CITY OF NEHALEM
25-YEAR HARVEST PLAN
2000 – 2025

BOB'S CREEK WATERSHED

May, 2000

Prepared by:
William Davidson

Mason, Bruce & Girard, Inc.

HISTORY

In 1981, Mason, Bruce & Girard, Inc. (MB&G) was asked to inventory the City of Nehalem Watershed and recommend to the City Council levels of harvest for the next twenty years. In 2000, the City of Nehalem City Council requested that MB&G update a forest management plan on the City of Nehalem Watershed for the next twenty-five years.

In 1981, the forest community in the operable area (operable area is defined as an area where lined or tractor and wheel logging can occur) consisted of approximately 70 percent conifer timber types and approximately 27 percent red alder timber types. Three percent of the operable area was non-forest (roads, ponds, etc).

MANAGEMENT PLAN FROM 1981 – 2000

In 1981, MB&G recommended that a harvest level be instigated, based on a cut of 50% of the anticipated volume growth. From 1981 to 1986, no harvest practices were conducted due to a recession in the timber industry. The first timber sale, Nehalem #1, was sold and harvested in 1988.

Since 1987, six timber sales have been harvested on the City of Nehalem Watershed. The most recent harvest occurred in 1999. To date, approximately 4.8 million board feet have been harvested and removed from the Watershed. Gross revenue to the City of Nehalem has been approximately $1.2 million dollars.

If in 1987 the Watershed were sold, the City of Nehalem would have anticipated a selling price of approximately $1.2 to $1.3 million dollars. Based on the harvesting revenues to date, the City of Nehalem has collected approximately $1.2 million dollars and the City still owns the Watershed.

1981 TIMBER MANAGEMENT GOALS

During the initial harvest conversion period (60-70 years) it was recommended that:

1. Water quality and quantity considerations be given first priority. Buffer strips should be retained along principle tributaries. Adequate drainage structures capable of handling peak discharges should be installed where appropriate beneath roadways.

2. Clear cutting should be the preferable harvesting practice. This practice will generate the most capitol and the least cost and aid future site occupancy by converting a coniferous-hardwood forest to a coniferous forest.

3. Convert hardwood forests (red alder) to coniferous forest via hardwood harvesting.

4. Reforestation efforts to be given high consideration. Utilize methods to insure high survival and protection of seedling through first two years of establishment.

5. Commercial thinning should be low priority. Coniferous stands are, in most cases, too intermixed to achieve added growth in residual trees.

1981 FOREST MANAGEMENT CONSIDERATIONS

The highest potential adverse factors that could influence the quality of domestic water from a watershed area are associated with human presence, road construction and timber harvesting.

1. Human Presence

   Coliform and virus organisms, which may inhabit the intestinal tract of warm-blooded animals, can adversely affect water quality. Closure of the Watershed to public entry and use and careful scrutiny of human activities (especially management related) could minimize the potential danger to water quality through entry of these organisms into waterways.

2. Roads

The primary conflict between water quality and roads usually develops because of road location related to soil erosion. Short-term influences of new road construction usually last from one to two years. On the City of Nehalem Watershed, short minimum access spur roads will need to be constructed as forest management practices progress. The existing rock-dirt roadways could be developed into primary mainline roads with reconstruction and with larger culverts installed. This can be accomplished as a condition of future timber sales.

3. Timber Harvesting

Timber harvesting and road use activities necessary to facilitate harvesting have a potential of at least three adverse effects on water quality.

- They can lead to an increase of suspended sediment concentrations in water that is used for domestic consumption. High turbidity tends to mask chlorinating attempts and thus may not always completely purify water.
- Alteration of stream temperatures can be influenced by harvest practices. Aquatic plant and microorganism development could increase with sustained water temperature increases.
- Logging residues that enter stream courses can cause reduced concentrations of dissolved oxygen and thus influencing water chemistry. Large logging residues (logs, chunks, etc.) may influence stream channel stability.

