

DETERMINING GROUP POLICY ABOUT OPEN SPACE PRIORITIES

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Summary

A systematic procedure was used to formulate an explicit Group Policy about criteria for acquisition of open space. The procedure revealed specific areas of agreement and disagreement among members of the Open Space Board of Trustees. The Group Policy, based on seven general factors, (Aesthetics, Availability, Cost, Location, Need for Action, Protection of the Environment, Use Potential), resulted in predicted judgments of the desirability of thirty-one land categories which were in close agreement with the judgments of members of the Board. The average relative importance for each of the seven general factors was: Need for Action (20.6), Aesthetics (17.4), Protection of the Environment (16.4), Location (14.6), Availability (12.4), Cost (-11.0), and Use Potential (7.6). The manner in which the Group Policy could be applied to new land categories was illustrated; it was also emphasized that the Group Policy could be modified easily to incorporate new information or changing values of members of the Board. Changes in the Group Policy would result in changes in the priorities listed above.

It was recommended that the procedures continue to be used as aids to 1) discussion and agreement among members of the Board, 2) communication with the public and city agencies about open space policy, 3) formulating systematic descriptions of the components of the general factors underlying judgments of open space desirability.

The predicted judgments, based on the Group Policy, resulted in the following priorities for the thirty-one land categories under consideration:

1. South Boulder Creek from Highway 93 to Boulder-Denver turnpike
2. South Boulder Creek from Eldorado Canyon to Highway 93
3. Davidson Mesa south of Boulder-Denver turnpike
4. Mountain Backdrop
5. Baseline Reservoir
6. Davidson Mesa east of Boulder-Denver turnpike
7. Intersection of Four Mile Creek and Longmont Diagonal
8. Marshall Mesa (including Marshall Lake)
9. Hayden Lake Area
10. Boulder Creek from 55th Street to 75th Street
11. Boulder Creek from 24th Street to 55th Street
12. South Boulder Creek from Boulder-Denver turnpike to junction with Boulder Creek
13. Boulder Creek from 75th east
14. Valmont Link (from Valmont Road to Boulder Creek)
15. Bear Mountain Link
16. Mesa Reservoir Area
17. Link between Boulder Reservoir and Sawhill Ponds area, including Twin Lakes
18. White Rocks natural area
19. Four Mile Creek from Longmont Diagonal east
20. Wonderland Creek (density transfer)
21. Four Mile Creek to Longmont Diagonal (density transfer)

22. Dry Creek
23. Bear Canyon Creek (density transfer)
24. Six Mile Reservoir buffer zone along northern side of Longmont Diagonal
25. Wellman Canal (density transfer)
26. Six Mile Reservoir buffer zone along southern side of Longmont Diagonal
27. Valmont Reservoir Area
28. White Rock Ditch (density transfer)
29. South Boulder Canyon Ditch (density transfer)
30. Viele Lake Out-Fall (density transfer)
31. Farmer's Ditch, including the environmental corridor to Six Mile Reservoir on the east and the environmental corridor to Mesa Reservoir on the west

Introduction

The Open Space Board of Trustees (OSBT) is responsible for formulating general policy about open space and suggesting specific procedures to implement these policies. The Board is also responsible for making recommendations about whether the city should acquire particular parcels of land. The extent to which the recommendations about specific parcels of land are in accord with general policy about open space is of interest to other departments and to citizens in general. Consequently, a list of priorities which is accompanied by the rationale for the priorities is important not only because it facilitates the Board's performance of its duties but also because of its value as an aid to communication.

Priorities serve as a guide for action. It is necessary to formulate priorities because resources are limited. Because of limited resources, all land potentially available for open space cannot be acquired. Different land parcels are desirable for open space for different reasons. The trade-offs between the various factors must be considered in establishing priorities.

Formulating priorities about open space requires judgment; members of the Board must continually exercise their judgment with regard to acquisition of potential open space land. Research on human judgment has revealed that people are often inconsistent in making judgments and find it difficult to describe accurately how they make their judgments. The limitations of human judgment become more severe as the amount of information on which the judgment is based increases. Computer graphics procedures have been developed to ameliorate these limitations of judgment. In brief, computer graphics procedures make it possible for people to describe in an explicit and accurate manner how they make judgments, and permit them to make consistent judgments. Computer graphics procedures were used by the OSBT in order to formulate an explicit Board policy with regard to criteria for open space acquisition and to reveal specific areas of agreement and disagreement among members of the Board. The policy of the Board was formulated with the specific intent that the policy could be easily modified to incorporate new information or to reflect changes in values by members of the Board.

In summary, the purpose of using computer graphics procedures was to formulate a group policy which 1) was explicit, 2) revealed differences in judgments among members of the Board, and 3) could easily be modified. A brief description of the procedures used, the results obtained, and recommendations for future work follow.

Method

The general method used permitted each Board member to describe his policy with regard to criteria for open space acquisition in an explicit manner, to see the consequences of the policy, and permitted the Board to arrive at a compromise Group Policy. Each Board member then had the opportunity to modify his individual policy; a new, modified Group Policy was obtained and applied to actual land categories to determine the consequences of the Group Policy in a realistic way.

A policy refers to a description of the manner in which a person puts information together to make a judgment. The particular items of information which are used to make the judgment are called factors. In this case, the judgment was a rating of the overall desirability of a parcel of land on a scale from 1 (undesirable) to 20 (desirable). The general factors (or criteria) used were: Aesthetics, Availability, Cost, Location, Need for Action, Protection of the Environment, and Use Potential (with regard to recreation). Each parcel of land was described by ratings from 1 (low) to 10 (high) on each of the seven general factors. For example, a particular land category (South Boulder Creek from Eldorado Creek to Highway 93) might be described by the ratings listed below:

<u>Factor</u>	<u>Rating</u>
Aesthetics	9.0
Cost	5.2
Location	9.4
Need for Action	6.4
Use Potential	8.4
Protection of the Environment	9.4
Availability	7.4

After Board members made judgments about a variety of land parcels on the basis of the factors, a statistical analysis permitted several types of information to be obtained.

