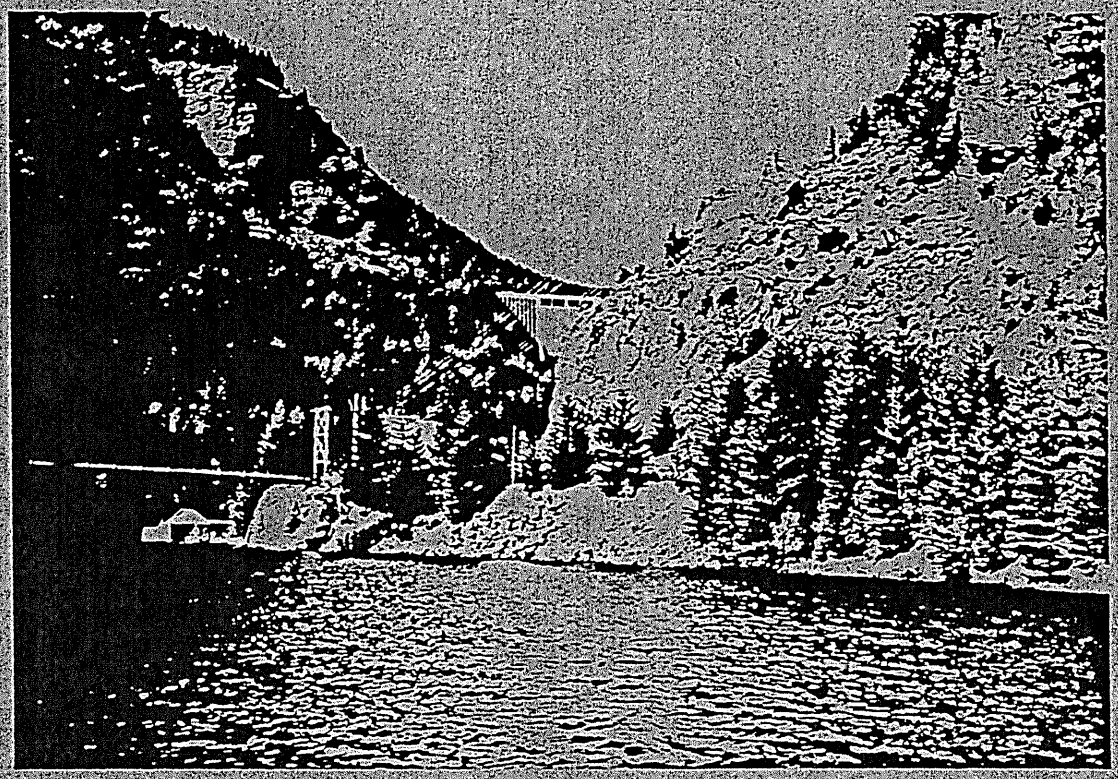
# SKAGIT RIVER
# HYDROELECTRIC
# PROJECT

FERC No. 553

# REPORT ON AESTHETICS:
# VISUAL QUALITY
# MITIGATION ANALYSIS



City of Seattle
City Light Department

APRIL 1991

Skagit River Hydroelectric Project

FERC No. 553

# Report on Aesthetics:
## Visual Quality Mitigation Alternatives Analysis

Submitted by

City of Seattle
City Light Department

April 1991

# TABLE OF CONTENTS


Page

EXECUTIVE SUMMARY ..... ES-1

1.0 INTRODUCTION ..... 1-1
- 1.1 SKAGIT RIVER HYDROELECTRIC PROJECT RELICENSING ..... 1-1
- 1.2 PROJECT OVERVIEW AND LOCATION ..... 1-1

2.0 INVENTORY AND ANALYSIS APPROACH ..... 2-1
- 2.1 LANDSCAPE ZONES AND UNITS ..... 2-1
  - 2.1.1 Skagit Project Facility Zone ..... 2-1
  - 2.1.2 Ross Lake National Recreation Area West Entry Zone ..... 2-2
  - 2.1.3 Skagit Recreational River Zone ..... 2-2
  - 2.1.4 Sauk Scenic River Zone ..... 2-2
  - 2.1.5 Rights of Way from Darrington to Bothell ..... 2-3
- 2.2 EVALUATION METHODS ..... 2-3
- 2.3 VISIBILITY OF PROJECT FACILITIES ..... 2-4
  - 2.3.1 Ross Dam Complex ..... 2-4
  - 2.3.2 Diablo Dam Complex ..... 2-4
  - 2.3.3 Gorge Dam Complex ..... 2-5
  - 2.3.4 Transmission Lines ..... 2-6
  - 2.3.5 Diablo and Newhalem Townsites ..... 2-6
- 2.4 VISUAL IMPACT ASSESSMENT OF FACILITIES ..... 2-6