Recommendations

1. Harvest techniques should be implemented and controlled to give the least practical conflict with water quality. Streamside buffer strips should be retained along major tributaries (Bob's and Anderson Creek) to assure protection of potential fluctuations in water temperature and soil disturbance.
2. Clear cutting with line logging techniques should be required on those areas with moderate to steep slopes (greater than 35%). Yarding should be aligned to pull logs away from stream channels. Machinery will be kept away from critical slopes and soils.
3. Limit logging activities to times when soil moisture conditions are relatively dry and favorable (June to September).

4. A properly maintained and located road system should be planned for on the Watershed. Restrictions in the use of the roads in periods of inclement weather and culverts designed to handle peak discharges are vital considerations necessary to insure high water quality.
5. Vegetative cover changes can significantly alter the stream flow cycle of the watershed area. Immediate reforestation is necessary to aid in soil protection.

City of Nehalem
25-Year Harvest Plan
May, 2000

Table 1

Species	1981 Projected 1987 Total Volume Un-managed Forest	Operable Acres -- 692 1981 (Interpolated) Projected 2000 Total Volume Un-managed Forest	Actual 2000 Total Volume Exisiting Forest
Western Hemlock	8,469,000	11,122,000	10,862,640
Sitka spruce	964,000	1,190,000	231,120
W. Red Cedar	314,000	400,000	115,560
Douglas Fir	422,000	546,000	115,560
Red Alder	2,592,000	3,977,200	920,000
Shore Pine	-	-	100,000
Total	12,761,000	17,235,200	12,344,880
		Harvested to date:	4,792,000
		Combined Total:	17,136,880
If Watershed sold in 1987:	$ 1,225,056	Gross Revenue to date:	$ 1,186,020

2000 FOREST INVENTORY

Method

Aerial photographs and data collected by MB&G personnel was used to divide the Nehalem Watershed into timber types, stocking levels, age, acres and volume per acre. Increment borings of selected trees were used to generate growth predictions. Representative timber types were sample-cruised in order to estimate volume.

Categories

Two subdivisions of the Watershed were established.

1. Operable Area – Those acres accessible from existing or from future road systems and terrain which could be harvested using conventional line and/or tractor and wheeled logging machinery.
2. Inoperable Area – Due to steep slopes and rock outcrop areas, this area has been excluded from immediate management planning.

Timber Types and Stocking

Coded numbers found on the timber type map correspond to designated timber types.

Species Identification	
H	Western hemlock
SS	Sitka spruce
WC	Western red cedar
RA	Red Alder

Stocking Class	
Poor	10% - 40% occupancy
Medium	40% - 70% occupancy
Well	70% - 100% occupancy

Type Class

1	Established seedlings and saplings
2	Saplings 3.5" DBH to merchantable trees
3	Merchantable trees less than 22" DBH
4	Merchantable trees greater than 22" DBH

Stocking is the measure of the site occupancy of trees. Conifer stocking ranges from medium to well stocked. In most coniferous types, red alder occurs intermixed or in small pure clumps.

CITY OF NEHALEM
25-YEAR HARVEST PLAN

AERIAL PHOTOGRAPHS
Date: 7/3/97
Scale: Approximately 1" = 1,000'