The weight of each factor reflects the relative importance of the factor to the judgment. A factor which is very important and has a large influence on the judgment has a high weight; a factor which is not very important and has little influence on the judgment has a low weight. The function form of each factor relates the values of the factor to the values of the judgment. A positive linear function form indicates that the judgment increases as the value of the factor increases. For example, a positive linear function form for the factor Aesthetics would indicate that the judgment of overall desirability of a parcel increases as the rating on Aesthetics increases. On the other hand, a negative linear function form indicates that judgments of desirability decrease as the values of the factor increase. For example, a negative linear

function form for the factor Cost would indicate that judgments of desirability decrease as Cost increases (see Figure 1). There are other types of function forms; for example, non-linear function forms in which the judgment is highest for a particular intermediate value of a factor - a higher or lower value of the factor results in lower judgments. However, only positive and negative linear function forms were needed to describe the relationship of the seven factors to judgments about open space desirability.

The combination rule specifies how the factors contribute to the judgment. When the combination rule is additive, the effect of a particular factor on the judgment does not depend on other factors. Non-additive combination rules are more complicated than additive rules; however, additive rules are often adequate to account for the judgments.

The weights and function forms for each factor, together with the combination rule, describe a person's judgmental policy. The consistency of the judgmental policy can be assessed, and the policy can be applied to a new set of objects (e.g., land parcels) which permits the consequences of the policy to be examined in detail.¹ The three stages of the procedure followed by Board members are listed below.

¹ The procedures are described in greater detail in Appendix 1 of the paper by Steinmann, Stewart & Hammond (1973). General background information about human judgment may be found in Slovic & Lichtenstein (1973); statistical details in Hirsch, Hammond & Hirsch (1964); and an example of an application in Balke, Hammond & Meyer (1973).

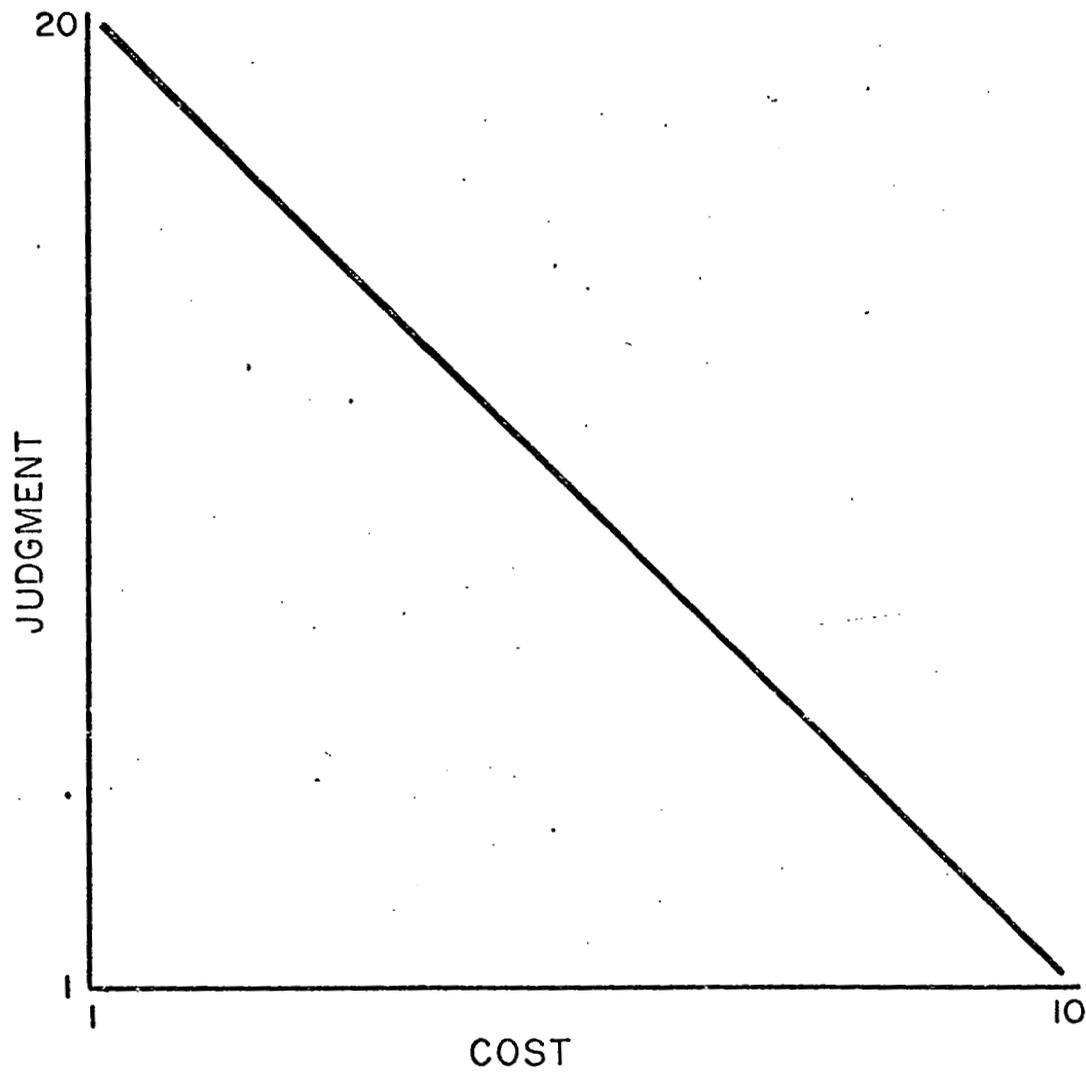


Figure 1. Function form relating judgments of desirability to Cost factor.

Stage 1: Eliciting general factors and subfactors. The set of general factors were obtained by asking the members of the OSBT to list all factors which influenced their judgments about the desirability of parcels of land for open space. All suggestions were collated and distributed to the group. Discussion resulted in seven general factors which were judged to be comprehensive and independent of each other. Subfactors for each factor were also listed in order to define each general factor in a systematic manner. (General factors and subfactors are listed in Appendix 1.)

Stage 2: Formulating a Group Policy. Each Board member made judgments about the desirability of 40 hypothetical parcels of land which varied with respect to values of the seven general factors. After the 40 judgments, each member saw a pictorial representation of his policy in terms of weights and function forms for each factor. The policy was then applied to the parcels and "predicted judgments" were obtained. The predicted judgments are the judgments that would be made by a perfectly consistent application of the policy. Consequently, each person saw the consequences of his policy.

