Protection of Aquatic and Riparian Habitat on Private Land

Evaluating the Effectiveness of Covenants in the City of Surrey, 1995

Prepared for:

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FOREWORD

This study surveyed the effectiveness of Section 215 covenants for protecting fish habitat in two municipalities in the lower mainland – the City of Surrey and the District of Maple Ridge. The City of Surrey initiated the study, and jointly funded it with the Department of Fisheries and Oceans' Fraser River Action Plan (FRAP). The City of Surrey and the District of Maple Ridge both contributed staff support for the project, with FRAP providing project management. This study contributes to a larger series of studies and initiatives of senior and local governments to protect streams in urban areas more effectively.

The City of Surrey, the District of Maple Ridge, and the Fraser River Action Plan undertook this review in response to indications that covenants were not effectively complied with for protecting fish habitat. Government agencies have also been concerned about the effectiveness of covenants since they are the primary tool used to protect urban riparian areas. This study systematically evaluates covenant compliance and the rate of encroachment for six sites in Surrey, and six sites in Maple Ridge

This document consists of the following components:

- Fish habitat protection - Links land use with protection of fish habitat, reviewing the functions of riparian areas as key elements of fish habitat.
- Background on covenants - Outlines a chronology of development of covenants, and describes how covenants are applied to protect environmentally sensitive areas, such as riparian areas.
- Covenant compliance description - Discusses covenant compliance, including location of covenants in relation to top of bank; describes, and illustrates through colour photographs, examples of encroachments, from minor to major.
- Results of field and resident surveys - Provides a systematic evaluation of the effectiveness of covenants to protect fish habitat in six streams in the City of Surrey, as well as tabular results of a field survey of six streams in the District of Maple Ridge.
- Evaluation of covenant use - Presents and discusses the findings of the study; includes recommendations for improving protection of fish habitat in urban areas.

This document can be informative and useful for municipalities across B.C. when considering how best to protect urban fish habitat. The results of this study can assist municipalities in assessing the usefulness of covenants as a tool for protecting fish habitat, and in considering alternatives.

This study was conducted by consultants Susan Inglis, Patty Thomas, and Emma Child, with review by Melody Farrell and Fern Hietkamp of FRAP. For more information, please contact Fern Hietkamp at 666-2044.

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ABSTRACT

This project systematically evaluated, through site and resident surveys, the viability of Section 215 covenants to protect the fish habitat of six streams in the City of Surrey. This study found that the overall frequency of encroachment for the covenanted properties was high at 75%, even though 96% of the responsible parties claimed to be concerned about stream habitat. There was no significant difference ($p \leq 0.05$) in percent encroachment between those properties with covenants and those without. Hyland Creek had the highest encroachment (88%) of the six creeks studied, while Bear Creek had the lowest (0%). Based on the preliminary results of this study, fences (required by MELP) along the covenant boundary were found to be effective in decreasing encroachment in the areas surveyed (n=28). The findings of this study indicate that Section 215 covenants alone are not effective in protecting fish habitat in this municipality under the current management regime. Lack of enforcement and resident knowledge of the conditions attached to the covenants provide partial explanations for their failure. This study recommends that alternative approaches be explored, focusing on land use planning, legal tools, financial tools, voluntary stream stewardship, and awareness-building.

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1.0 INTRODUCTION

1.1 URBAN STREAMS

In the face of rapid urbanization in the lower mainland of British Columbia, environmental protection of fish habitat is becoming increasingly important. Native salmonids, once abundant and widely distributed, have declined sharply in numbers and in diversity of genetic types. One of the major contributing factors to this decline is the destruction of the quality and quantity of freshwater habitat (Nehlsen ***et al***. 1991).

Riparian habitat is the area adjacent to rivers or streams that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. This habitat directly and profoundly influences the instream habitat of fish and is essential to fish. It controls stream temperature; purifies, stores and conserves water; stabilizes stream channels; provides nutrient and food input to the aquatic system; and, through downed woody debris, increases stream complexity by creating structures such as pools that offer deep, low velocity, protected waters for refuge and cover, overwintering habitat and juvenile rearing areas. Destruction of the hydrological and vegetative qualities of aquatic and riparian habitats by urbanization is often complete and irreparable.

Fish-bearing rivers and streams that flow through heavily developed areas rarely resemble their natural form. Fish habitat can be negatively affected from activities that occur during the land development process and subsequently by residents. During the land development process streams are replaced with drainpipes and culverts, riparian areas are stripped, and municipal wastes contribute pollutants and sediments to the water. Sediments deposited into a creek can reduce water quality and bury gravel substrate required by salmonids. When landowners remove or alter the stream's riparian vegetation, important habitat that fish use during all stages of their life cycle is destroyed.

The tool commonly used by government to protect these riparian areas on private land is covenants. The effectiveness of covenants as a tool to protect streams on privately-owned lands is increasingly being questioned by senior and local government and citizens alike. These concerns range from that of enforcement, to security and liability, to the use of fencing. This report evaluates “section 215” covenants as a stream protection tool, and as part of the government’s ongoing process of planning and evaluating urban stream stewardship programs. This is done using a case study of covenants in the City of Surrey.

1.2 BACKGROUND ON COVENANTS

Prior to 1978, covenants were held under common law but were not designed to protect environmentally sensitive areas. In 1978 “section 215” covenants were created under section 215 of the ***Land Title Act*** (S.B.C., 1978, c. 25). Now, common law covenants are an agreement between adjacent private landowners, whereas

s.215 covenants are an agreement between a private landowner and the Crown or a Crown corporation or agency, a municipality or a regional district, or a local trust committee under the ***Islands Trust Act.*** Recent changes to this section of the ***Land Title Act*** (1994) have expanded the group of eligible covenant holders to include designated non-governmental organizations, and this opportunity is now being actively explored by NGOs throughout the province. These are being termed "conservation covenants" and are not the subject of this report. Refer to Appendix 1 for a complete legal chronology of s.215 covenants.

Although they have other environmental and non-environmental uses, the s.215 covenants examined in this study are specifically used to protect fish habitat on privately owned land. These “fish and wildlife” covenants are a written agreement between a landowner (the covenantor) and the Ministry of Environment, Lands and Parks (the covenantee) in which the covenantor agrees not to alter the riparian portion of her or his property covered by the covenant. In the City of Surrey, covenant documents must be signed by both parties before land is approved for subdivision.

The exact wording and restrictions found in covenant documents varies depending on the municipality, the geography of the site, and the year that the covenant was signed. Included in Appendix 2 is an example of Surrey's covenant documents. Most of the sites surveyed in Surrey for this case study have a combination of a buffer zone dedicated to local government for conservation purposes and a covenant, as illustrated in Figure 1. The creek itself up to the covenant boundary is public land which, in the areas studied in this report, corresponds to the top of bank. The definition of top of bank, as discussed in section 2.2, is based on significant breaks in slope. Therefore, the location of the top of bank (which is also the streamside boundary of the covenant) varies according to the topography of an area. The covenanted areas in the Surrey example of this report extend 5 metres back from the top of bank (i.e. from the public area). This covenanted area is referred to as the riparian area of the lot. Also, houses are set back, according to local government setback conditions, at least an additional 5 metres from the outer covenant boundary. Since 1992, covenanted areas have the following fencing requirement, set by the Ministry of Environment, Lands and Parks, to protect sensitive fish and wildlife habitat:

> A permanent fence must be constructed at the covenant boundary between the development area and the covenant area prior to the start of site development. . . The fence must be constructed of chain link or cedar, be a minimum of 1.2 meters in height and be posted with small metal signs indicating the area is protected by a section 215 covenant, for preservation of sensitive fish and wildlife habitat. Pedestrian gate access is permitted provided the gateway is no more than 60 cm (24 inches) in width.

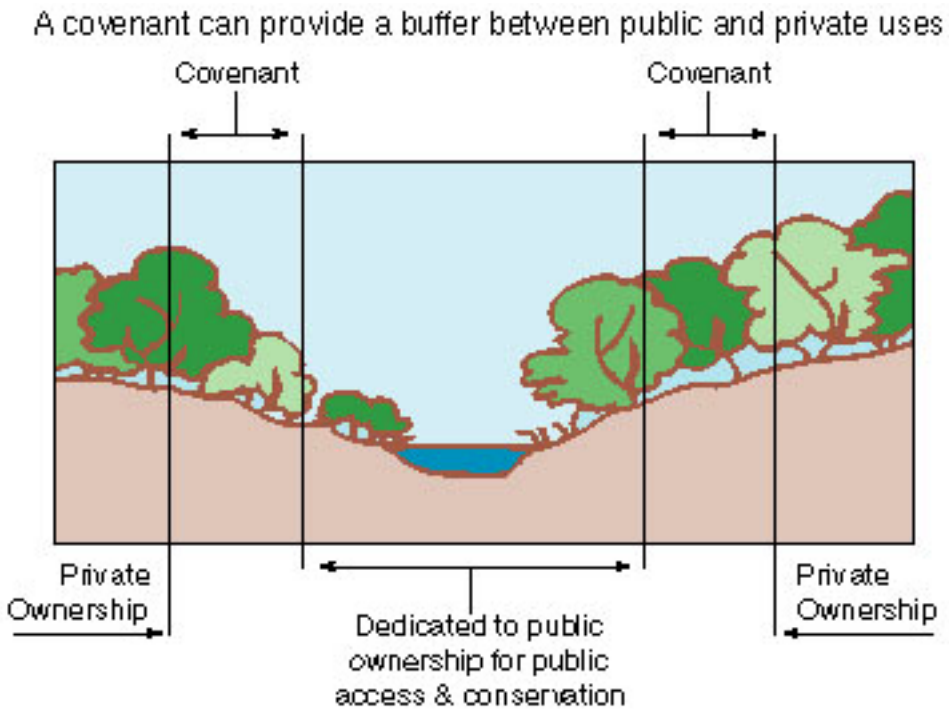

Figure 1: Land tenure option used by the City of Surrey (from Department of Fisheries and Oceans et al., ***Stream Stewardship Guide*** 1994)

Covenants have some attractive features for developers, homeowners, and governments. While the provisions of a covenant prohibit construction within a covenant area, developers can use the land covered by a covenant to calculate the building envelope size. This ensures there is no reduction in the size of the buildings that can be constructed on the lots, while protecting the riparian area of the lots. The area of a lot covered by a covenant remains private property and does not permit public trespass. Since a covenant restricts what homeowners can do on a portion of their land, it may lower the assessed value of the property and lead to lower property taxes. According the B.C. Assessment Authority (BCAA), fish and wildlife covenants along a stream will affect the property's assessment if it has a "direct effect on the market" (R. Miller, BCAA, pers. comm.). The effect of the covenants on the assessed value of the land is more readily determined during the development stage according to how many lots (in the case of single-family residential) or how many units (in the case of multi-family residential) are achievable with the restrictions of covenants. With private single-family subdivided lots in Surrey, assessments of property with covenants are dealt with on a case-by-case basis, and often in response to individual landowners' requests (R. Miller, BCAA, pers. comm.). Covenants can also

be a low cost way for governments to preserve fish habitat, in that, when successful, habitat can be protected by a covenant without being purchased outright or maintained by the government.