May, 2000

7-3-97

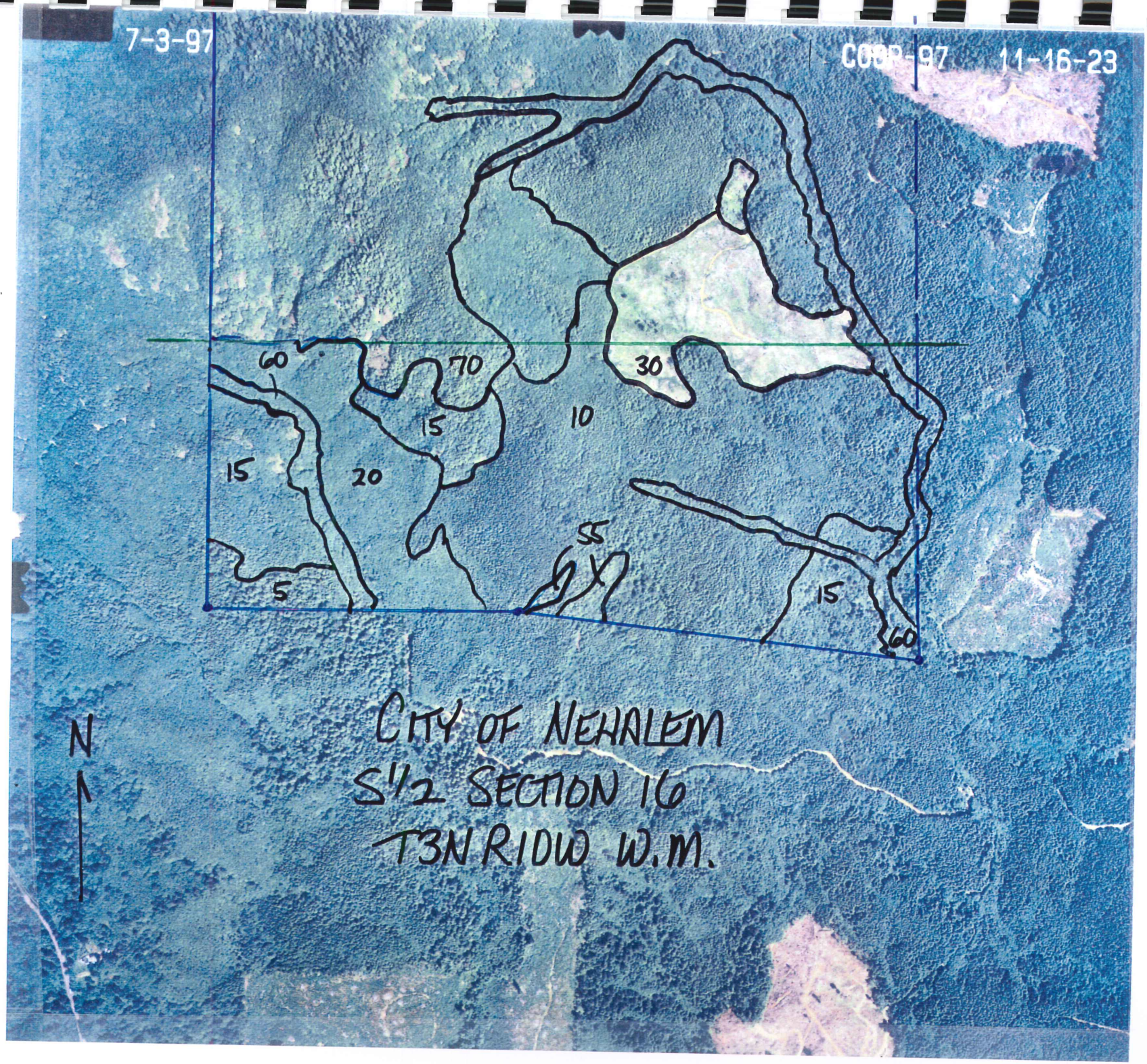
COOP-97 12-16-50

CITY OF NEHALEM

W1/2 SECTION 15

T3N R10W W.M.