A Group Policy was also constructed by taking the average of the weights obtained from the five Board members. The average Group Policy was also applied to the 40 parcels so that members could observe the consequences of a potential compromise policy which incorporated the views of each member of the group.

After seeing his own policy and its consequences, examining the other members' policies (and judgments), assessing the Group Policy (and predicted judgments), each member had the opportunity to modify his policy by changing his weights on each of the seven general factors.

Stage 3: Applying the new Group Policy to real parcels of land. Board members constructed a list of land parcels potentially under consideration as open space. Each member rated the thirty one parcels of land on the seven general factors and made an overall judgment about the desirability of each parcel. The Group Policy was then applied to the average rating of the five Board members, which resulted in a predicted judgment.

Results

Stage 1 (Factors).

The general factors and subfactors are listed in Appendix 1.

Stage 2 (Group Policy).

Weights. Table 1 contains the Group Policy. The relative importance weight for each of the seven general factors was: Need for Action (20.6), Aesthetics (17.4), Protection of the Environment (16.4), Location (14.6), Availability (12.4), Cost (11.0) and Use Potential (7.6). The standard deviation reflects the extent to which the weights for a given factor differed among members of the Board. Members of the Board tended to have similar weights for Use Potential (standard deviation = 2.19) but not Need for Action (standard deviation = 13.33).

The major changes from the initial weights to the modified weights consisted of decreases in the relative importance of Cost and Use Potential, and increases in the relative importance of Need for Action and Location.

Table 1
Means and Standard Deviations
of Initial Weights and
Modified Weights (Group Policy)

	Initial Weights		Modified Weights (Group Policy)	
	Mean	Standard Deviation	Mean	Standard Deviation
Aesthetics	17.6	10.21	17.4	9.26
Cost	-15.0	8.28	-11.0	4.85
Location	11.8	7.60	14.6	6.31
Need for Action	16.0	12.63	20.6	13.33
Use Potential	10.8	2.59	7.6	2.19
Protection of the Environment	14.4	8.90	16.4	6.88
Availability	14.4	5.03	12.4	6.80

Stage 3 (Priorities).

Ratings of general factors and predicted ratings. The average rating of each land category on the seven general factors is presented in Table 2. The standard deviation ¹ reflects the agreement among the five Board members. (The ratings of each Board member are listed in Appendix 2.) The application of the modified weights (Group Policy) to the average ratings of the seven general factors results in a predicted judgment. Predicted judgments for each of the thirty-one land categories are presented in Table 2. (An example of the application of the procedure to a specific land category is illustrated in Table 3.) The predicted judgments are very similar to the actual overall judgments. The correlation coefficient ² between the predicted judgments and the average of the overall judgments is .94. A graph of the relationship between the average overall judgments and the predicted judgments is presented in Figure 2. The high correlation means that the consequences of the Group Policy are, in fact,

¹ The standard deviation is a measure of the extent to which the ratings (or judgments) of the five members differ from one another. The standard deviation will be zero when there is agreement with respect to the ratings or judgments. When there is a maximum amount of disagreement about a rating (for example, two ratings of "1" and three ratings of "10"), the standard deviation is 4.41. When there is a maximum amount of disagreement about a judgment (for example, two ratings of "1" and three ratings of "20"), the standard deviation is 9.31.

² The correlation coefficient reflects the degree to which two sets of scores (in this case, predicted judgments and overall judgments) are linearly related to each other. A correlation coefficient of zero indicates no linear relationship; a correlation coefficient of +1 (positive) or -1 (negative) indicates a perfect relationship. A high positive correlation between the two sets of scores means that the thirty-one land categories were rated in the same way by 1) the Group Policy, and 2) the average overall judgment. The similarity between two sets of scores increases as the correlation coefficient approaches 1.

Correlation coefficients will be used later to reflect the amount of agreement between members of the Board.

Table

Means and Standard Deviations¹ of Ratings
on General Factors, Overall Judgments,
and Predictions Derived from Group Policy

Land Categories	General Factors							Judgments	
	Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability	Overall Judgment	Predicted Judgments
South Boulder Creek from Eldorado Canyon to Highway 93	9.00 1.41	5.20 2.17	9.40 .55	6.40 1.52	8.40 1.52	9.40 .89	7.40 2.30	17.00 1.41	18.25
South Boulder Creek from Highway 93 to Boulder- Denver Turnpike	8.80 .84	6.20 2.77	9.40 .55	8.40 1.14	8.00 2.35	8.80 .84	7.40 2.51	18.40 .89	18.70
South Boulder Creek from Turnpike to Junction with Boulder Creek	6.40 2.30	8.00 2.35	7.80 1.92	7.60 1.67	5.20 1.10	5.80 3.35	4.00 2.00	12.60 5.32	11.73
Davidson Mesa South of Turnpike	9.60 .55	5.80 1.79	9.60 .55	7.20 1.92	4.40 2.61	8.40 1.82	5.60 1.67	17.40 2.79	16.76
Davidson Mesa East of Turnpike	7.50 1.29	7.75 .96	8.50 2.38	9.00 .82	3.00 1.63	6.25 2.87	5.50 1.73	13.75 4.92	14.02
Baseline Reservoir	7.60 1.82	6.00 2.12	8.20 1.30	6.60 1.14	7.20 2.68	7.20 1.48	7.60 1.82	15.80 2.28	15.34

¹ The top entry is the average, or mean score; the lower entry is the standard deviation.