On a final note, the terminology involving s.215 covenants can be confusing. Section 215 covenants are often generically referred to as "restrictive covenants". While this term is descriptively correct for the s.215 covenants studied in this report, it fails to take into account that s.215 covenants can also be "positive" in nature. In addition, common-law covenants (agreements made between two private landowners) are also known as "restrictive covenants." Therefore, to avoid confusion, this report uses the term covenant to refer to s.215 covenants. Another confusing situation arises when comparing British Columbian terms to those used in the United States. The covenants studied in this report are similar to conservation easements used in the United States. The non-governmental organizations (NGOs) that hold these conservation easements in the USA often refer to themselves as "Land Trust" groups (see Loukidelis 1992). Land Trusts are also found in British Columbia, but they may or may not hold s.215 covenants. As previously noted, the new changes to the Land Title Act allowing designated NGOs to hold these covenants are being termed "conservation covenants", and it is these that are directly comparable to the U.S. conservation easements.

2.0 METHODS

2.1 STUDY AREA

The study area included six creeks within the City of Surrey (Figure 2). Surrey is the lower mainland's largest and Canada's fastest growing municipality. It is bounded by the Fraser River to the north, Delta to the west, Langley to the east, and White Rock, Semiahmoo Bay, and the U.S. boundary to the south. Surrey is drained by three major river systems: the Serpentine, the Little Campbell, and the Nicomekl. The six creeks studied in this report are tributaries of the Serpentine River, which drains into Boundary Bay. This watershed (the Serpentine and its tributaries) supports runs of coho, chinook, cutthroat, steelhead, rainbow trout, three-spine stickleback, prickly sculpin, and western brook lamprey. In total, approximately 5.2 kilometers of creeks were surveyed.

Site 1 is known as Unnamed Creek "C". This area is located on the west side of Brookside subdivision, from the power line crossing at 140th Street and 84th Avenue, north to 88th Avenue. Approximately 875 metres of this creek was surveyed. The subdivision consists of new (circa 1990), large houses on single family lots.

The second site surveyed was Enver Creek. Site 2 consisted of an area from the power line crossing at 84th Avenue, through Brookside, to 92nd Avenue. Approximately 1.6 kilometers of this creek was surveyed. This site contains a mixture of privately owned homes, built in the 1980s.

Site 3 included two unnamed creeks, referred to as East Creek and West Creek. Sites 1, 2, and 3 are in close proximity to each other. The area surveyed began at the confluence of the two creeks at approximately 85th Avenue and extended up to 88th Avenue. Six hundred and fifty metres of East Creek and 575 metres of West Creek were surveyed. This site contains a mixture of old and new single family homes interspersed with hobby farms.

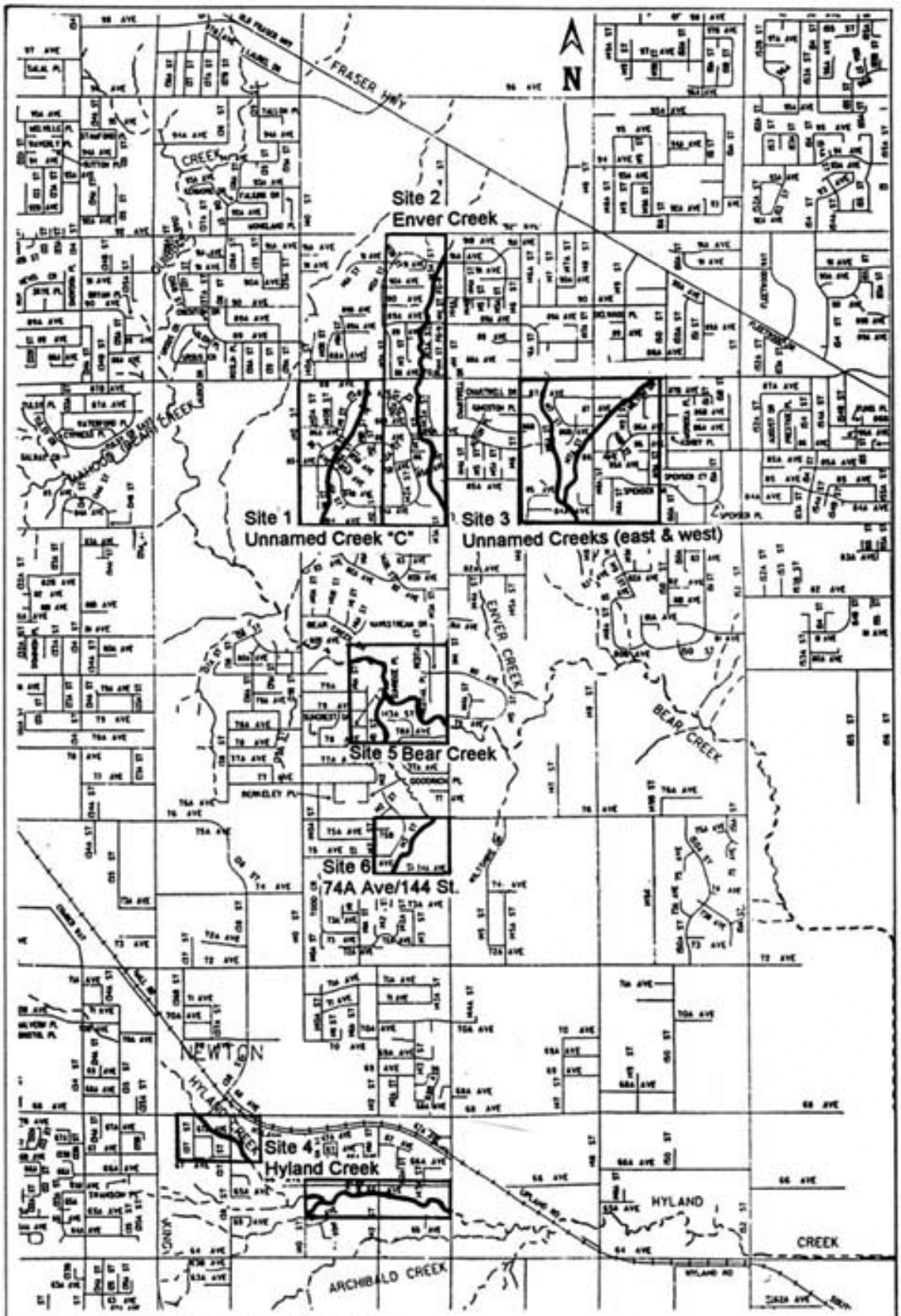

Figure 2: Survey site locations, City of Surrey

Site 4, Hyland Creek, is bounded by King George Highway to the west, 144th Street to the east, 68th Avenue to the north, and 64th Avenue to the south. The surveyed creek length was 1.15 kilometres. This site contains a mixture of hobby farms, large undivided parcels of land, and new subdivisions.

At site 5, Bear Creek, 300 meters were surveyed next to a recently built subdivision known as the Hawkstream. Three of the thirteen lots in this early-1990 subdivision were undeveloped.

Site 6 is known as project number 7891-0602-00. It is located off 74A Avenue and 144th Street. Fifty metres of creek were surveyed at this site. The subdivision was built in 1991 and is surrounded by large tracts of undeveloped land to the northeast and southeast.

2.2 COVENANT COMPLIANCE

Information on Surrey's covenants were obtained from several sources. Some covenants were found through examining subdivision, engineering, and explanatory maps at Surrey's city hall. Additional covenants were located, and existing covenants verified, using Ministry of Environment, Lands and Parks (MELP) maps. If these two sources failed to provide the necessary information for a property, selective title searches were conducted through the Land Title Office using the following approach. If a subdivision contained sequential numbering, only one title per sequence was searched. If sequential numbering was not evident in a subdivision, as many title searches as financially possible were done. In this scenario, the number of title searches was minimized through careful analysis of subdivision layouts.

Sites were surveyed during the months of February and March 1995, and each homeowner's compliance with their covenant was recorded. The top of bank (TOB) was first identified, and 5 meters was measured back towards the homeowner's property. The type and amount (meters) of encroachment into this covenant area was then measured and noted. Notes identified MELP-required fences on the covenant lines, their structure, position and presence of a sign. Properties that were inaccessible due to thick barriers of blackberry bushes were excluded from the data base. During the survey, brief, random evaluations of the stream's health were made.