N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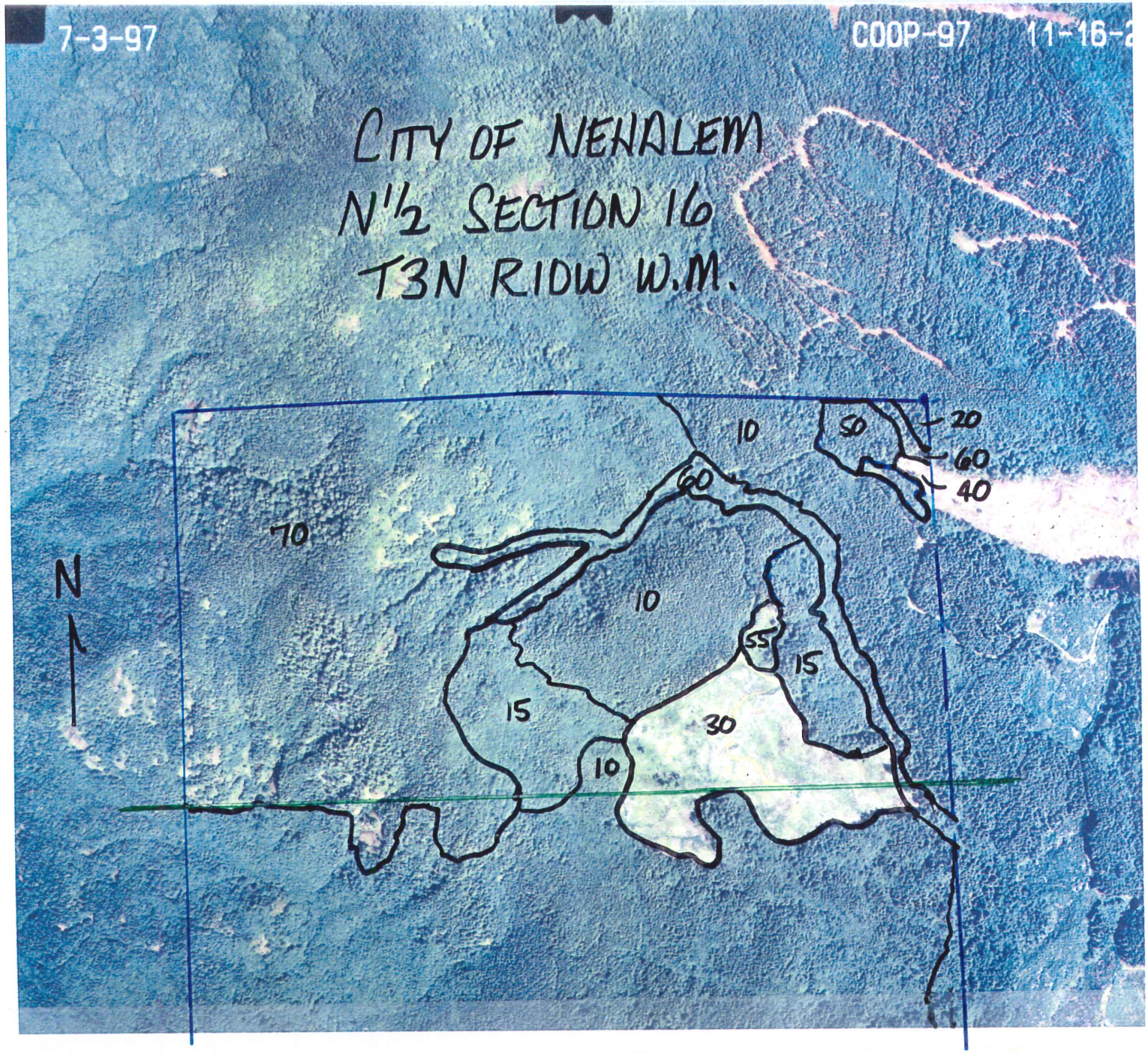
CITY OF NEHALEM
S1/2 SECTION 16
T3N R10W W.M.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CITY OF NEHALEM
N 1/2 SECTION 16
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City of Nehalem
25-Year Harvest Plan
May, 2000

Table 2

T3N, R10W, Section 15 - W1/2
320 Acres

Map Code Number	Timber Type	Age In Years	Growing Acres	Road Acres	Total
10	H33	50	116.0	0.4	116.4
20	RA33	50	7.5	0.6	8.1
30	D13	12	54.0	1.0	55.0
40	D13	7	23.0	0.4	23.4
50	H13	2	85.3	3.0	88.3
W	Pond		4.1	-	4.1
60	Buffer		24.7	-	24.7
		Total:	314.6	5.4	320.0

Of the 320.0 acres, approximately 34.2 acres are reserved from cutting due to Forest Practice rules and non-productive lands.