3.0 POTENTIAL MITIGATION MEASURES ..... 3-1
- 3.1 CANDIDATE MEASURES CONSIDERED ..... 3-1
- 3.2 MEASURES ADDRESSED IN OTHER PLANS ..... 3-11
- 3.3 MEASURES BEYOND THE CITY'S AUTHORITY ..... 3-11

4.0 ALTERNATIVE AESTHETIC MITIGATION MEASURES ..... 4-1
- 4.1 DEFINITION OF ALTERNATIVES ..... 4-1
- 4.2 ALTERNATIVES ..... 4-2
  - 4.2.1 Comprehensive Structural and Operations Mitigation—Alternative 1 ..... 4-2
  - 4.2.2 Comprehensive Structural Mitigation—Alternative 2 ..... 4-7
  - 4.2.3 Selective Mitigation—Alternative 3 ..... 4-8
  - 4.2.4 Minimal Mitigation—Alternative 4 ..... 4-9

## TABLE OF CONTENTS (continued)


Page

5.0 EVALUATION OF MITIGATION MEASURES AND ALTERNATIVES ..... 5-1
5.1 EVALUATION OF INDIVIDUAL MEASURES ..... 5-1
5.2 EVALUATION OF ALTERNATIVES ..... 5-3
5.2.1 Comprehensive Structural and Operations Mitigation—Alternative 1 ..... 5-3
5.2.2 Comprehensive Structural Mitigation—Alternative 2 ..... 5-4
5.2.3 Selective Mitigation—Alternative 3 ..... 5-4
5.2.4 Minimal Mitigation—Alternative 4 ..... 5-5
5.3 SELECTED ALTERNATIVE ..... 5-5

6.0 CONSULTATION AND COORDINATION WITH INTERVENORS ..... 6-1

7.0 REFERENCES ..... 7-1

APPENDIX A – FERC Additional Information Request

# LIST OF FIGURES


| Figure | | Page |
|---|---|---|
| 1-1 | Visual Quality Analysis Study Area | 1-2 |


# LIST OF TABLES


| Table | | Page |
|---|---|---|
| 2-1 | Existing visual impacts of Skagit Project Facilities on affected landscape units | 2-7 |
| 3-1 | Potential aesthetic mitigation measures considered | 3-2 |
| 4-1 | Visual Impact Mitigation Alternatives | 4-3 |

# EXECUTIVE SUMMARY

The City of Seattle, City Light Department has submitted an application to the Federal Energy Regulatory Commission (FERC) to relicense the Skagit River Hydroelectric Project (Number 553). The Project is located along State Route 20 in northwestern Washington and consists of Ross, Diablo, and Gorge dams and supporting facilities at river miles 105, 101, and 97, respectively. As part of the supporting documentation for the license application, the City was asked to prepare a visual mitigation and enhancement plan identifying and describing the visual characteristics of the study area, Project facilities and visual characteristics, the impacts of those facilities on the visual quality of the study area, and proposed measures for mitigating those impacts. This document summarizes project facilities and their impacts as previously presented to the FERC (SCL, 1989), presents candidate visual mitigation measures, describes alternatives for mitigation, and assesses the environmental and economic aspects of implementing those alternatives.

Four alternatives were evaluated to mitigate impacts from Project reservoirs and river shorelines, dams, powerhouses and switchyards, townsites, and transmission lines. The first alternative, Comprehensive Structural and Operations Mitigation, would reduce most of the high to moderate visual impacts associated with Project facilities, but at a high cost. Included in this alternative are measures to increase Ross Lake reservoir levels and Gorge bypass reach flows; underground or relocate key segments of transmission lines; remove logbooms and stumps; improve vegetation management; remove, redesign, or change the color of project facilities; repaint the surge tanks and paving the Gorge dam access road immediately, and improve lighting.

The Comprehensive Structural Mitigation Alternative is similar to the first alternative but excludes the higher cost and lower effectiveness measures such as mitigation for Ross Lake reservoir levels and Gorge bypass reach flows, undergrounding transmission lines, and paving the access road to Gorge dam.