There were some difficulties encountered in identifying the covenant areas. In some instances, the areas were identified by the presence of property pegs. Unfortunately, few properties had pegs in place and in some sites it was evident that these pegs had been moved. If pegs were not in place, the original TOB was identified by the age and type of vegetation present and the stream bank gradient. However, some sites had been landscaped with fill, thereby disguising the original TOB. In these cases, the covenant boundaries were estimated based on experience (accounting for such aspects as gradient and vegetation age and changes in

character) and by measuring from the high water mark of the creek. Budgetary constraints did not allow for legal survey of top of bank and property and covenant boundaries.

The encroachments were classified, statistically designated, and mapped as follows:

- No encroachment:
  designated numerical value of "0"
  mapped green

- Minor encroachment:
  designated numerical value of "1"
  mapped yellow

- Moderate encroachment:
  designated numerical value of "2"
  mapped orange

- Major encroachment:
  designated numerical value of "3"
  mapped red

The encroachment classification system was based on three considerations. First was the impact of the encroachment on the riparian zone. Second was how difficult it would be to remove the encroachment and return the area to its natural state. Third, the different types of encroachments into the covenant area were considered, viewing these encroachments as cumulative. Thus, for example, several moderate encroachments would elevate the classification to a major encroachment.

Example of a property with **no** encroachment.

Example of a property with a **minor** encroachment (cleared to top of bank).

Example of a property with a moderate encroachment.

Example of a property with a major encroachment.

Numerous types of encroachments were found during the covenant compliance survey. Photographs were taken at sites to illustrate examples of each encroachment classification. Examples of these are shown in Figure 3. An example of a very common minor encroachment was a mowed lawn to the TOB. Moderate encroachments ranged from a fence erected at the TOB (the homeowner thereby claiming the covenant area as backyard property), to a shed built at the TOB, to landscaped and removed vegetation past the TOB. Major encroachments included landscaping and/or building structures to the creek, the placement of landfill and/or retaining walls past the TOB, and the release of household effluents into the creek. Retaining walls, although a more solid and pervasive structure than a fence, were given a moderate encroachment classification if the retaining wall was set back far enough to not impede the natural meander of the creek and allow natural vegetation to grow at the stream bank. Also, in some circumstances where houses were built near the TOB with a steep gradient to the creek, these retaining walls were actually protecting the stream from potentially serious sediment loads due to erosion. In difficult and unclear cases, the experience and best judgment of the authors were used to classify a site.

The following example illustrates how the above encroachment classification system was applied. The survey of Lot 12 of "Unnamed Creek C" revealed that the occupants had:

- cleared to TOB
- done some burning on site
- cut down some trees in the covenant area

Clearing to TOB, the small area used for burning bush, and the removal of a few trees were each classified as minor encroachments, assuming that this vegetation could readily grow back and licenses were obtained to remove the trees. The cumulative effect of these minor encroachments led to a final classification of "moderate", the site was mapped as an orange area, and was given a numerical rating of "2" for the purpose of statistical analysis.

To present an overall picture of each of the six sites surveyed, the data was statistically analyzed using weighted means and t-tests (Zar 1984). The following severity index was used to classify the weighted average of the encroachment classes (0, 1, 2, or 3) obtained for each creek site (data was weighted due to different sample sizes):

- >2 (Poor)
- 1.5-2.0 (Marginal)
- 1-1.5 (Acceptable)
- 0-1 (Good)

The summary for each site included information on the presence or absence of a covenant, encroachment types and classifications, severity index, and general creek health.

2.3 RESIDENT SURVEY

To assess the residents' knowledge and attitude toward covenants, a 'door to door' survey of the study area was conducted. Additional questions were posed to residents in sites 5 and 6 who had fencing along their covenant boundary. In order to determine relationships between compliance and knowledge, survey results were statistically analyzed by weighting the means and applying a t-test.

Hyland Creek was excluded from the resident survey because these residents received a letter explaining the study (Appendix 4) before the 'door to door' survey occurred, and were hence more informed than their cohorts about their covenants before being interviewed. It was necessary to deliver these explanatory letters at this site due to some residents denying the field investigators access to their covenanted property.

2.4 ADDITIONAL STUDY AREA

A study following the same methodology was also conducted in the District of Maple Ridge. The study included five sites totaling approximately 8.2 kilometres in length, all tributaries of the Fraser River: McKinney Creek, Coho Creek, Whispering Falls subdivision, Kanaka Creek, and two Unnamed Creeks. The number of lots surveyed totaled 206. The results from this study area are reported in Appendix 6, in tables corresponding to the Surrey results presented in the main body of this document. A resident survey was not conducted in Maple Ridge.

3.0 RESULTS

3.1 COVENANT COMPLIANCE

In total, 261 lots were surveyed, including lots with covenants and those without. Looking at all lots with and without covenants, the level of encroachment into the 5 metre area from the top of bank was high at 74%. The most common extent of encroachment was a moderate one, accounting for 34% of the lots surveyed. The least common type of encroachment encountered was a major one, and over half of all lots surveyed either had no or minor encroachments.

Table 1: Percent encroachment of all lots surveyed

Encroachment Classification	% of lots (n=261)
none	26
minor	26
moderate	34
major	14
Percent Total Riparian Encroachment	**74**

Of the 261 lots surveyed, 185 or 71% had covenants. The frequency of encroachment into these covenanted areas was 75%. Similar to the findings for all surveyed lots, the most commonly occurring encroachments were moderate and the least common were major.

Table 2: Percent encroachment of all lots with covenants

Encroachment Classification	% of lots (n=185)
none	25
minor	25
moderate	35
major	15
Percent Total Covenant Encroachment	**75**

Of the 261 lots surveyed, 29% did not have covenants. These lots without covenants were sited outside the 5 metre area from the top of bank, subdivided before covenants came into use (circa 1978), or were not yet subdivided (e.g. hobby farms). There was no significant difference ($p \leq 0.05$) between those properties with covenants in place and those without, with respect to both percent encroachment and severity.

Table 3: Percent encroachment of all lots without covenants

Encroachment Classification	% of lots (n=76)
none	30
minor	29
moderate	30
major	11
% Total Non-Covenant Encroachment	**70**

The overall situation for all lots surveyed is summarized in Table 4. The overall severity index for all the sites surveyed was 1.4 (Acceptable). Enver Creek had the highest severity rating at 2.3 (Poor) and the second highest frequency of encroachment (80%), indicating that it had the highest percentage of moderate and major encroachments of the six creek sites surveyed. The northern portion of this creek requires attention to restore it to a healthy state. Site 4 (Hyland Creek) had the second highest severity index at 1.7 (Marginal). As with site 2 (Enver Creek), human encroachments along Hyland Creek have detrimentally affected this stream's health. Site 5 (Bear Creek) was the only site with no encroachments (n=6).

Table 4: Summary of site encroachment frequencies, severity indices, and general stream health

Creek	%Encroach-ment	Severity index	General stream health
Site 1 Unnamed creek "C"	71% (n=63)	1.1 Acceptable	The southern portion of the creek was in fairly good condition with good flow, gravel substrate, and adequate instream and overstream cover. Heading upstream, however, water quality decreased as channel containment was lost, resulting in increased sediment in the creek. In this section, dams made by children had decreased the flow.
Site 2 Enver Creek	80% (n=81)	2.3 Poor	The southern portion of the creek contains adequate cover and a substrate dominantly composed of sand, silt, with only a small amount of gravel. The northern end of this creek was in poor health with stream containment lost, aquatic vegetation and excessive amounts of organic debris 'choking' what remains of the channel, and garbage found in and around the creek.
Site 3 Two unnamed creeks	75% (n=55)	1.3 Acceptable	These creeks contained very good fish habitat with plenty of cover and a substrate composed of small and large gravel, cobbles, boulders and a small percentage of sand. Unfortunately, household effluents in the form of detergents were observed draining into the creek from a storm sewer on East creek.
Site 4 Hyland Creek	88% (n=43)	1.7 Marginal	Hyland Creek contained good in-stream fish habitat with a substrate composed of small and large gravel, cobbles, boulders and a small amount of sand. However, this creek lacked overstream cover.
Site 5 Bear Creek	0% (n=13)	0 Good	Bear Creek had adequate instream and overstream cover but was quite turbid.
Site 6 74A Ave./144th St.	33% (n=6)	0.33 Good	This tributary to Bear Creek contained good fish habitat with plenty of instream and overstream cover with a small amount of silt over a gravel substrate.
OVERALL	**74% (n=261)**	**1.4 Acceptable**	

The detailed results for each of the six creek sites surveyed are found in Appendix 5 and summarized below by site in the following manner:

Site 1 (unnamed creek "C").....Table 5 and Figure 4
Site 2 (Enver Creek).....Table 6 and Figure 4
Site 3 (two unnamed east and west creeks).....Table 7 and Figure 5
Site 4 (Hyland Creek).....Table 8 and Figure 6
Site 5 (Bear Creek).....Table 9 and Figure 7
Site 6 (74A Ave./144th St.).....Table 10 and Figure 7

3.1.1 Site 1 (Unnamed Creek "C")

Fifty-six of the 63 properties surveyed in site 1 had covenants. The frequency of encroachment for lots with covenants was relatively high at 75%. However, at this site the most common type of encroachment was "minor", found in 43% of the lots surveyed.

Although the sample is small (n=7), the lots without covenants had a lower percent encroachment (43%) than the lots with covenants. The lots without covenants had their property lines outside the 5 metre leave area. However, two lots had fences at the TOB (moderate encroachments) and one homeowner had mowed to the TOB (a minor encroachment).

Site 1 had generally minor or no encroachments, and a severity index of 1.1 (Acceptable), giving it the third lowest rating of the six sites studied. Its stream health was generally also good. The southern portion of the creek had good flow, gravel substrate, and adequate instream and overstream cover. Upstream of this, however, water quality decreased as channel containment was lost, resulting in increased siltation of the creek. In this section, dams had decreased the flow.

