dixon Creek. He does not see that the SWMP addresses planning for the immediate future. He was a Corvallis resident during the 1964, 1996, and 1997 floods. He stated that Dixon Creek did not flood during 1964 but did flood during 1996 and 1997. As a senior citizen, he is concerned that the City is discussing increasing wastewater fees, which seem to continue increasing. He contended that senior citizens cannot afford to flush toilets in Corvallis because of the City's wastewater fees.

Al Bown inquired whether staff intended that building on hills would not significantly change runoff. He inquired whether anyone conducted infiltration studies on the surrounding hills to determine the rate at which water percolates through the soil. He asked if estimates were calculated regarding the amount of water that will flow down Dixon Creek as a result of the new construction on the ridge.

Mr. Bown inquired whether the differences in soils were studied and the amount of water each soil type holds.

Dave Steele inquired how far water backed up in Dixon Creek from the Willamette River during the 1996 flood event.

Donna Schmitz referenced the Cross-Jurisdictional Basin Storm Water Management policies and inquired about the timeline for working with Benton County concerning developing a basin-wide storm water management program and how it relates to the urban fringe boundary.

Don Herbert inquired whether staff reviewed whether, during a major storm event, releasing water early is more advantageous than releasing it late. He asked whether it was better to release storm water early while waiting for storm water from Blodgett and Fall Creek to enter the storm water system.

Page 4

Excerpts from USC Meeting, 8/14/01

Marge Stevens referenced the Cross-Jurisdictional Basin Storm Water Management policies and inquired whether these policies would include working with the EPA concerning non-point source pollution runoff.

**EXCERPTS OF MEETING MINUTES
URBAN SERVICES COMMITTEE
AUGUST 16, 2001**

George Mears inquired, from a benchmark perspective, where the 1996 and 1997 floods would be considered in relation to the floodplains. Mr. Moser responded that the 1996 rainfall event was recorded as a 25-year event. He noted that, during a two-year period, the community experienced four storms classified as greater than ten-year events and two storms classified as greater than 25-year events. The February 1996 storm involved rain falling on frozen slopes at elevations above 800 to 1,000 feet. This created a runoff greater than would have been expected from the rainfall event. He noted that, in terms of scale, the community has experienced some very large flood events. He was not aware of similar events during the 20 years preceding the 1996 flood.

Mary Nolan referenced the issue of costs. She expressed surprise that the July 3rd memorandum from Public Works staff to the USC was not included in the material made available to the public. She said Public Works staff performed an order-of-magnitude estimate for the SWMP. One of the floodplain management policies had an estimated cost of \$263 million. She commented that the cost of the policy is so large that it will probably not be effectively implemented and, thus, should not be included. She said the SWPC was asked to classify the recommendations according to current State or Federal mandate, anticipated State or Federal mandate, community need demonstrated through scientific evidence, and those recommended at the discretion of the SWPC. She said she did not believe anyone could make an informed comment about the recommended policies without the classification breakdown. She added that the request was made July 3rd and later.

Karen Steele inquired as to the source of the funds for the projects.

Carlyn Roy referenced Chapter 5 of the SWMP and expressed concern about basing public opinion on the survey responses of 366 residents in a town of 50,000 people. She observed that the City was considering adopting a plan prior to know the cost of its implementation. She referenced page 542 of the draft plan concerning floodplains and noted alternatives "a" through "d" concerning construction in the floodplain. She said 30 participants rated the alternatives and favored more restrictive alternatives. She expressed concern about polling the citizens, rather than following the opinions of 30 citizens. While the City is facing budgetary shortfalls and the school district is closing schools and addressing budget issues, she believes the City must prioritize projects for the next two years. She expressed hope that the SWPC, the USC, and the Council will take these facts into consideration. She believes the population is not growing at a pace that can support some of the proposed projects.

Ms. Roy noted that many Corvallis residents are affected by the SWMP, particularly in the more-populated areas. She inquired whether the residents were asked about how they would be affected by the plan.

Stan McCall stated that he owns property on SE Bridgeway Avenue. He said the mill race was change during 1987 to develop the property along Third Street; this forced water across his property. In accordance with City permits, he filled his property during 1979 to create building sites. The property is still four inches too low, but the City will not allow him to add four inches of fill. He consulted Federal agencies, which told him that the City has authority to change the mill

race and not allow him to fill his property. City staff have told him that they must follow Federal rules. He questioned whether the SWMP was required by State and Federal regulations.

Mr. McCall inquired whether the entire SWMP was required by Federal regulations or merely desired by the City and the SWPC.

Chaun MacQueen inquired whether anyone could suggest a better means of reaching the public. She said she is an education outreach specialist for the Benton Soil and Water Conservation District.

Liz Frenkel said she knew the SWMP was underway for some time, but she did not spend time investigating the actions related to the plan. She attended the August 14th USC/SWPC meeting, reviewed the basin maps and recommendations, and researched the internet. She thanked the USC and the SWPC for conducting the meetings this week and noted that she would submit her written comments and questions. She added that the meetings provided her an opportunity to learn about the plan.