Table 2 (Continued)

Land Categories	General Factors						Judgments		
	Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability	Overall Judgment	Predicted Judgments
Mountain Backdrop	9.20 1.10	7.20 3.11	9.20 1.10	5.80 3.42	8.00 1.87	8.20 1.48	5.40 2.07	16.40 1.14	15.60
Hayden Lake Area	4.40 2.19	8.40 1.14	5.80 1.92	9.40 .89	8.20 1.30	5.00 1.87	8.40 1.14	12.40 4.39	12.58
Boulder Creek from 30th Street to 55th Street	7.40 1.14	5.60 1.95	7.20 2.17	4.60 1.52	5.60 1.95	7.40 3.13	4.00 1.41	11.60 3.78	11.82
Valmont Reservoir Area	5.60 1.82	7.20 1.48	6.40 1.82	3.60 1.52	3.40 .89	5.60 2.88	3.40 1.14	9.60 1.82	7.43
Valmont Link (from Valmont Road to Boulder Creek)	6.20 1.64	5.40 1.52	8.00 .00	4.20 1.79	3.80 1.79	5.60 1.34	4.20 1.30	10.20 1.92	9.99
Marshall Mesa (including Marshall Lake)	7.80 .84	4.40 .55	7.80 1.92	4.40 .89	8.20 1.48	7.40 1.82	5.00 1.41	13.40 2.70	13.67
Boulder Creek 55th Street to 75th Street	7.20 1.30	4.80 2.17	7.60 2.41	3.80 1.30	5.80 1.92	7.40 2.19	5.20 1.79	11.00 2.83	12.17
Link between Boulder Reservoir and Sawhill Ponds area, including Twin Lakes	6.00 1.87	6.40 1.52	8.00 .71	4.60 1.14	4.40 1.14	4.80 2.28	3.80 1.10	10.80 2.59	9.35

Table 2 (Continued)

Land Categories	General Factors							Judgments	
	Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability	Overall Judgment	Predicted Judgments
Six Mile Reservoir buffer zone along northern side of Longmont Diagonal	6.20 2.17	8.80 1.30	7.40 1.14	3.60 1.34	3.80 1.48	5.00 3.67	5.00 2.35	10.80 2.77	8.09
Six Mile Reservoir buffer zone along southern side of Longmont Diagonal	5.80- 2.17	8.20 2.05	7.20 1.30	3.40 .89	2.80 .84	4.60 3.05	5.80 2.17	10.20 3.70	7.71
Dry Creek	6.40 1.34	5.60 1.52	6.60 1.14	3.00 .71	3.20 .84	5.60 2.07	3.80 1.79	8.60 2.88	8.26
Intersection of Four Mile Creek and Longmont Diagonal	6.60 1.14	5.00 1.22	7.80 1.92	6.20 2.17	5.20 1.64	6.80 1.79	7.00 2.55	12.40 2.88	13.73
Bear Mountain Link	6.60 1.52	5.20 1.64	7.80 1.48	3.40 1.14	5.40 1.82	5.80 1.30	3.60 1.34	10.40 1.67	9.92
Bear Canyon Creek (density transfer)	5.60 2.61	3.00 3.39	7.00 2.35	2.40 .55	3.80 2.17	5.20 2.59	3.20 1.79	6.60 2.51	8.21
Boulder Creek from 75th East	7.00 2.35	5.40 1.52	6.40 1.82	4.20 1.79	4.60 2.07	6.80 .84	5.00 2.12	9.20 3.35	10.85
White Rock Ditch (density transfer)	4.60 1.14	3.00 2.35	6.60 2.07	2.80 1.30	3.20 1.48	4.40 1.95	3.80 1.79	7.80 1.79	7.39

Table 2 (Continued)

Land Categories	General Factors						Judgments*		
	Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability	Overall Judgment	Predicted Judgments
Farmer's Ditch, including the environmental corridor to Six Mile Reservoir on the east and the environmental corridor to Mesa Reservoir to the west	5.00 2.00	4.20 1.79	5.60 2.30	3.40 1.52	3.20 .84	3.20 1.79	4.00 1.41	6.60 2.79	6.56
Four Mile Creek to Diagonal (density transfer)	5.80 1.92	3.20 2.39	6.00 1.41	3.00 1.58	4.20 1.92	5.40 2.19	4.00 1.41	8.00 3.81	8.71
Four Mile Creek from Diagonal East	5.80 1.92	3.80 2.39	5.80 1.64	4.00 3.16	4.20 1.92	5.40 2.19	4.60 2.30	7.60 4.16	9.31
Mesa Reservoir Area	6.00 1.22	3.80 1.30	5.60 1.14	3.60 1.34	5.80 .84	5.20 1.48	5.40 2.88	9.60 2.97	9.67
Wonderland Creek (density transfer)	5.40 2.07	2.60 2.51	6.80 1.64	3.00 1.58	4.20 1.64	4.80 1.92	4.00 1.41	7.20 3.35	8.76
South Boulder Canyon Ditch (density transfer)	5.00 1.83	1.50 .58	5.25 1.50	2.00 .82	3.00 .82	4.50 1.73	3.75 1.50	7.20 2.95	6.96
Viele Lake Out-Fall (density transfer)	4.40 1.14	3.20 3.35	6.60 2.30	2.20 .45	4.20 2.77	3.80 2.17	3.80 2.17	5.80 2.28	6.73

Table 2 (Continued)

Land Categories	General Factors							Judgments	
	Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability	Overall Judgment	Predicted Judgments
Wellman Canal (density transfer)	5.00 2.16	1.75 .96	6.25 1.89	2.00 .82	5.75 3.30	4.25 1.71	3.75 1.50	7.00 2.35	7.89
White Rocks Natural Area	8.20 1.10	5.40 2.61	4.20 2.59	2.60 1.14	3.80 2.68	8.40 1.67	3.20 1.79	10.20 2.86	9.34
Mean	6.51	5.23	7.15	4.53	4.97	6.01	4.86	10.82	10.82
Standard Deviation	1.45	1.95	1.31	2.09	1.75	1.57	1.42	3.46	3.46

Table 3

Example of Application of Group
Policy to Ratings of South Boulder
Creek (From Eldorado Canyon to
Highway 93)

Factor	Average Rating on Factor	Group Policy (Average Weight)	Product
Aesthetics	9.0	.174	+ 1.5660
Cost	5.2	- .110	- .5720
Location	9.4	.146	+ 1.3724
Need for Action	6.4	.206	+ 1.3184
Use Potential	8.4	.076	+ .6384
Protection of the Environment	9.4	.164	+ 1.5416
Availability	7.4	.124	+ .9176
			Sum = 6.7824

The sum of the product of each factor rating multiplied by the factor weight is transformed to have the same mean and standard deviation as the overall judgments by the formula: $3.255 (\text{Sum}) - 3.827$. In this example $3.255 (6.7824) - 3.827 = 18.25$, the predicted judgment. It should be noted that this transformation does not change the order of the judgments.