Table 5: Summary of site 1 (unnamed creek "C")

Encroachment Classification	% lots with covenants (n=56)	% lots without covenants (n=7)
none	25	57
minor	43	14
moderate	18	29
major	14	0
% Overall Encroachment	**75**	**43**

Severity Index: 1.1

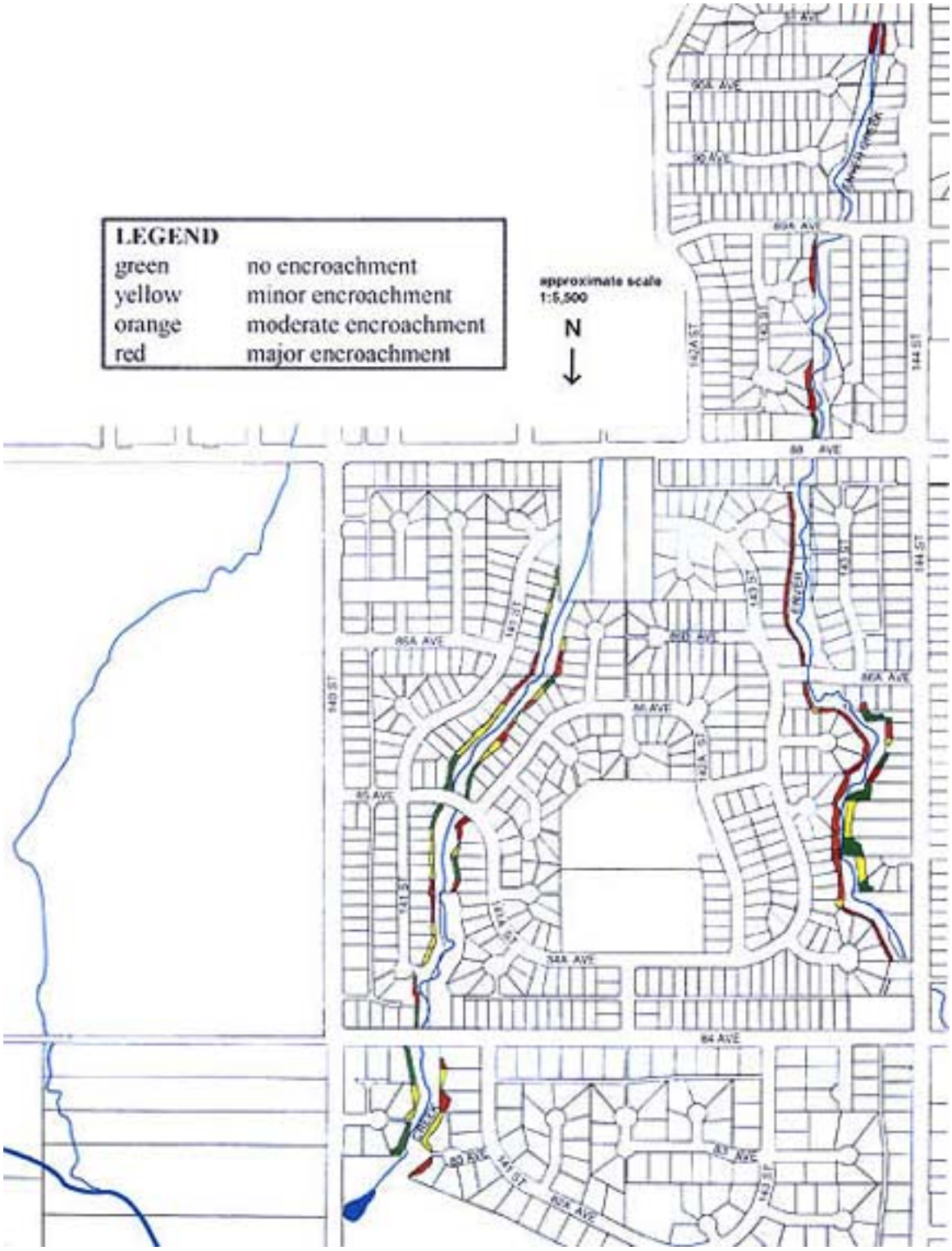

Figure 4: Map of a covenant compliance for Site 1 (unnamed creek C) and Site 2 (Enver Creek).

3.1.2 Site 2 (Enver Creek)

Site 2 had the second highest frequency of encroachment (80%) of all the six sites surveyed. There was no significant difference ($p \leq 0.05$) between those properties with covenants and those without. This site had many major encroachments, including household effluents entering the creek, garbage strewn through the riparian zone, and landscaping to the creek. In one example, the owner's intentions were good, but they lacked knowledge about the importance of riparian vegetation. Their landscaping efforts channelized and modified the flow of the creek, and downstream the creek had lost containment and developed an enlarged flood plain. In another example, a landowner had stabilized the creek bank with cobbles and then built a 1.5 meter retaining wall 1.1 meters from the creek. In addition, this homeowner appeared to be working on a hot tub site at the creek side.

Enver Creek had the highest severity index (2.3) of the six sites surveyed. The southern portion of this creek provides only marginal fish habitat with adequate cover and a substrate of sand, silt, and only a small amount of gravel. It is no surprise that the northern end of this creek was in poor health, considering the many moderate and major encroachments occurring in this section. In this area, the stream lost containment and was choked with aquatic vegetation and excessive amounts of organic debris.

Table 6: Summary of site 2 (Enver Creek)

Encroachment Classification	% lots with covenants (n=53)	% lots without covenants (n=28)
none	11	36
minor	17	21
moderate	53	32
major	19	11
% Overall Encroachment	**89**	**64**

Severity Index=2.3

3.1.3 Site 3 (Two Unnamed Creeks - East and West Creeks)

Site 3 had an overall encroachment frequency of 75%. However, when statistically analyzed, no significant difference ($p \leq 0.05$) was found between those properties in the

Figure 5: Map of covenant compliance for Site 3 (two unnamed east and west creeks).

East Creek with covenants in place and those without. The sample size for West Creek was too small to statistically analyze. This site had the least percentage of covenanted lots, indicative of some pre-1978 subdivisions. Despite this, the results show a severity index of 1.3. As with site 1, some of the encroachments in lots without covenants appear to be cases of trespassing onto parkland.

Despite a high percentage of encroachment, these creeks contained very good fish habitat with plenty of cover and a substrate composed of small and large gravel, cobbles, boulders and a small percentage of sand. However, detergent effluents were observed draining into East Creek from a storm sewer.

Table 7. Summary of site 3 (two unnamed East and West Creeks)
A) East Creek

Encroachment Classification	% lots with covenants (n=11)	% lots without covenants (n=14)
none	27	14
minor	18	43
moderate	36	36
major	18	7
% Overall Encroachment	**73**	**86**

Severity Index=1.3

B) West Creek

Encroachment Classification	% lots with covenants (n=3)	% lots without covenants (n=27)
none	67	26
minor	33	30
moderate	0	30
major	0	15
% Overall Encroachment	**33**	**74**

3.1.4 Site 4 (Hyland Creek)

Site 4 had the highest overall frequency of encroachment (88%) of the six sites surveyed. For this site, only lots with covenants were surveyed. The many small farms (without covenants) found in this site were not surveyed due to concerns about trespassing as well as for logistical reasons.

The severity index for this particular creek was 1.7 (Marginal), the second highest of the six sites surveyed. Contributing to this high degree of encroachment were

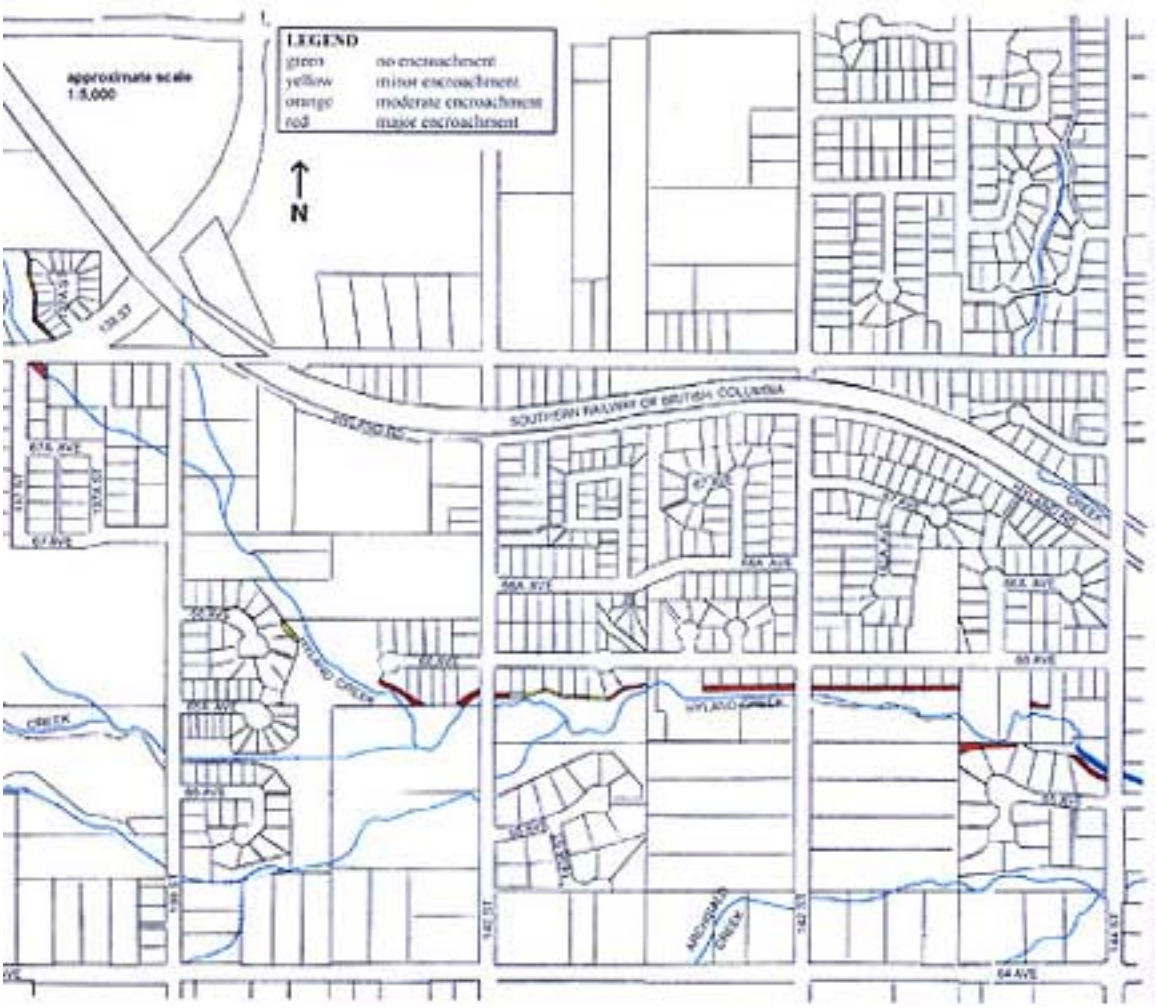

Figure 6: Map of covenant compliance for Site 4 (Hyland Creek).