City of Nehalem
25-Year Harvest Plan
May, 2000

Table 2A

T3N, R10W, Section 15 - W1/2
320 Acres

Timber Type	Age In Years	Growing Acres	Net Volume Per Acre	Total
H33	50	116.0	30.0	3,480
RA33	50	7.5	20.0	150
D13	12	54.0		-
D13	7	23.0	20.0	-
H13	2	85.3		-
Pond		4.1		-
Buffer		24.7		-
	Total:	314.6		3,630

City of Nehalem
25-Year Harvest Plan
May, 2000

Table 3

T3N, R10W, Section 16
640 Acres

Map Code Number	Timber Type	Age In Years	Growing Acres	Road Acres	Total
5	H43SS432	90	9.6	-	9.6
10	H33	50	227.8	2	229.6
15	H431/RA431	50	87.5	1	88.4
20	RA33	50	38.5	1	39.0
30	D13	10	35.9	1	36.7
40	D13	7	1.0	-	1.0
50	H13	2	5.8	-	5.8
55	Brush		7.0	-	7.0
60	Buffer		37.6	-	37.6
70	Non-Operable		185.2	-	185.2
		Total:	635.9	4.0	639.9

Operable acres total 450.7 of which approximately 41.7 acres are reserved from cutting due to Forest Practices rules.

City of Nehalem
25-Year Harvest Plan
May, 2000

Table 3A

T3N, R10W, Section 16
640 Acres

Timber Type	Age In Years	Growing Acres	Net Volume Per Acre	Total
H43SS432	90	9.6	20	192
H33	50	227.8	30	6,834
H431/RA431	50	87.5	12	1,050
RA33	50	38.5	20	770
D13	10	35.9		-
D13	7	1.0		-
H13	2	5.8		-
Brush		7.0		-
Buffer		37.6		-
Non-Operable		185.2	5	926 /1
	Total:	636		8,846
			Summary Total Sec 15 & 16:	12,476

/1 volume not included

FUTURE TIMBER MANGEMENT DIRECTION

In 2000, the operable area has been reduced by 25 acres to account for the reservation of buffer strips by the Oregon Forest Practices Act. In 2000, conifers occupy 80 percent of the operable area and hardwoods occupy 17 percent. Three percent of the operable area is non-forest (roads, ponds, etc). Based on work that was done in the year 2000, the existing forest volume is calculated as approximately 12.3 million board feet. Since 1988, approximately 4.8 million board feet have been harvested. This combine total equals approximately 17.1 million board feet.

In 1981, the projected volume estimate for 2000 of 17.2 million, closely approximates the combined volumes found in the year 2000 (i.e. 17.1 million board feet). In the 1981 report, a projected volume estimate for 1987 totaled 12.7 million board feet. From this report, a volume estimate for the year 2000 (via interpolation) is estimated at 17.2 million board feet.

In the year 2000, it is estimated that in the operable area on the City of Nehalem Watershed, there are 12.3 million board feet. The majority of the volume is Western hemlock. If no further cutting were to occur in this forest, we would project the volume to increase to 22.3 million board feet in the year 2025. In the 1981 plan, a 50 percent of growing stock level harvest was recommended. Based on the data formulated in preparing this report, it is also recommended that a 50 percent harvest level be instigated for the next 25-year management plan. This would result in approximately 11.2 million board foot being harvested or approximately 800,000 board feet every second year. For further calculations see Table 4.

Reference Table 5, it is estimated as an indication of immediate harvest value, which has been discounted 20 percent, that the existing stand found this date on the City of Nehalem Watershed would be worth approximately $3.4 million dollars. As stated in the previous discussion, it would be anticipated without further harvesting that the level of growing stock would be 22.3 million board feet by 2025. At a 50 percent harvest level, from 2000 – 2025, approximately 11.2 million board foot harvest could occur. This would result in a little over 800,000 board feet being harvested and an average projected gross income every second year of $400,000 dollars until 2025.