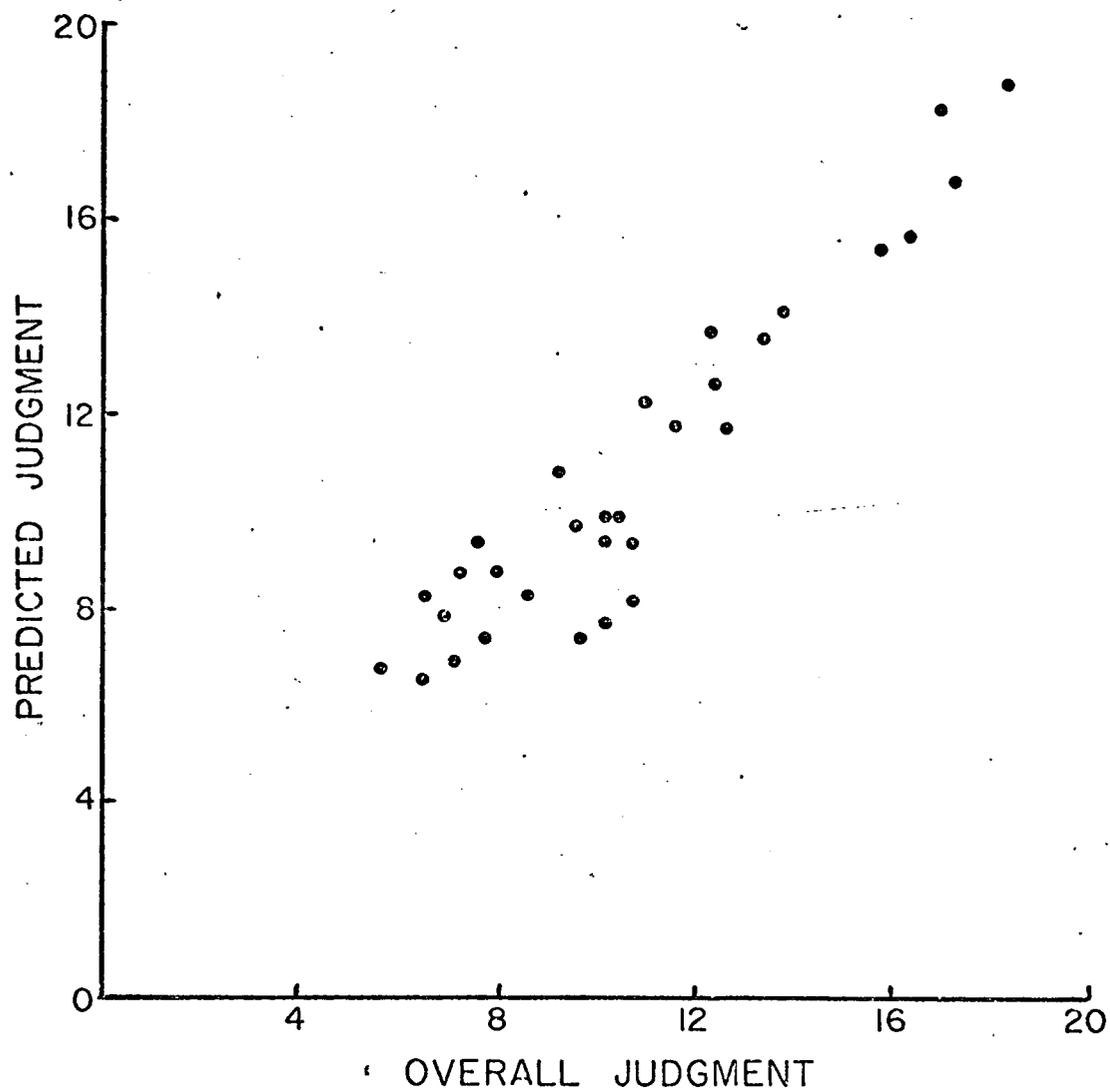


Figure 2. Correlation between Overall Judgments and Predicted Judgments

what they should be. That is, the application of the Group Policy to actual land categories results in predicted judgments which are in accord with the average overall judgment of the group. The predicted judgments are, in effect, the consequences of an explicit Group Policy, which can be modified to reflect either changing values of Board members, or to take into account new information.

Agreement among members. The procedure is useful because an explicit Group Policy which can be easily modified is formulated. In addition, the procedure can result in increased understanding between members of the Board.

As previously indicated, the standard deviations in Table 1 reflect the extent of agreement about the relative importance of the seven factors. Areas of disagreement often provide fruitful topics for discussion.

The standard deviations in Table 2 also reflect disagreement among Board members for ratings on the seven general factors and for the overall judgment. In order to determine the sources of disagreement, correlations between members of the Board were obtained. Tables 4 - 10 reveal the extent to which each Board member's set of ratings is correlated with the ratings of other members; Table 11 contains the same measures with regard to overall judgments. In general, agreement was higher for the Overall Judgment (.68), Need for Action (.65), and Use Potential (.54), and lower for ratings of Location (.40) and Availability (.41). The average intercorrelation among the five members of the Board for the remaining general factors is: Aesthetics (.43), Protection of the Environment (.44), and Cost (.48).

Table 4
 Agreement among Board Members with
 regard to Ratings on Aesthetics

	CD	RJ	JG	CM	CMcC
CD	1.000	.495	.356	.771	.593
RJ	.495	1.000	.425	.477	.126
JG	.356	.425	1.000	.224	.217
CM	.771	.477	.224	1.000	.362
CMcC	.593	.126	.217	.362	1.000

Table 5
 Agreement among Board Members with
 regard to Ratings on Availability

	CD	RJ	JG	CM	CMcC
CD	1.000	.397	.215	.437	.331
RJ	.397	1.000	.340	.595	.493
JG	.215	.340	1.000	.423	.284
CM	.437	.595	.423	1.000	.546
CMcC	.331	.493	.284	.546	1.000

Table 6
 Agreement among Board Members with
 regard to Ratings on Cost

	CD	RJ	JG	CM	CMcC
CD	1.000	-.077	.708	.685	.849
RJ	-.077	1.000	-.113	.194	-.054
JG	.708	-.113	1.000	.478	.612
CM	.685	.194	.478	1.000	.772
CMcC	.849	-.054	.612	.772	1.000

Table 7
 Agreement among Board Members with
 regard to Ratings on Location

	CD	RJ	JG	CM	CMcC
CD	1.000	.414	.406	.606	.527
RJ	.414	1.000	.435	.546	.175
JG	.406	.435	1.000	.259	.205
CM	.606	.546	.259	1.000	.240
CMcC	.527	.175	.205	.240	1.000