homeowners who removed all of their riparian vegetation to install fences at the top of the creek. In another example, homeowners were burning debris on their cleared creek bank. One newer subdivision in this site had nine houses with covenant fencing in place. One of the homeowners in this subdivision had removed the fencing, landscaped to the TOB, and built a shed within the covenanted area. Others were using the area outside the fence for storage. However, despite these violations, this particular subdivision had a much lower frequency of encroachment (55%) than the remainder of the site (91%).

Although this site lacked overstream cover, it contained good fish habitat with a substrate composed of small and large gravel, cobbles, boulders and a small amount of sand.

Table 8: Summary of site 4 (Hyland Creek)

Encroachment Classification	% lots with covenants (n=34)	% lots with covenants and covenant fencing (n=9)
none	3	44
minor	18	33
moderate	59	11
major	21	11
% Overall Encroachment	**91**	**55**

Severity Index=1.7

3.1.5 Site 5 (Bear Creek)

The Hawkstream is a new subdivision of 13 lots next to Bear Creek. Three of the thirteen lots surveyed were undeveloped at the time of the survey. Since it had been subdivided in 1992, all lots had covenants as well as 1.2 meter high cedar fences in place along the covenant boundary. This site had no encroachment and a severity index of "0" (Good), the best results of the six sites surveyed.

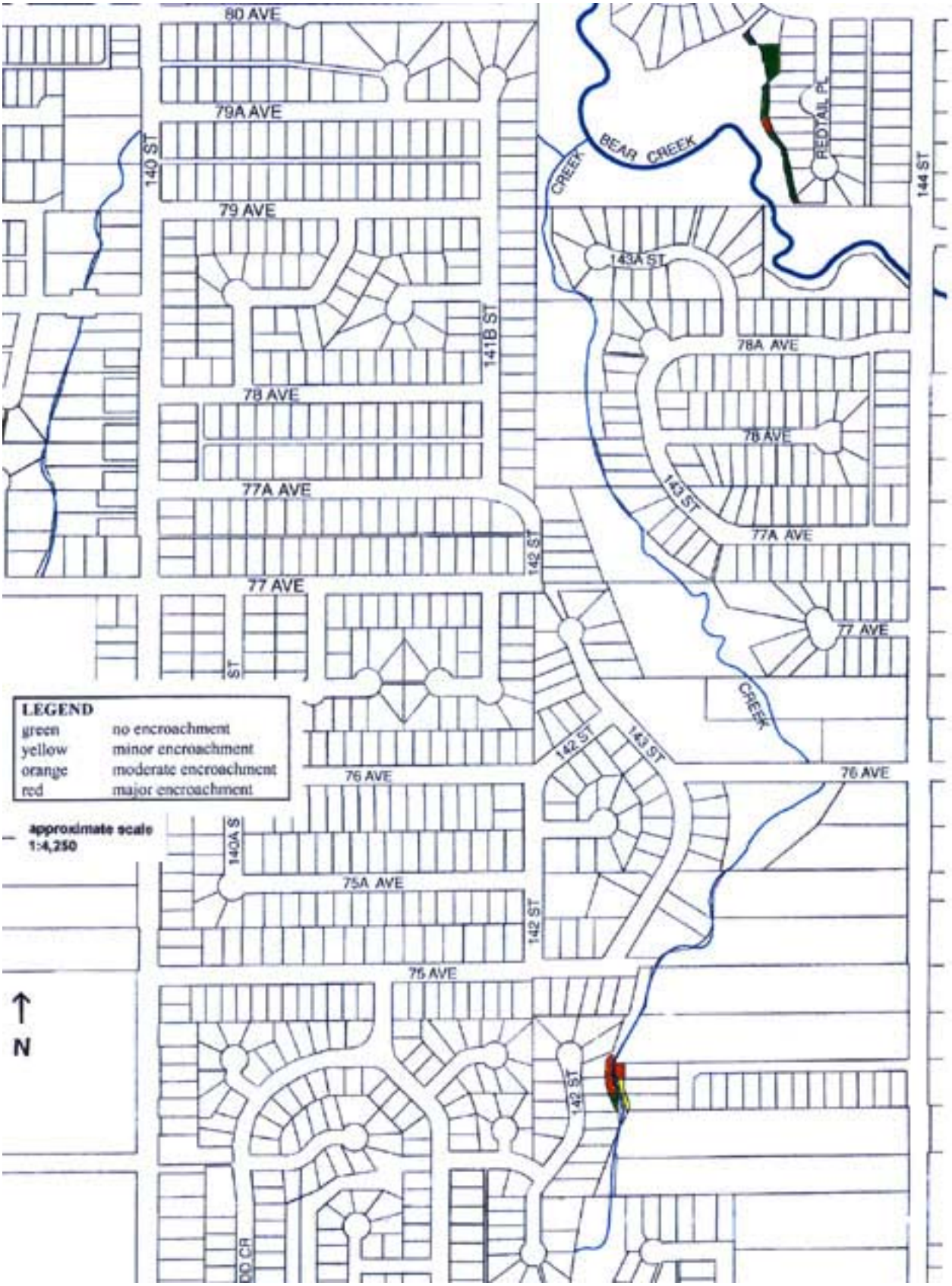

Figure 7: Map of covenant compliance for Site 5 (Bear Creek) and Site 6 (74Aave./144th St.)

In terms of fish habitat, this section of Bear Creek contained plenty of instream and overstream cover. It had a silt substrate and was quite turbid at the time of assessment.

Table 9: Summary of site 5 (Bear Creek)

Encroachment Classification	% lots with covenants and covenant fencing (n=13)
none	100
minor	0
moderate	0
major	0
% Overall Encroachment	**0**

Severity Index=0

3.1.6 Site 6 (74A Ave./144th St.)

Site 6 was similar to site 5 (Bear Creek) in that all 6 lots surveyed had fencing in place along the covenant boundary. This site also had signs on the fences indicating that the area was sensitive fish habitat protected by a Section 215 covenant. This site had a low frequency of encroachment (33%) and a severity index of 0.33 (Good). Two homeowners had encroached to a "minor" degree into the covenant area; one was using it for storage and another appeared to be using the area for garbage disposal.

This tributary to Bear Creek contained good fish habitat with plenty of instream and overstream cover with a small amount of silt over a gravel substrate.

Table 10. Summary of site 6 (74A Ave./144th St.)

Encroachment Classification	% lots with covenants and fencing (n=6)
none	67
minor	33
moderate	0
major	0
% Overall Encroachment	**33**

Severity Index=0.33

3.2 RESIDENT SURVEY

Homeowners were surveyed to determine levels of knowledge regarding their covenants (see Appendix 4 for copy of questionnaire). Table 11 summarizes how many residents with covenants were interviewed for the 5 areas surveyed. Table 12 summarizes residents' responses to the questionnaire for all of the study areas. For a further breakdown of responses by study area, refer to Appendix 5. The responses of those residents having fences on their covenant line are given in Table 13.

Table 11. Numbers of residents interviewed

Study site	Number of properties with covenants	Number of residents interviewed	% of residents interviewed
1 Unnamed "C"	56	29	52
2 Enver Creek	53	30	57
3 Two unnamed creeks (E & W)	East -11 West -3	East -9 West -3	East -82 West -100
5 Bear Creek	13 (with covenant fences)	4	31
6 74 A Ave. /144 St.	6 (with covenant fences & signs)	5	83
Overall	**142**	**80**	**56**

Overall, residents' response rates to the survey were acceptable at 56% (T. Kam, United Communication Research, pers. comm.).