Larry Earhart said he presumed that the estimated \$263 million cost represented investment to achieve no loss in the 100-year floodplain. He believes it would be more relevant and effective to consider the cost to prevent 90 percent of anticipated flood-related damage. He expects that \$10 million invested in projects would resolve 90 percent of anticipated flood-related loss. He would prefer a lower cost figure to prevent a lower percentage of flood-related loss.

Bob Frenkel said he appreciated the Committee presenting tonight's forum and seeing citizens involved in the SWMP development process. He commended the SWPC for development of the SWMP, which he observed is the first step in a continuing process. He commented that many of the concerns expressed today address the problem as though the SWMP were the last step in the process. He noted that the SWMP represented an in-depth analysis of the complexities of hydrological systems in the urban environment and provides a means of prioritizing capital improvement funds, which could not be done without an analysis. The plan also provides a means of mitigating damage to property and the City and maintaining the integrity of a natural resource system. The plan provides a rational basis for cooperative ventures between the City, Benton County, the development community, and citizens. He added that he serves as Chair of the Jackson Frazier Wetland Advisory Committee and looks forward to preparing detailed written comments for the Committee's consideration. He thanked the USC and the SWPC for conducting the forum.

A member of the audience questioned whether the \$263 million in recommendations includes necessary land purchases, citing Floodplain Management Policy FP4-42d; if so, he believes the City would own a lot of worthless land to prevent construction of structures in the floodplain.

Karen Steele stated that her family lived on Dixon Creek for 30 years and did a lot of work themselves on the creek bank. She said part of the plan includes \$120,000 to build a rock wall. Residents along the creek have brick terraces on their properties, and passersby consider the terraces structurally sound and attractive. She questioned how building a rock wall would save her house or anything downstream during a 100-year flood, speculating that it would not do a

better job than what the area residents have already constructed. She said the riprap on one side of the creek has been overgrown by ivy, which helps hold soil in place. Along the creek bank are large cottonwood and ash trees, the roots of which would be damaged by construction of a rock wall, resulting in possible removal of the trees; she questioned who would pay for the work. She inquired how the proposed SWMP differs from the 1981 DMP. She said she did not see anything indicating what components of the proposed SWMP are new, were in existence, or are being updated; she added that she would like to see a comparison of the two plans. She would also like to know what aspects of the proposed SWMP are required by Federal or State regulations and what aspects are options. She asked how the proposed SWMP affects current plans and construction in terms of what can be done along the creek. The current instructions do not follow any guidelines that contribute to good creek maintenance. She noted that many limbs fell into the creek during a wind storm last night; she said leaving the limbs in the water will result in "dead" water, creating an environment for mosquitos. She clarified that the \$120,000 project was indicated in Stream System Policy SS-20 for Dixon Creek.

Ms. Steele acknowledged Ms. Benner's comments but suggested including State or Federal legal citations to assist citizens in researching the regulations.

Stan McCall said the SWMP did not contain an indication about the floodway, but it does mention the floodplain. He said the Federal government permits construction in the floodplain. He inquired why the City changed its policy to prohibit building in the floodplain.

Mr. McCall noted that South Corvallis flooded four times during 42 years. Ms. Benner suggested that Mr. McCall review the floodplain alternatives and determine if one better meets his perspective. Mr. McCall said his property is in the floodplain and the floodway.

Mary Nolan observed that informing the public and making them aware of what is happening involves, as key factors, language and presentation. She suggested attending marketing classes. If notices are written in technical jargon, they will be understood only by people who know the jargon. Associating cost estimates with notifications will get public attention.

Bob Frenkel referenced the costs of flood damage associated with building into the floodplain and the more deadly floodway. He suggested that the only way to evaluate the costs to the community is to compare them with the costs of protection. He said this was why many of the laws were mandated by the Federal government, noting the national recognition that it is often cheaper to deal with protection projects.

An audience member referenced the Council beginning the review process in three weeks and inquired how staff would refine costs during the three-week period.

An audience member suggested that the SWPC, the USC, the Planning Commission, and the Council should determine how much of the SWMP is really necessary and who will pay for it. He referenced a recent study that named Corvallis as having the highest cost of living in the state. He believes the local tax base is suffering and schools are being closed because no one can afford to live in Corvallis. He does not expect that more people will become residents of Corvallis if costs are increased. He observed that the proposed SWMP will be expensive to implement and

must be paid for by taxpayers.

Chaun MacQueen inquired whether the City could obtain grant funding to help offset the costs paid by local residents. MacQueen suggested private resources.

Dave Steele stressed the need to review the economic picture of Corvallis. He expressed concern if Hewlett-Packard lays off employees and how such action would impact the City's tax base.

An audience member inquired which area of Corvallis is most susceptible for flooding and whether there were plans to address that area first.