The Selective Mitigation Alternative, the preferred alternative, focuses on measures which are moderately to least costly and would be most effective in mitigating Project visual impacts. The Gorge bypass reach would continue to be managed as in the past. Ross Lake management would be little changed, with a slight increase in early season lake levels driven by compliance with the downstream anadromous fish flow plan. Under this alternative, the surge tanks and Gorge dam access road would be painted during the normal maintenance cycle, improved vegetation management would occur (emphasis on native plant species for landscaping), and transmission towers would be repainted.

The Minimal Alternative includes improved vegetation management and sedimentation/erosion control, repainting facilities during the normal maintenance cycle, painting transmission line towers, and continuing to use existing lighting.

The Selective Mitigation Alternative was chosen as the preferred alternative because it does not include the high costs of transmission line undergrounding or relocation as in the first two alternatives, altering operation of reservoir or river levels, paving roads, or immediately repainting

facilities which have recently undergone maintenance. However, the Selective Alternative does address a significant number of visual impacts, particularly those that can be accomplished at a reasonable cost. Additionally, the Selective Alternative implements those measures which have less adverse environmental impacts and which would not increase potential traffic and personal hazards to the public. Consequently, the City considered this alternative to be the most balanced and cost effective approach to visual mitigation and enhancement for the Skagit Project.

The City worked with the Intervenors in the Project relicensing proceedings, recreation and aesthetics issue forum, to refine the Selective Alternative into an agreed upon Project Visual Quality Mitigation Plan. That plan is contained in the Settlement Agreement on Recreation and Aesthetics.