Table 8
 Agreement among Board Members with
 regard to Ratings on Need for Action

	CD	RJ	JG	CM	CMcC
CD	1.000	.622	.461	.691	.839
RJ	.622	1.000	.532	.666	.674
JG	.461	.532	1.000	.641	.602
CM	.691	.666	.641	1.000	.698
CMcC	.839	.674	.602	.698	1.000

Table 9
 Agreement among Board Members with
 regard to Ratings on Protection of
 the Environment

	CD	RJ	JG	CM	CMcC
CD	1.000	.556	.477	.639	.479
RJ	.556	1.000	.396	.449	.287
JG	.477	.396	1.000	.277	.457
CM	.639	.449	.277	1.000	.277
CMcC	.479	.287	.457	.277	1.000

Table 10
 Agreement among Board Members with
 regard to Ratings on Use Potential

	CD	RJ	JG	CM	CMcC
CD	1.000	.637	.545	.680	.513
RJ	.637	1.000	.324	.804	.531
JG	.545	.324	1.000	.427	.240
CM	.680	.804	.427	1.000	.534
CMcC	.513	.531	.240	.534	1.000

Table 11
 Agreement among Board Members with
 regard to Ratings on Overall Judgments

	CD	RJ	JG	CM	CMcC	Predicted Ratings
CD	1.000	.527	.716	.771	.742	.773
RJ	.527	1.000	.524	.733	.577	.865
JG	.716	.524	1.000	.681	.753	.758
CM	.771	.733	.681	1.000	.723	.859
CMcC	.742	.577	.753	.723	1.000	.753
Predicted Ratings	.773	.865	.758	.859	.753	1.000

Differences in overall judgments between Board members can reflect differences in the relative importance of the factors (or inconsistency) and are not unexpected. However, large differences with regard to the ratings of the general factors can be due to different interpretations of the factors or the degree of familiarity with or knowledge about the particular land categories. It is suggested that systematic methods which decrease the variability in the ratings be used.

Table 11 indicates that each person's overall judgments correlate more highly with the predicted ratings than they do with the ratings of any other Board member. This is because the predicted ratings are the consequence of a compromise policy, and because the Group Policy is perfectly consistent. Consequently, the consequences of the Group Policy should be acceptable to each member of the Board.

Intercorrelations among the factors. Table 12 contains the correlations among the seven general factors. The correlation between Aesthetics and Protection of the Environment is .93 (land categories tend to receive the same ratings on each of these two factors). The Board should discuss whether the two factors mean the same thing, or whether a high rating on Aesthetics is the only way in which a high rating on Protection of the Environment can be obtained. In any event, the two factors do not appear to be independent.

Table 12
Intercorrelations among General Factors

General Factor	Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Aesthetics	1.000	.318	.656	.447	.443	.927	.341
Cost	.318	1.000	.392	.629	.154	.280	.415
Location	.656	.392	1.000	.587	.436	.555	.451
Need for Action	.447	.629	.587	1.000	.514	.489	.749
Use Potential	.443	.154	.436	.514	1.000	.579	.651
Protection of the Environment	.927	.280	.555	.489	.579	1.000	.448
Availability	.341	.415	.451	.749	.651	.448	1.000

Modifications to the Group Policy

Changes in the policy of the Board can be made by 1) adding and/or deleting general factors, 2) modifying the weights of the general factors, 3) defining the general factors more precisely in terms of subfactors so that differences in ratings of the general factors are minimized. Of course, the ratings of each land category in terms of the seven factors can and should be changed to reflect whatever new information becomes available. In particular, it is expected that such factors as Cost, Availability, and Need for Action are subject to greater change than factors such as Aesthetics and Use Potential. The Group Policy can be easily applied to old land categories when changes in ratings on the seven general factors are made and can also be applied to new land parcels which come to the attention of the Board.

Recommendations

The three recommendations are that the Board 1) continue to use the procedures developed to make each member's policy explicit and to facilitate agreement among members of the Board, 2) use the Group Policy as an aid to communication with other departments, agencies, and the public, 3) develop systematic procedures for rating land categories in terms of the seven general factors.

Continued use by OSBT. The predicted ratings of the Group Policy were in very close agreement with the average overall judgment. The Group Policy, therefore, is a good description of the views of the Board. Specific areas of agreement and disagreement are clearly revealed and can be used to structure group discussion. Consequently, the Board should continue to use the procedures as an aid to judgments about the desirability of open space land categories.

Aid to communication. The Group Policy provides an explicit rationale for the judgments of desirability or short-, medium- and long-range priorities. Therefore, the Group Policy can serve to explain to such committees as the Open Space Administrative Review Committee or the City Council, the objectives of the Open Space Board of Trustees. In addition, the Group Policy should prove to be valuable in structuring discussion with the public, for example, at public hearings. Discussions about particular parcels of land should always focus on the seven general factors.

The Board might also request that other city agencies and departments provide the Board with information about their policies in a clear and systematic manner.

Measuring land parcels on the general factors. Since there was disagreement about the ratings on the general factors, a systematic procedure for rating the factors should be developed. Assessing the relative importance of the sub-factors used to define each general factor would result in a checklist which would provide unambiguous ratings on the general factors.

Members of the Institute of Behavioral Science will continue to consult with the Open Space Board of Trustees with respect to appropriate community projects.