City of Nehalem
25-Year Harvest Plan
May, 2000

Table 4

Species	Actual 2000 Total Volume Existing Forest	Projected 2025 Total Volume w/o Further Harvest	50% Harvest Level	
Western Hemlock	10,862,640	19,676,586	9,838,293	
Sitka spruce	231,120	418,651	209,325	
W. Red Cedar	115,560	209,325	104,663	
Douglas Fir	115,560	209,325	104,663	
Red Alder	920,000	1,666,488	833,244	
Shore Pine	100,000	181,140	90,570	
Total	12,344,880	22,361,516	11,180,758	
Harvested:	4,792,000		860,058	every 2nd year
Combined Total:	17,136,880			

City of Nehalem
25-Year Harvest Plan
May, 2000

Table 5

Species	2000 Total Volume Existing Forest	Indication of Value Immediate Harvest Value Discounted 20%	2025 Total Volume without Further Harvesting	50% Harvest Level of Volume Increase 2000 to 2025	Projected Income
Western Hemlock	10,862,640	$ 3,041,539	19,676,586	9,838,293	$ 4,171,028
Sitka spruce	231,120	$ 64,714	418,651	209,325	$ 88,745
W. Red Cedar	115,560	$ 32,357	209,325	104,663	$ 44,373
Douglas Fir	115,560	$ 32,357	209,325	104,663	$ 44,373
Red Alder	920,000	$ 257,600	1,666,488	833,244	$ 353,261
Shore Pine	100,000	$ 28,000	181,140	90,570	$ 38,398
Total:	12,344,880	$ 3,456,566	22,361,516	11,180,758	$ 4,740,177
Harvest Since 1987:	4,792,000				
Combined Volume:	17,136,880			860,058 every 2nd year average	$ 400,000

RECOMMENDED HARVEST LEVEL 2000 TO 2025

11.2 million board feet harvest level over the next 25 years.

800,000 board foot harvest every other year.

$400,000 anticipated gross revenue to the City of Nehalem every other year.

SHORT-TERM MANAGEMENT DIRECTION

As stated previously, the majority of the harvesting in the next twenty-five years will be in Section 16. Final harvest units will be visible from the surrounding Nehalem town area. Harvest units in Section 16 will need to be carefully laid out to reduce visual impact and also provide wind firm boarder edges so that blowdown does not become a problem.

Commercial thinning should be looked at in some areas of Section 15 and along the main fork of Bob's Creek in Section 16 where operations may occur on gentler slopes and stable soils.

Final harvest will still be the preferred silvicultural practice in the Watershed. Besides careful unit layout, line logging, preferably with sky-car carriages, should be employed to reduce impact on the forestland and other resources.

A potential problem exists in the first three final harvest areas. These plantations were reforested with Douglas fir species and a fungal disease called Swiss needle cast invaded this species. Swiss needle cast could result in growth reduction and mortality losses. Later sale areas where reforested exclusively with Western hemlock to avoid potential problems with this disease.

FUTURE PROJECTS

Future harvesting will occur mainly in Section 16. In order to facilitate harvesting, minor spur roads must be developed from the existing spur road that runs more or less north-south in this section. We anticipate development in the SE1/4 of spur roads leading along ridgelines and oriented towards the southeast. Other future minor spur roads to be developed will occur heading in a southwest direction from the main existing spur in the SE1/4.

Red alder slashing in final harvest units, usually older than 5 years, should occur periodically. Red alder should not be allowed to over top the coniferous plantings in the recently harvested units. At times, pre-commercial thinnings in 10 to 15-year old plantations should occur. Landing slash pile burning is necessary followed by immediate reforestation of burnt areas.

Road-rocking and drainage and culvert repair will need to be monitored and maintained. Seeding with perennial rye grass along road shoulders should help to reduce erosion.

CITY OF NEHALEM WATERSHED

W½ Section 15, T3N, R10W
Section 16, T3N, R10W W.M.