# 1.0 INTRODUCTION

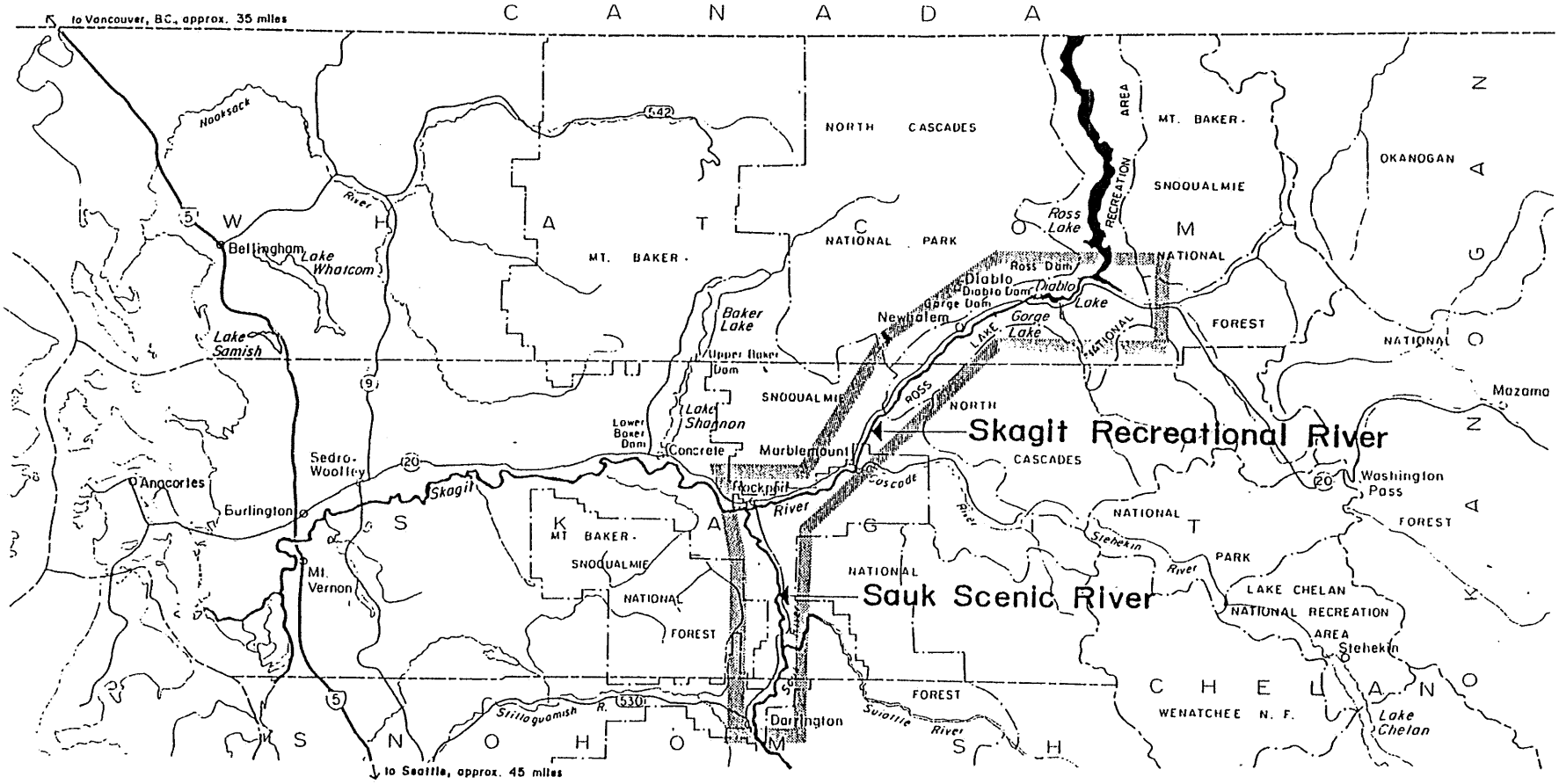
## 1.1 SKAGIT RIVER HYDROELECTRIC PROJECT RELICENSING

The City of Seattle, City Light Department (the City) owns and operates the Skagit River Hydroelectric Project, Number 553 (Project) under a license from the Federal Energy Regulatory Commission (FERC). This is a regionally important hydroelectric generating facility because it provides about two-fifths of the City's generating resources. The original 50-year license for the project expired in 1977, and an application for relicensing was filed at the time and accepted in 1979. Several interested parties have intervened and made comments to the FERC concerning the relicense application. These intervenors are the U.S. Department of Interior (National Park Service, Bureau of Indian Affairs, U.S. Fish and Wildlife Service); U.S. Department of Agriculture (Forest Service); U.S. Department of Commerce (National Marine Fisheries Service); Washington Department of Wildlife; Washington Department of Fisheries; Washington Department of Ecology; North Cascades Conservation Council; and the three Skagit System Cooperative Indian Tribes (Sauk-Suiattle Tribe, Upper Skagit Tribe, and Swinomish Indian Tribal Community).

On October 31, 1988, the FERC sent the City an Additional Information Request (AIR) identifying nine specific topics requiring additional study to provide supporting documentation for the relicensing proceedings (letter from Dean L. Shumway, Director, Division of Project Review, FERC, Washington, D.C.). See Appendix A. The City has conducted a number of studies to address these topics, including studies of the project's visual impact. This report presents an analysis of alternative measures to mitigate the visual impacts of the project. It provides an overview of the project area, reviews the methods used to inventory the visual characteristics and to assess the potential impacts of the project, and concludes with the comparative analysis used to select effective, environmentally acceptable, and economically feasible mitigative measures.

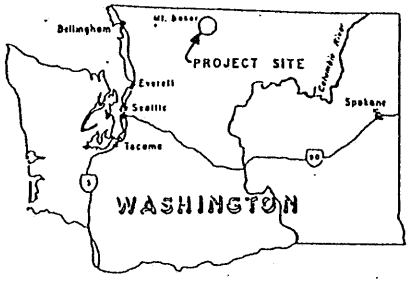
## 1.2 PROJECT OVERVIEW AND LOCATION

The Project consists of three major hydroelectric dams and associated transmission lines located in northwestern Washington. See Figure 1-1. The majority of the Project facilities, including all three dams and powerhouses, are located within the Ross Lake National Recreation Area (RLNRA) which is part of the North Cascades National Park Service Complex. The Skagit River, which originates in Canada, drains an area of 2,704 square miles and runs 162 miles to its mouth in Puget Sound near Conway, Washington. The Skagit River crosses into the United States at River Mile (RM) 127 and is the third largest river in Washington. The three project dams, Ross, Diablo, and Gorge, are located at RM 105, 101, and 97, respectively. Below the Gorge powerhouse, the river runs free of impoundments and is protected under the National Wild and Scenic Rivers Act from the RLNRA boundary at Bacon Creek (RM 82.9) to Sedro Woolley (RM 24.4). Also protected under the Wild and Scenic Rivers Act are the three main tributaries to the




## LEGEND

| | |
|---|---|
| CANADA | International Border |
| SKAGIT | County Line |
| ROSS LAKE N | Public Land Unit Boundary |
| | River / Stream |
| | Lake |
| 20 | Roads |
| Mazama | Town |
| | Study Area Boundary |




LOCATION MAP

N

Scale 1:500,000

| CITY OF SEATTLE CITY LIGHT DEPARTMENT | |
|---|---|
| SKAGIT RIVER PROJECT | FERC NO. 553 |
| Report on Aesthetics | |
| VISUAL QUALITY ANALYSIS STUDY AREA<br>Figure 1-1 | |
| This map corresponds to EXHIBIT J, Sheet No. 101 - 108 | |

Skagit (the Cascade, Sauk, and Suiattle rivers) which enter the Skagit downstream from the project impoundments.