References

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Appendix 1

General and Specific Factors

Specific Factors

More Detailed Factors

General Factor: AESTHETICS (Natural features that are pleasing to the senses)

1. Slopes over 50 feet
2. Water (lakes and streams)
3. Trees/forest/vegetation
4. Rock formations
5. Scenic vistas
6. General uniqueness
7. Visibility (e.g., Backdrop)

General Factor: COST (Appraised market value)

- | | |
|--|---|
| 1. Cost with respect to past Greenbelt (GB) purchases | a) out of scope of budget
b) reasonable with regard to staff and committee knowledge of current market conditions
c) in line with MAI appraisal |
| 2. Purchase price include other than cash considerations | a) development rights
b) tax break for gift
c) zoning adjustments of adjacent holdings
d) terms of purchase
e) purchase options |
| 3. Maintenance costs (Reconstruction and initial maintenance costs included) | a) trash removal
b) fire
c) required staffing
d) GB rules enforcement
e) facility removal
f) environmental reconstruction |

General Factor: AVAILABILITY (Degree of resistance to acquisition)

- | | |
|---------------------------|--|
| 1. Seller willing to sell | a) condemnation required
b) unwilling
c) willing
d) anxious |
|---------------------------|--|

Appendix 1 (Continued)

General and Specific Factors

Specific Factors	More Detailed Factors
<p>General Factor: LOCATION (Geographical position in regard to contiguity to other Open Space and relevance to urban shaping)</p>	
1. Contiguous with existing or proposed holdings	
2. Designated Greenbelt (GB) on Boulder Comprehensive Plan (BCP)	<ul style="list-style-type: none"> a) on circumferential loop b) defines urban areas c) defines sub-communities
3. Location with regard to existing development	
4. Entranceway to city	
5. Accessibility	
6. Environmental corridor	
7. Provides line of definition Boulder Valley	
<p>General Factor: NEED FOR IMMEDIATE ACTION (Imminence of permanent unavailability)</p>	
1. Imminence of development	<ul style="list-style-type: none"> a) plotted b) zoning c) currently under development d) proposed development e) logical next development
<p>General Factor: USE POTENTIAL (Ability of the land to be used for recreational purposes)</p>	
1. Recreational use	<ul style="list-style-type: none"> a) water (lakes, streams, boating, fishing, picnicking, ice skating) b) trails (bicycling, hiking, horse riding) c) rock climbing d) flora and fauna observation e) non-structural recreation
2. Co-ordination with other programs	<ul style="list-style-type: none"> a) flood control b) storm damage c) parks system d) land use policies e) land management plans

Appendix 1 (Continued)

General and Specific Factors

Specific Factors**More Detailed Factors**

General Factor: PROTECTION AND PRESERVATION OF THE UNIQUE FEATURES OF THE NATURAL ENVIRONMENT

- | | |
|--|---------------------------------------|
| 1. Types of natural environment | a) mountain |
| | b) trees |
| | c) mesa |
| | d) lake |
| | e) stream |
| | f) meadow |
| | g) vegetation |
| 2. Wildlife environment | a) large animals |
| | b) small animals |
| | c) birds |
| | d) fish |
| 3. Present environmental condition | a) state of disruption or naturalness |
| | b) reconstructable |
| | c) roads |
| | d) existing wildlife population |
| | e) beetle problem |
| 4. Specific characteristics of environment | a) drainage area |

Overall Judgments and Ratings on General

Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
South Boulder Creek from Eldorado Canyon to Highway 93	CD	17	10	6	9	6	9	10	5
	RJ	17	10	3	10	8	9	8	9
	JG	17	7	3	10	5	6	10	8
	CM	15	8	6	9	5	8	9	5
	CMcC	19	10	8	9	8	10	10	10
South Boulder Creek from Highway 93 to Boulder-Denver Turnpike	CD	18	8	9	9	7	9	8	7
	RJ	18	9	3	10	10	9	8	10
	JG	20	9	4	10	8	10	10	10
	CM	18	8	6	9	8	8	9	5
	CMcC	18	10	9	9	9	4	9	5
South Boulder Creek from Turnpike to Junction with Boulder Creek	CD	7	4	8	5	8	5	1	5
	RJ	12	7	9	10	9	7	5	3
	JG	19	6	4	8	7	5	9	7
	CM	8	5	10	7	5	5	5	2
	CMcC	17	10	9	9	9	4	9	3
Davidson Mesa South of Turnpike	CD	20	10	4	10	8	8	10	7
	RJ	15	10	4	10	8	5	6	7
	JG	20	10	6	10	7	5	10	6
	CM	18	9	8	9	4	3	9	3
	CMcC	14	9	7	9	9	1	7	5
Davidson Mesa East of Turnpike	CD	13	7	9	10	10	5	4	8
	RJ								
	JG	20	8	7	10	8	3	10	4
	CM	8	6	8	5	9	3	4	5
	CMcC	14	9	7	9	9	1	7	5

Appendix 2 (Continued)

Overall Judgments and Ratings on General

Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Baseline Reservoir	CD	12	8	5	7	6	7	5	8
	RJ	17	10	6	10	8	10	9	8
	JG	18	5	3	8	7	3	7	10
	CM	16	8	8	9	5	9	8	5
	CMcC	16	7	8	7	7	7	7	7
Mountain Backdrop	CD	16	10	10	10	8	8	8	7
	RJ	18	10	3	10	10	8	10	8
	JG	16	10	10	8	1	10	6	3
	CM	15	8	5	10	5	5	8	4
	CMcC	17	8	8	8	5	9	9	5
Hayden Lake Area	CD	6	3	8	4	8	7	3	7
	RJ	14	8	9	9	10	9	5	9
	JG	17	3	7	6	10	10	4	8
	CM	10	5	10	5	9	8	8	8
	CMcC	15	3	8	5	10	7	5	10
Boulder Creek from 30th Street to 55th Street	CD	12	7	5	6	6	7	8	5
	RJ	6	6	9	6	2	3	2	2
	JG	15	7	4	10	5	8	10	5
	CM	10	8	5	5	5	5	8	3
	CMcC	15	9	5	9	5	5	9	5

Appendix 2 (Continued)

Overall Judgments and Ratings on General
Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Valmont Reservoir Area	CD	8	3	7	4	4	3	2	3
	RJ	9	6	9	8	4	3	5	4
	JG	12	5	7	8	1	3	10	2
	CM	8	6	8	7	4	3	6	3
	CMcC	11	8	5	5	5	5	5	5
Valmont Link (from Valmont Road to Boulder Creek)	CD	10	5	5	8	6	6	4	5
	RJ	9	5	8	8	6	2	5	4
	JG	13	5	5	8	4	4	5	6
	CM	8	8	5	8	2	2	7	3
	CMcC	11	8	4	8	3	5	7	3
Marshall Mesa (including Marshall Lake)	CD	17	9	4	8	4	9	8	7
	RJ	13	7	5	9	5	10	5	5
	JG	15	8	4	10	5	8	10	5
	CM	10	8	5	5	3	8	7	3
	CMcC	12	7	4	7	5	6	7	5
Boulder Creek 55th Street to 75th Street	CD	8	6	4	5	3	6	4	8
	RJ	13	9	8	9	5	8	8	5
	JG	14	8	2	10	4	7	10	5
	CM	8	6	5	5	2	5	7	3
	CMcC	12	7	5	9	5	3	8	5