Table 12: Summary of overall resident responses to questionnaire

Questionnaire Item	Number of residents	% of residents
original occupants of home	58/80	**73**
length of residence less than 5 years	39/80	**49**
own home	69/80	**86**
environment stated as important	76/80	**95**
stream stated as important	63/80	**79**
riparian area stated as important	48/80	**60**
aware that stream is fish-bearing	32/80	**40**
rate stream condition as:		
poor	20/80	**25**
neutral	22/80	**28**
good	28/80	**35**
no opinion	10/80	**13**
have access to stream	64/80	**80**
make use of stream (children's play or walks)	29/80	**36**
aware of any stream protection requirements	61/80	**76**
aware of covenant on property	57/80	**71**
claim to know conditions of covenant	44/57	**77**
actually do know conditions of covenant	9/44	**20**
informed of covenant by:		
lawyer	17/46[1]	**37**
realtor	17/46	**37**
fisheries pamphlets	4/46	**9**
municipality	3/46	**7**
do not remember	5/46	**11**

Table 13: Summary of resident responses to questions about MELP fences

Covenant fence questions	Bear Creek	74 A Ave./144 St.
aware of fence	100% (n=4)	80% (n=5)
aware of sign on fence	N/A	0% (n=4)
believe fence obstructive	0% (n=4)	25% (n=4)
was informed of fence	50% (n=4)	50% (n=4)
informed of fence by Realtor	100% (n=2)	100% (n=2)

Of all the people surveyed, 95% stated that the environment was important to them. In particular, streams and riparian areas were mentioned 79% and 60% of the time, respectively, when people were asked what aspects of the environment were important to them. The awareness that the streams supported fish was quite low at 40%. There was a fairly even spread among people's perceptions of the health of the streams. Most people

indicated that they had access to the stream itself, while 36% of the respondents used this access, predominantly for children's play and for walking. The survey showed that 71% of those surveyed were aware that they had a covenant on their property. However, although 77% of these individuals stated that they were aware of the conditions attached to their covenants, further questioning revealed that only one-fifth actually knew what the covenant conditions were. Most of these people were informed by realtors and lawyers. There was no significant difference ($p \leq 0.05$) between the type or frequency of encroachment by those residents who were aware of their covenants and those who were not.

Questions regarding the covenant fence revealed that approximately 90% of residents were aware of the fence and only 13% found the fence obstructive (the fences in this survey were made of cedar and were 1.2 meters high). None of the residents surveyed in the 74A Ave/144 St. development were aware of the MELP's "Very Sensitive Fish Habitat" sign on their fence.

[1] exceeds 44 because some residents informed by more than one source

4.0 DISCUSSION

Overall, the frequency of encroachments for all lots with covenants surveyed in Surrey was high at 75%. Clearly these covenants, as presently implemented, are ineffective for protecting fish habitat. However, low percentages of encroachments were found in small subdivisions at site 4 (Hyland Creek), site 5 (Bear Creek), and site 6. This low frequency is due to two main factors. First, the presence of fencing along the covenant boundary appears to be effective in impeding encroachment into the riparian area. Second, these subdivisions are relatively new; there simply has not been the same amount of human activity over time as in other areas.

General stream health correlates reasonably well with the condition of the riparian area. If encroachments reached the creek, overstream cover was lost. Stream bank erosion often occurred where riparian vegetation had been removed and the erosion of bank materials increased siltation of the substrate. These conditions combined to significantly reduce fish habitat both at the site and downstream of it.

Taken together, the findings from the covenant compliance study and the resident survey yield paradoxical results. Although residents express high levels of concern and interest in their streams, their frequent encroachment suggests otherwise. The residents who were aware of their covenants encroached as frequently as those residents who were unaware of their covenants. Clearly, there is a gap between residents' stated concerns and knowledge, and their actual behaviours. This suggests that to increase the effectiveness of covenants and narrow this gap, education and enforcement issues need to be addressed.

Several educational issues arise from the findings of the covenant compliance study and the resident survey:

1) The findings of the resident survey reveal a considerable gap between those who ***say*** they know the conditions of their covenant and those who ***actually*** understand the terms. Thus, well-meaning residents may not know that their particular actions qualify as an encroachment. It is important to note, though, that under the Land Title system, the purchaser is ". . . deemed to know what is shown on the title at the land title office, whether [they] actually looked it up or not" (findlay and Hillyer 1994, 42). Thus, landowners are ultimately responsible for their actions on their property.

2) The majority (three quarters) of residents were informed about their covenant by lawyers and realtors. The Covenant Charge document (attached to the title of the land) is written in legal language. Although the document tells residents what they cannot do, it does not explain why such actions should not be undertaken. It is unclear whether residents are aware of the importance of riparian areas in supporting the life cycle of salmonids. This is despite recent efforts by the City of Surrey, which, in the fall of 1994, distributed "Stream Health" pamphlets to many residents in the study area. Residents also may not realize that many individual encroachments cumulatively contribute to serious fish habitat degradation. Further research would be

necessary to determine exactly what lawyers and realtors tell their clients and whether this information is appropriate and understood by residents.

3) There are many situations where residents successfully produce an esthetically pleasing landscape around a stream, but degrade sensitive fish habitat. In these cases, education about the riparian zones may produce landscaping schemes that take fish needs into account.

4) The residents surveyed from site 6 were not aware of the signs on their covenant fence, which indicates that the signs need to be more prominent. The fact that MELP has increased the size of this sign may help resolve this visibility issue.

The second main reason for the gap between resident responses and covenant compliance is lack of enforcement. From the point of view of the Ministry of Environment, Lands and Parks (MELP) and the Department of Fisheries and Oceans (DFO), covenant enforcement would entail lengthy, costly, and risky civil action suits. This leads to a situation where residents may express concerns about their streams, but they also know that there will be no enforcement action associated with encroaching into sensitive areas. If violators know there are penalties for their inappropriate actions, they may make more of an effort to educate themselves about their responsibilities respecting covenants.

The covenant fences, recently required by MELP at the time of development, seem to have been an effective measure in reducing encroachment into the riparian zone in the small number of cases in this study. The presence of a clearly marked boundary also simplifies the monitoring and enforcement process. However, despite the success of fencing, it is not ***the*** solution to covenant encroachments. Most areas with fencing are in relatively new subdivisions, that is, they have had less temporal exposure to human activity than older, unfenced subdivisions with covenants. Without subsequent monitoring and enforcement, homeowners could simply remove the fencing and encroach into the covenant.

Although this study found that only 1 out of 8 residents surveyed with covenant fencing on their property found it obstructive, the conclusion cannot be drawn that other homeowners would concur with this due to the small sample size. Concern has been expressed elsewhere regarding covenant fencing, prompting DFO and MELP to develop a guide to access planning and barrier options for environmentally sensitive areas which will provide information on fencing as well as live or plant barriers (in press).

5.0 RECOMMENDATIONS AND CONCLUSION

This study has shown that covenants are largely ineffective in protecting fish habitat under the present management regime, and has highlighted the need to more effectively do so. It must be recognized that no single group, agency, or tool alone can provide a comprehensive stream protection or stewardship program. What is needed is cooperation and coordination between the federal, provincial, and local levels of government, non-governmental organizations, and private land owners in protecting fish habitat. Alternative practices must be sought. Following are some recommendations that can augment fish habitat protection.

5.1 LAND USE PLANNING AND URBAN DESIGN

A proactive and preventative measure for reducing threats of encroachment is to avoid development in these sensitive areas altogether. This would entail recognition and incorporation of these sensitive areas into the earliest stages of the land use planning process. This could be done through Official Community Plan (OCP) designations and protective zonings, other bylaws, and through creative subdivision design. The planning process should also include provisions for the purchase or dedication of these areas for conservation purposes.

There are many tools available to governments and citizens to plan for, purchase, or dedicate riparian habitat on private urban lands. The following publications specifically deal with the legal options for private land protection: ***Here Today, Here Tomorrow*** (findlay and Hillyer, 1994), and ***Private Conservancy Options: Riparian Zone Protection*** (Turtle Island Group, 1995). The ***Stream Stewardship Guide*** (DFO ***et al***., 1994) outlines the municipal land use planning tools available for riparian habitat protection. Local and senior governments, NGOs, and citizens must begin to implement some of these tools in order to rectify the failure of current practices if riparian habitat is to be protected in highly urbanized environments. They include such voluntary private land stewardship options as donations, land exchanges, and land leasing. They also include such planning tools as adequate fixed setbacks, a comprehensive environmental bylaw, parkland dedications, down-zoning, comprehensive development zoning, density bonus zones, and development permit areas. The aforementioned documents provide detailed information on these options.

5.2 FINANCIAL ASPECTS OF ECOLOGICALLY SENSITIVE PRIVATE LAND

The financial aspects of habitat protection options, including covenants, must be explored more fully in British Columbia. The "untaxing of nature" will be critical to the success of private land stewardship activities, and as yet the opportunities for both property and income tax savings are not adequate. Opportunities that do already exist need to be more widely "advertised" to landowners as encouragement. For example, donations of ecologically sensitive land now qualify for a larger tax credit under the ***Income Tax Act*** than previously; under the ***Property Transfer Tax Act***, tax relief for the owner can be obtained when a Section 215 covenant is

registered with the federal Cabinet's approval on a property at the time of sale. The property tax implications of assessing land values by treating sensitive lands as a common property resource rather than a private commodity also needs to be explored with the B.C. Assessment Authority.

5.3 CONSERVATION COVENANTS

A new legal option for protection has been created under recent amendments to the ***Land Title Act*** which allows conservation groups to hold s.215 covenants. These are being referred to as "conservation covenants". While these are now being actively explored and implemented throughout B.C. by such NGOs as The Nature Conservancy, Turtle Island Earth Stewards, and the West Coast Environmental Law Association, the use of them would not apply to the situation studied in this report. Due to logistics and NGO resources, conservation covenants are only practical in situations where ***large*** private properties are involved. It has been learned from examples in the United States that easements (the equivalent of s.215 covenants) are a very useful and popular tool for conservation of ***large tracts*** of environmentally significant land. ***The Conservation Easement Stewardship Guide*** (Lind 1991) gives planning, implementation, and on-going monitoring and maintenance information for conservation covenants.

5.4 VOLUNTARY STREAM STEWARDSHIP

Another avenue which must be explored is voluntary stream stewardship. A cooperative partnership between government and NGOs could be established to set up a program of voluntary stream stewardship in the City of Surrey.