The Project is operated for the primary purpose of producing electrical power. Project operations are also subject to considerations related to flood control, fish and wildlife, and recreation. The Ross dam impoundment is the largest reservoir, extending about 24 miles to the north. Approximately 1-1/2 miles of the lake is located in Canada. The Diablo and Gorge developments have relatively small storage capability and are generally operated as run-of-the-river plants dependent upon flow releases from Ross powerhouse.

The Project transmission system consists of two 230-kV double circuit transmission lines running from the project area to a substation in Bothell, Washington, a distance of approximately 87 miles (SCL, 1978). Other developments which support the operation and maintenance of the project include the towns of Newhalem and Diablo, various access roads, and other small support facilities. Most of the project facilities are located on federal land under the jurisdiction of the Department of Interior National Park Service. The project boundary encompasses 19,266 acres within the 128,261 acre RLNRA (NPS, 1985). In addition, the transmission line corridor from the project boundary to Darrington crosses just under 3/4 of a mile of the Skagit Wild and Scenic River corridor, administered by the U.S. Forest Service, and about 5-1/4 miles of the Mt. Baker-Snoqualmie National Forest. Land owned by the City includes part of the town of Diablo, all of the town of Newhalem, and parts of the transmission line right-of-way.

# 2.0 INVENTORY AND ANALYSIS APPROACH

The study methods used to analyze alternative visual mitigation measures were selected and adapted from the visual management systems used by the Forest Service (FS, 1973, 1977), Bureau of Land Management (BLM, 1986), and Washington State Department of Transportation (WDOT, 1985). These methods are particularly relevant because the FS administers part of the study area and WDOT manages the North Cascades Highway (SR 20) as a state scenic highway. BLM's contrast rating system is relevant for the evaluation of built facilities, an area that the FS system does not adequately address.

This analysis first determined the areas from which the the City facilities could be seen, evaluated whether these facilities positively or negatively affected the existing visual quality, and determined the magnitude or significance of the impact. From this visual quality analysis, mitigation needs and priorities were established. Frequent meetings were held between the intervenors and the City to obtain comments and recommendations prior to and throughout development of the methodology and the resulting analysis. A description of project facilities and their visual characteristics was previously provided to the Federal Energy Regulatory Commission (SCL, 1989). The following sections summarize the features of the study area and the visibility of project facilities, as presented in that report, as a basis for evaluating the impacts of the visual mitigation alternatives; Figure 1-1 indicates these areas.

## 2.1 LANDSCAPE ZONES AND UNITS

To facilitate the assessment of visual resources and the assignment of priorities for visual management and mitigation, a series of discrete landscape units along the reaches of the Skagit and Sauk rivers were delineated which are visually affected by the Project. These units were identified on the basis of spatial enclosure and relative continuity of viewer experience. The Project affects five major landscape zones. The Ross Lake Zone is discussed in another document (Parametrix, 1989); only the four remaining zones are described below (see Figure 1-1). The Skagit Project Facility Zone contains the greatest concentration of Project facilities, with Project facilities in the remaining three zones limited to transmission lines.

### 2.1.1 Skagit Project Facility Zone

The Skagit Project Facility Zone, from Ross dam to Newhalem, is the northernmost of the four landscape zones in this study. Ross Lake, Diablo Lake, Diablo townsite, Gorge Lake, and the Newhalem townsite are major features of this zone. It provides visual access from the front country of the RLNRA along State Route 20 to the wilderness back country of the national park. The two larger Project reservoirs accentuate expansive views. The impressive views are dominated by steep mountain slopes leading to snow capped peaks in both foreground and distant views. This zone has the steepest elevation gain on SR 20 and features the highest concentration

of Project facilities along the SR 20 corridor. The vegetation throughout the zone is upland coniferous, consisting of fir, cedar, and hemlock. The dominant user groups are pleasure drivers and bicyclists along SR 20, boaters and campers on the lakes, and hikers on shoreline and mountain trails in the Diablo Lake and Ross Lake vicinities.