Appendix 2 (Continued)

Overall Judgments and Ratings on General
Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Link between Boulder Reservoir and Sawhill Ponds area, including Twin Lakes	CD	13	6	6	8	6	6	5	5
	RJ	8	4	8	8	5	5	1	3
	JG	13	6	5	9	4	4	5	5
	CM	8	5	5	7	3	4	7	3
	CMcC	12	9	8	8	5	3	6	3
Six Mile Reservoir buffer zone along northern side of Longmont Diagonal	CD	9	7	8	6	6	4	1	4
	RJ	8	4	10	8	3	6	1	9
	JG	12	4	7	7	3	2	7	4
	CM	10	7	9	7	3	4	8	3
	CMcC	15	9	10	9	3	3	8	5
Six Mile Reservoir buffer zone along southern side of Longmont Diagonal	CD	11	7	6	6	5	4	2	6
	RJ	7	4	10	8	3	2	1	9
	JG	12	4	6	7	3	2	7	6
	CM	6	5	9	6	3	3	5	3
	CMcC	15	9	10	9	3	3	8	5
Dry Creek	CD	7	5	6	5	3	4	5	5
	RJ	8	7	8	8	2	3	4	1
	JG	12	7	4	7	4	4	6	5
	CM	5	5	5	6	3	3	4	3
	CMcC	11	8	5	7	3	2	9	5

Appendix 2 (Continued)

Overall Judgments and Ratings on General

Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Intersection of Four Mile Creek and Longmont Diagonal	CD	10	5	6	5	5	6	4	7
	RJ	16	7	3	9	8	7	6	10
	JG	15	6	5	10	7	6	8	7
	CM	10	7	6	7	8	4	8	8
	CMcC	11	8	5	8	3	3	8	3
Bear Mountain Link	CD	12	7	4	8	4	5	5	2
	RJ	10	5	8	10	5	5	4	5
	JG	10	8	4	7	2	6	6	5
	CM	8	5	5	6	3	3	7	3
	CMcC	12	8	5	8	3	8	7	3
Bear Canyon Creek (density transfer)	CD	3	3	1	6	2	6	2	5
	RJ	8	5	9	10	3	3	3	2
	JG	5	10	2	5	3	6	8	5
	CM	8	5	2	5	2	3	6	3
	CMcC	9	5	1	9	2	1	7	1
Boulder Creek from 75th East	CD	6	5	5	4	3	5	6	8
	RJ	14	9	5	8	7	7	8	5
	JG	10	9	4	8	5	6	7	6
	CM	6	4	8	5	3	3	6	3
	CMcC	10	8	5	7	3	2	7	3

Appendix 2 (Continued)

Overall Judgments and Ratings on General

Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection the Environment	Availability
White Rock Ditch (density transfer)	CD	8	3	1	5	2	4	2	5
	RJ	10	6	6	8	5	5	3	5
	JG	6	5	2	7	2	3	5	5
	CM	6	4	5	4	3	3	5	3
	CMcC	9	5	1	9	2	1	7	1
Farmer's Ditch, including the environmental corridor to Six Mile Reservoir on the East and the environmental corridor to Mesa Reservoir to the West	CD	4	3	1	5	2	4	2	5
	RJ	10	5	5	8	5	3	2	5
	JG	4	7	5	2	5	4	4	5
	CM	6	3	5	7	3	3	6	3
	CMcC	9	7	5	6	2	2	2	2
Four Mile Creek to Diagonal (density transfer)	CD	3	3	1	5	2	4	2	5
	RJ	10	7	7	7	5	5	5	5
	JG	13	8	4	8	4	7	8	5
	CM	6	5	2	5	3	3	6	3
	CMcC	8	6	2	5	1	2	6	2
Four Mile Creek from Diagonal East	CD	3	3	1	5	2	4	2	5
	RJ	10	7	7	7	5	5	5	5
	JG	13	8	4	8	9	7	8	8
	CM	4	5	5	4	3	3	6	3
	CMcC	8	6	2	5	1	2	6	2

Appendix 2 (Continued)

Overall Judgments and Ratings on General
Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Mesa Reservoir Area	CD	6	4	4	5	3	6	3	6
	RJ	14	7	2	7	5	7	5	10
	JG	10	7	5	6	5	5	5	5
	CM	8	6	3	6	3	6	6	3
	CMcC	10	6	5	4	2	5	7	3
Wonderland Creek (density transfer)	CD	2	3	1	5	4	5	2	5
	RJ	10	5	7	8	5	5	4	5
	JG	10	8	2	9	2	6	7	5
	CM	6	4	2	6	3	3	6	3
	CMcC	8	7	1	6	1	2	5	2
South Boulder Canyon Ditch (density transfer)	CD	3	3	1	4	2	3	2	5
	RJ	8	-	-	-	-	-	-	-
	JG	11	6	2	7	2	4	5	5
	CM	6	4	2	4	3	3	6	3
	CMcC	8	7	1	6	1	2	5	2
Fieles Lake Outfall (density transfer)	CD	2	3	1	5	2	6	1	5
	RJ	7	5	9	9	2	3	2	2
	JG	8	4	2	9	2	8	5	7
	CM	6	6	3	6	3	3	6	3
	CMcC	6	4	1	4	2	1	5	2

Appendix 2 (continued)

Overall Judgments and Ratings on General

Factors for each Board Member

Land Category	Board Member	Overall Judgment	General Factors						
			Aesthetics	Cost	Location	Need for Action	Use Potential	Protection of the Environment	Availability
Wellman Canal (density transfer)	CD	3	3	1	5	2	6	2	5
	RJ	8	-	-	-	-	-	-	-
	JG	9	5	2	9	2	8	6	5
	CM	8	4	3	6	3	8	4	3
	CMcC	7	8	1	5	1	1	5	2
White Rocks Natural Area	CD	12	7	4	5	4	4	8	5
	RJ	7	8	8	1	1	1	10	2
	JG	14	10	2	3	3	8	10	5
	CM	8	8	8	4	3	4	8	3
	CMcC	10	8	5	8	2	2	6	1