"Stewardship" refers to:

> . . . cooperative forms of planning and management of environmental resources in which all users and managers share the responsibility for management and conservation. Stewardship embodies a new ethic of caring for local ecosystems in the interests of long-term sustainability. Stewardship includes but goes beyond voluntary efforts by community groups. Stewardship requires sharing...sharing of decision-making authority, of responsibility for ecosystem protection, and of the benefits of a given resource. Stewardship provides priorities for the management of local ecosystems for sustainability (DFO and MELP 1994, 3)

At present, Surrey has several established environmental organizations (Nicomekl Enhancement Society, Serpentine Enhancement Society, Tynehead Society, Surrey Environmental Partners, White Rock & Surrey Naturalists Society), although there are no comprehensive or city-wide stream stewardship groups or programs. An example of a more comprehensive approach is neighbouring Langley's Salmon River Watershed Management Partnership and Langley Environmental Partners Society, which has undertaken such work as tree planting, training and mentoring of students, storm drain marking, stream signage, and biophysical inventories. For Surrey to undertake a similar program, initial efforts would have to be directed at educating volunteers, building community support, and fund-raising. Support for both setting up and running a Surrey program could be provided by established environmental and community groups and schools such as the B.C. Institute of Technology's Fish and Wildlife students (Mark Angelo, BCIT, pers. comm.). There is definitely interest within non-governmental organizations in forming cooperative partnerships with governments to assist in stream stewardship initiatives.

Three recent publications are available to help start up a stewardship group. ***Community Stewardship: A Guide to Establishing Your Own Group*** (available from the Fraser Basin Management Program) is aimed at individuals, interest groups and communities who want to launch stream stewardship initiatives in their own community. ***Streamkeepers Handbook: A Practical Guide to Stream Care*** and the associated training program focuses on hands-on activities ranging from simple to more involved, such as stream clean-ups and stream-side planting. Information on the Streamkeepers program can be obtained from the Department of Fisheries and Oceans or Capilano College. ***Water Stewardship: A Guide for Teachers, Students, and Community Groups*** (available from MELP) is intended to encourage and support involvement by educators, students and interested members of the public in water stewardship.

5.5 COVENANT AWARENESS

Beyond the incorporation of riparian areas into the land use planning and design phases of development and the use of other land protection tools by government and citizens, attention must be paid to covenant awareness and education. As outlined in the previous section, this study highlighted the fact that urban residents along streams simply are not aware of covenants, their importance, or their restrictions. This can be partially attributed to the fact that they do not understand the importance of riparian vegetation and therefore the purpose of the covenant restrictions. In discussions with private landowners it becomes readily apparent that most people view fish habitat as strictly the water in which fish live; the streamside vegetation several metres back from the water is not as readily considered important for fish. Education of the ecological "why" of covenants would increase people's respect of the conditions attached to covenants. Making new buyers aware of the covenants on title would alleviate the reactive measure of having to educate residents already established on property along creeks.

Increasing the awareness and understanding of the terms of covenants among lawyers and realtors involved in the sale of property and encouraging them to explain the reason for the covenants would significantly increase landowner awareness. An awareness strategy targeted at these professionals, perhaps through their associations or professional continuing education and development programs, should be established. Once they are informed of the covenant issues, they can be supplied with brochures, simple information packages, or other materials explaining the "why's" and "what's" of covenants, which could be included with the property transfer documents provided to their clients.

5.6 CONCLUSION

A wide variety of private land stewardship options need to be implemented in order to preserve riparian areas and fish habitat in urban areas. The traditional use of Section 215 covenants is not an adequate tool, particularly in the absence of other stewardship approaches. The cooperative and creative efforts of all parties concerned - citizens, developers, lawyers, realtors, municipal, provincial and federal government staff, and environmental and community groups - will be necessary for the protection and successful stewardship of streams in heavily urbanized environments.

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APPENDIX 2: EXAMPLE OF S.215 COVENANT DOCUMENT, CITY OF SURREY

RESTRICTIVE COVENANT

(SECTION 215 LAND TITLE ACT)

THIS AGREEMENT made the day of , 19 .

BETWEEN:

(hereinafter called the "Covenantor")

OF THE FIRST PART

AND:

HER MAJESTY THE QUEEN in the Right or the Province of British Columbia, as represented by the Regional Fish & Wildlife Manager, Ministry of Environment

(hereinafter called the "Covenantee")

OF THE SECOND PART

WHEREAS:

A. The Covenantor is the registered owner of or has an equity of redemption in ALL AND SINGULAR that certain parcel or tract of land and premises situate, lying and being in the Municipality of _____in the Province of British Columbia, and more particularly described as:_____

(hereinafter called the "said lands")

B. Section 215 of the Land Title Act provides, interalia, that there may be registered as a charge against the title to land a covenant, whether of a negative or positive nature, in respect of the use of the land or the use of a building or to be erected on land, in favour of a Municipality or the Crown.

C. An unnamed creek (commonly known as _____) is situated upon and runs through a portion of the said lands as shown on the Plan prepared by _____B.C.L.S. dated for reference _____Drawing No. _____ a true copy of which is annexed hereto as Schedule "A" to this Agreement (hereinafter called the "said creek").

D. The Covenantor has agreed to restrictions on the use of a portion of the said lands adjacent to the said creek.

NOW THEREFORE THIS AGREEMENT WITNESSETH that pursuant to Section 215 of the Land Title Act, and in consideration of the sum of One Dollar ($1.00) now paid to the Covenantor by the Covenantee (the receipt and sufficiency whereof is hereby acknowledged), the parties hereto hereby covenant and agree each with the other as follows:

1. THE COVENANTOR COVENANTS AND AGREES with the Covenantee that:

(a) no building or structure, fencing or any part thereof, including any fixed equipment, mobile home or modular home shall be constructed, reconstructed, moved, extended or located nor shall any landfill, land clearing or other disturbance take place within _____metres of the top of bank / natural boundary / centreline / top of the ravine bank, including the ravine.
(DELETE WHICHEVER IS NOT APPLICABLE)
of the creek as shown on Schedule "A";

(b) the Covenantor shall not, without the prior written consent of the Covenantee, which consent to be in the Covenantee's sole discretion, cut down, trim, prune, defoliate, alter, remove or in any way tamper with or work on any trees, shrubs, plants, bushes, ground cover, vegetation or any other form of plant life within that portion of the said lands within a distance of _____meters from the natural boundary / top of bank / centreline / top of the ravine bank, including the ravine.
(DELETE WHICHEVER IS NOT APPLICABLE)
of each side of the said creek as shown on Schedule "A", so that the said trees, shrubs, plants, bushes, groundcover, vegetation and other forms of plant life remain in a naturally vegetated state in perpetuity;

(c) the Covenantor shall ensure that any clearing and/or excavation done on the said lands shall be completed in such a manner to ensure that the release of silt, concrete, leachate or any other

deleterious substances shall not fall into the said creek via ditches, storm sewers or overland flow. And the Covenantor shall further ensure than all construction and excavation wastes, overburden, soil, or other substances deleterious to aquatic life shall be disposed of or placed in such a manner as to prevent their entry into any watercourse or storm sewer system; and

(d) The Covenantor shall, at the expense of the Covenantor, do or cause to be done all acts reasonably necessary to grant priority to this Agreement over all charges and encumbrances which may have been registered against the title to the said lands in the New Westminster Land Title Office save and except those specifically approved in writing by the Covenantee or in favour of the Covenantee.

(e) The Covenantor shall not construct dwellings within _____meters of the covenant boundary as boldly outlined on Sketch Plan annexed hereto as Schedule "A".

2. IT IS MUTUALLY UNDERSTOOD AND AGREED by and between the parties here that:

(a) In this agreement the term:

(i) "natural boundary" means the visible high water mark of the said creek where the presence and action of the water are so common and usual and so long continued in all ordinary years as to mark upon the soil of the bed of the said creek a character distinct from that of the banks thereof in respect of vegetation as well as in respect of the nature of the soil itself; and

(ii) "centerline" means a line running between and equi-distant from the natural boundaries of the said creek'

(iii) "top of ravine bank" means first significant break in the slope of a ravine;

(b) nothing contained or implied herein shall prejudice or affect the rights and powers of the Covenantee in the exercise of its functions under any public and private statutes, by-laws, orders and regulations, all of which may be fully and effectively exercised in relation to the said lands as if this Agreement had not been executed and delivered by the Covenantor;

(c) the covenants set forth herein shall charge the said lands pursuant to Section 215 of the Land Title Act and Shall be covenants the burden of which shall run with the said lands. It is further expressly agreed that the benefit of all covenants made by the Covenantor herein shall accrue solely to the covenantee and that this Agreement may only be modified or discharged by agreement of the Covenantee, pursuant to the provisions of Section 215(5) of the Land Title Act;

(d) notwithstanding anything contained herein, the Covenantor shall not be liable under any of the covenants and agreements contained herein where such liability arises by reason of an act or omission occurring after the Covenantor ceases to have any further interest in the said lands;

(e) wherever the singular or masculine is used herein, the same shall be construed as meaning the plural, feminine or body corporate or politic where the context or the parties so require;

(f) this Agreement shall enure to the benefit of and be binding upon the parties hereto, their respective successors and assigns; and

(g) the parties hereto shall do and cause to be done all things and execute and cause to be executed all documents which may be necessary to give proper effect to the intention of this agreement.

IN WITNESS WHEREOF the parties hereto have hereunto set their respective hands and seals on the day and year first above written.

OR

IN WITNESS WHEREOF the Covenantor has hereunto affixed its corporate seal, attested by the hands of its officers duly authorized in that behalf, and the duly authorized representative of the Covenantee has hereunto set his hand and seal, the day and year first above written.