### 2.1.2 Ross Lake National Recreation Area: West Entry Zone

The Ross Lake National Recreation Area West Entry Zone is comprised of three areas of varying valley width, vegetation, enclosure, and height and steepness of valley walls. This zone is easily distinguished from the Skagit Project Facility Zone by the contrast in vegetation, with upland and floodplain deciduous forests predominating. Slope gradients of the valley floors are less dramatic and the Skagit River appears to be free-flowing, although its flow regime is regulated by hydroelectric operations upstream. Predominant visitor groups are drivers along SR 20 and rafters and anglers along the Skagit River.

### 2.1.3 Skagit Recreational River Zone

In this zone, the valley widens dramatically and the landscape becomes pastoral. Visible human influences increase with the introduction of housing to the landscape and camps with water-edge development to the riverscape. The Project transmission lines cross two segments of designated or recommended wild and scenic river in this zone; the Skagit River at RM 74 and Diobsud Creek near its mouth with the Skagit River. The hill-slopes are not as steep and the valley floor is relatively flat, allowing extended views up and down the valley. Both motorized and nonmotorized boating occurs here, with the greatest use in winter months due to steelhead fishing and eagle watching.

### 2.1.4 Sauk Scenic River Zone

The visual experience of the Sauk River valley as seen from SR 530 is very different than as seen from the river. The zone is shaped like an hourglass in plan view, with wide valley floors at both ends and a confined narrow section in the middle. From SR 530, the feeling is of heavy enclosure throughout most of the unit, due to dense forest vegetation, with occasional brief views to the meandering river, open fields, and valley side slopes.. The visibility of transmission facilities is low from SR 530. Views from the river are considerably more open, with frequent views to side ridges. The visibility of transmission facilities is also far higher from the Sauk than from SR 530. The Sauk is crossed twice by steel overhead truss bridges and once by the transmission right-of-way (ROW) at RM 6. This river reach gets relatively low boating use in comparison to upriver sections due to shallow and rocky conditions, and due to lack of adequate access facilities.

The ROW moves away from the Sauk River as it approaches Darrington, makes a turn to the west and passes out of the Skagit River Basin into the Stilliguamish drainage at about ROW mile 47.

### 2.1.5 Rights of Way from Darrington to Bothell

The remainder of the Project rights-of-way continue from Darrington to the Bothell substation. The section of this zone that extends from Darrington in Snohomish County west toward the town of Oso offers only intermittent views of transmission lines and towers, as most are hidden by foothills. Exceptions are open areas west of the Darrington fairgrounds and where Highway 530 crosses the ROW at ROW miles 40 and 34. At Oso, the transmission corridor begins to move out of the foothills into more open agricultural lands that extend south toward Granite Falls. Suburban areas begin to become mingled with the agricultural lands, and become predomoinant near Bothell.

Portions of the transmission right-of-way in this zone are fee-owned by the City, but the majority are owned by others with the City having only an easement. Specific parcels of City fee-owned lands are indicated in Exhibit K to the 1978 Project license application (SCL, 1978).

## 2.2 EVALUATION METHODS

To evaluate the visual impacts of the Skagit Hydroelectric Project, four factors were studied and characterized. The visual quality of the setting was characterized, the visual contrast of project facilities was determined, viewer exposure to project facilities was assessed, and viewer sensitivity to the facilities was evaluated. The relative value or importance of visual resources was then established to determine priorities for visual management and mitigation. The four facets of the evaluation process are described in greater detail below.

Existing visual resources within each of the study area landscape units were assessed for visual quality and character. A checklist inventory was prepared for each unit of principal visual attributes (i.e., landform, water features, vegetation, and manmade facilities) to facilitate describing the visual character and evaluation of visual contrast between project facilities and other existing visual resources. A professional visual quality assessment was prepared to determine vividness, intactness, and unity of the units (anchored by benchmark ratings) in a manner similar to that used for assessments for the Utility Accommodation Policy (WDOT, 1985), the Washington State Scenic & Recreational Highway Study (Jones & Jones, 1975), and Technical Report 7: Scenic Environment in the Copper Creek Environmental Assessment (SCL, 1979). "Vividness' is defined as the memorability of landscape components as they combine in striking and distinctive patterns. "Intactness" is the visual integrity of the natural and man-built landscape, and its freedom from encroaching elements. "Unity" is the visual coherence and compositional harmony of the landscape as a whole (Jones and Jones, 1979).