(DELETE WHICHEVER IS NOT APPLICABLE)

The Corporate Seal of

was hereunto affixed in the presence of:

_____
Authorized Signatory

_____
Authorized Signatory

OR

SIGNED, SEALED AND DELIVERED
by
in the presence of:

_____
Name

_____
Address

_____
Occupation

(DELETE WHICHEVER IS NOT APPLICABLE)

SIGNED, SEALED AND DELIVERED on behalf of
Her Majesty the Queen in Right of the Province of
British Columbia in the presence of:

_____ Regional Fish and Wildlife Manager,
Ministry of Environment or his Authorized Representative

_____

_____

This is the instrument creating the condition of covenant entered into under Section 215 of the Land Title Act by the Registered owner referred to herein and shown on the print of the plan annexed hereto and initialled by me.

_____

Approving Officer for the Municipality of_____

MEMORANDUM AS TO ENCUMBRANCES, LIENS AND INTERESTS

_____in favour of_____

registered under number_____.

CONSENT

The undersigned, being the holder of the encumbrance or entitled to the lien or interest referred to in the memorandum above written, hereby approves of, joins in and consents to the registration of the within Agreement and doth covenant and agree that the same shall be binding upon its interest in or charge upon the said lands and shall be an encumbrance upon the said lands prior to the above noted _____in the same manner and to the same effect as if it had been dated and registered prior to the said _____.

EXECUTED THIS day of , 19 .

SIGNED in the presence of:

_____
Name

_____
Address

_____

_____

_____
Occupaton

OR

The Common Seal of

_____

was hereunto affixed in the presence of:

_____
Authorized Signatory

_____
Authorized Signatory

(DELETE WHICHEVER IS NOT APPLICABLE)

APPENDIX 3: EXPLANATORY LETTER TO RESIDENTS SURVEYED

Fisheries and Oceans
Pacific Region
Suite 400 - 555 West Hastings St.
Vancouver B.C.
V6B 5G3

Pêches et Océans
Région du Pacifique
Piece 400 - 555 rue Hastings ouest
Vancouver (C.-B.)
V6B 5G3

Dear interested citizen:

Your cooperation in this study currently underway is greatly appreciated. The study is commissioned by the District Municipality of Surrey and the Department of Fisheries and Oceans to investigate the effectiveness of covenants in protecting riparian (streamside) areas. The field investigators are therefore visually assessing the condition of the riparian habitat in this area.

As you may be aware, in addition to the streams themselves, the vegetation adjacent to streams provides important fish habitat. Among other things, overhanging vegetation provides shade and regulates water temperature, root systems stabilize soil and prevent erosion, debris provides instream protection, and falling insects provide the primary food sources for fish.

Covenants are a tool often used by government to protect these environmentally significant streams and aquatic habitat. A covenant is a written agreement between a landowner and government in which the owner of the land promises to protect a portion of the property in specified way. These covenants are filed in the Land Title Office and are binding on all future owners of the land.

In the face of increased urban development, the federal, provincial and municipal levels of government are forging new and improved ways of protecting and promoting stewardship of environmentally significant areas This study of covenants is one small part of the process of assessing the success of stream protection measures, and will lead to more effective ways of doing so.

If you have any questions regarding this study or if you would like more information on the relationship between urban development/planning and the fisheries resource, please do not hesitate to call me at the number below.

Thank you again for your interest and cooperation in this study.

Sincerely,

Emma Child
666-2044

APPENDIX 4: RESIDENT QUESTIONNAIRE

1. How long have you lived at this residence?

   ❏ 0-1 year ❏ 2-4 years ❏ over 5 years

2. Are you the original occupant?

   ❏ yes ❏ no

3. Do you own or rent your home?

   ❏ own ❏ rent

4. Is the natural environment on your property important to you?

   ❏ yes ❏ no ❏ don't know

5. What features of your property do you consider of natural or environmental value?

   (do not read)
   ❏ stream
   ❏ riparian area
   ❏ trees
   ❏ wildlife, birds, animals
   ❏ other, specify _____

6. Are there fish in the stream you live along?

   ❏ yes ❏ no ❏ don't know

7. How would you rate the condition of the stream on a scale of 1 to 5, where 5 is excellent and 1 is very poor?

   1 2 3 4 5 ❏ don't know/care

8. Do you have access to the stream from your property?

   ❏ yes ❏ no ❏ don't know

9. Do you use the stream or streamside area for recreational or other purposes, e.g. children's play area, for walks, etc.?

   ❏ yes ❏ no
   Specify _____

10. Are you aware of any requirements to protect the stream?

❏ yes ❏ no
Specify_____

11. Do you have a covenant registered on your property title?

❏ yes

Do you know the conditions attached to the covenant?
❏ yes ❏ no
Specify_____

Who informed you?_____

❏ no

❏ don't know

[***for interviewer:*** Explanation of what a covenant is - an agreement between landowner and a government (municipal or MELP) that prohibits activities or limits the use of the property to certain uses. This is registered on title with the Land Title Office. It is valid for all subsequent owners of the land. Assure respondent that this is a research survey only and is not for enforcement purposes]

Additional questions for residents with MELP fencing:

1. Do you have a MELP fence in place on your property?

❏ yes ❏ no ❏ don't know

2. Is there a MELP sign on the fence?

❏ yes ❏ no ❏ don't know

3. Do you find this fence obstructive?

❏ yes ❏ no

4. Were you informed that a MELP fence was in place before you purchased your property?

❏ yes ❏ no ❏ don't know

5. Were you informed on the MELP fence policy

❏ before you purchased your property; by whom_____

❏ after purchasing your property; by whom_____

❏ never informed

APPENDIX 5: SUMMARY OF RESIDENT RESPONSES TO QUESTIONNAIRE, BY SITE

Questionnaire item	Site 1 (n=29) %:	Site 2 (n=30) %:	Site 3A (n=3) %:	Site 3B (n=9) %:	Site 5 (n=4) %:	Site 6 (n=5) %:
original occupants of home	76	63	100	78	100	60
length of residence less than 5 years	14	63	100	89	100	20
own home	97	80	67	67	100	100
environment stated as important	97	93	100	89	100	100
stream stated as important	76	80	100	78	100	60
riparian area stated as important	79	67	0	0	0	100
aware that stream is fish-bearing	66	30	33	11	25	20
rates stream condition as:						
poor	7	37	33	56	0	20
neutral	31	23	66	33	0	20
good	48	37	0	0	50	20
no opinion	14	3	0	11	50	40
have access to stream	79	90	100	89	25	40
make use of stream (children's play or walks)	28	47	0	44	0	60
aware of any stream protection requirements	90	77	33	67	75	40
aware of covenant on property	72	70	100	78	75	40
claim to know conditions of covenant	91	76	33	57	67	100
actually do know conditions of covenant	37	6	0	25	0	0
informed of covenant by:						
lawyer	38	31	0	50	33	50
realtor	29	38	100	50	67	0
fisheries pamphlets	19	0	0	0	0	0
municipality	5	13	0	0	0	0
do not remember	11	19	0	0	0	0

APPENDIX 6: RESULTS OF STUDY IN MAPLE RIDGE

Table 1: Percent encroachment of all lots with covenants

Encroachment classification	% of lots (n=206)
none	38
minor	15
moderate	19
major	29
Percent Covenant Encroachment	**63**

Table 2: Summary of Site 1 (McKinney Creek)

Encroachment classification	% of lots with covenants (n=59)
none	17
minor	25
moderate	31
major	27
Percent Overall Encroachment	**83**

Severity Index: 1.7

Table 3: Summary of Site 2 (Coho Creek)

Encroachment classification	% of lots with covenants (n=69)
none	17
minor	7
moderate	25
major	51
Percent Overall Encroachment	**83**

Severity Index: 2.1

Table 4: Summary of Site 3 (Whispering Falls subdivision)

Encroachment classification	% of lots with covenants (n=47)
none	87
minor	11
moderate	0
major	2
Percent Covenant Encroachment	**13**

Severity Index: 0.17

Table 5. Summary of Site 4 (Kanaka Creek)

Encroachment classification	% of lots with covenants (n=6)
none	38
minor	63
moderate	0
major	0
Percent Covenant Encroachment	**63**

Severity Index: 0.63

Table 6: Summary of Site 5 (Two Unnamed Creeks)

Encroachment classification	% of lots with covenants (n=23)
none	52
minor	0
moderate	13
major	35
Percent Covenant Encroachment	**48**

Severity Index: 1.3

Table 7: Summary of site encroachment frequencies, severity indices, and general stream health

Creek	% Encroach-ment	Severity Index	General Stream Health
Site 1 McKinney Creek	83% (n=59)	1.7 Marginal	Near 205th St. and 124th Ave., the stream had a predominantly sand substrate with little overstream vegetation. Coho fry were seen in two sites of the east branch of this creek, near 12210 to 12020 - 207A St. These sightings coincided with a presence of gravel substrate and adequate instream and overstream cover in the creek.
Site 2 Coho Creek	83% (n=69)	2.1 Poor	The creek had a good gravel substrate, but lacked instream and overstream cover due to the activities of beavers and humans off 227th St. near Balabanian Circle. The lower branch of the creek near 233rd St. and 124th Ave. lacked instream and overstream vegetation in some areas. This section had a substrate of 80% silt, 15% sand, and 5% small gravel.
Site 3 Whispering Falls Subdivision	13% (n=47)	0.17 Good	Both creeks in this subdivision had adequate instream and overstream cover. Unnamed creek, in the southwest portion of the site, had a substrate of 70% cobble, 10% boulder, 15% sand, and 5% silt.
Site 4 Kanaka Creek	63% (n=6)	0.63 Good	This creek had a substrate of 10% boulder, 20% cobble, 50% large gravel, 15% small gravel, and 5% sand. The instream cover was 20% and overstream cover was 15%.
Site 5 Two Unnamed Creeks	48% (n=23)	1.3 Acceptable	At 118th Ave. and 249th St., the creek had a substrate of 50% small gravel, 30% sand, 18% silt, and 2% boulder. The overstream cover was 60% and the instream cover was 5%. This section contained garbage both in and around the creek.
OVERALL	**62% (n=206)**	**1.4 Acceptable**	