Viewer response or receptivity to the appearance of project facilities was then evaluated for various user groups. This was done by determining viewers' sensitivity to project facilities by identifying

the activities participated in (e.g., sightseeing from a car, hiking, camping, etc.), their expectation of the characteristics to be viewed, and their awareness of features while conducting their activities.

The next step in assessing visual impacts of existing Skagit Project facilities was to evaluate the visual contrast of these facilities with the landscapes in which they are located. Contrast was measured using the parameters employed by the Forest Service and the Bureau of Land Management in their visual resource management system: form, line, color, and texture.

The ROW from Darrington to Bothell was not subjected to the same level of analysis. The City evaluated the fee-owned portions of the ROW for visibility, contrast and visual quality from the perspective of the general public on highways, streets, and waterways.

## 2.3 VISIBILITY OF PROJECT FACILITIES

The City has provided the FERC with an inventory and description of project facilities (SCL, 1989). The following sections summarize the description of the visibility of project facilities from the 1989 report, to establish a basis for determining the impacts and range of potential mitigation measures to reduce impacts.

### 2.3.1 Ross Dam Complex

An assessment of the visibility of Ross Dam Complex facilities showed that the dam and powerhouse are visually prominent from the Skagit Tour route but generally are not prominent in most other views. The viewpoints from SR 20 are high above the dam so the viewer looks down at the moderately prominent contrasting color of the wedge of the dam. The dam is highly prominent in the foreground to tour participants viewing it from Ross Canyon, about one-half mile away, and is inconspicuously visible from Ross Lake Resort. The intake structure is visible from almost all viewpoints of Ross dam and is easily recognized. Neither the dam nor the intake structure are visible from the Ross Lake Trailhead parking lot on SR 20. Ross Lake, the reservoir, is highly visible in the middleground for 4 to 5 miles along SR 20 east of milepost 133. Participants on the Skagit Tour do not see the reservoir during their visit. The access road is moderately prominent in the middleground for Skagit Tour participants when entering or leaving the boat dock at the powerhouse.

### 2.3.2 Diablo Dam Complex

The Diablo dam is visually prominent only from the Skagit Tour route and the dam access road. The dam is visible from a few middleground viewpoints and an informal pulloff between mileposts 127 and 129, and from a long-distance view from Diablo Lake Overlook at milepost 131.8. The dam has low visibility and prominence from Diablo Resort. The intake structure at the north abutment is visible from almost all views of the dam and is one of its most prominent features.

Diablo Lake is highly visible from multiple informal and developed pulloffs along SR 20 for about 5 to 6 miles east of milepost 128. The logboom at Buster Brown Campground can be seen from Diablo Lake Overlook on SR 20 but is not prominent, although the moored barges are moderately prominent from there. The logbooms become moderately prominent when viewed from the foreground on the dam access road near the intake structure and by Skagit Tour participants walking to and from the tour boat dock. The docks near the dam are prominent only in foreground views, such as from the resort access road. The access road has low visual prominence where it intersects with SR 20 and is in the background from views across the reservoir.

The Diablo switchyard, powerhouse, and incline lift are visually prominent only in close foreground views from within the townsite or along the Skagit Tour route and have low visibility and prominence from SR 20. The powerhouse also is visible from most parts of Reflector Bar but not from the Hollywood residential area. The surge tank is moderately visible from many locations along SR 20, including visual prominence from milepost 124 to 126 (due to the cleared transmission line right-of-way). The tank is easily recognizable in middleground views from milepost 127 to 130 and from Reflector Bar; and is very prominent in foreground views from the incline lift.

### 2.3.3 Gorge Dam Complex

The visibility of Gorge dam is very limited, comprised of middleground views which are strongest for eastbound traffic on SR 20. The access road is briefly visible where it intersects with SR 20 and is moderately prominent from the informal pulloff at milepost 123. The reservoir is visually prominent along SR 20 from the Diablo townsite to Gorge Creek and the north bank is adjacent to SR 20 for about three miles. A drawdown zone, represented by the lack of shoreline features and differences in rock weathering, is visible in the middle and foreground views. A large number of stumps are visible from SR 20 at the upper end of the reservoir where the water is shallow. The logboom is of low prominence to eastbound traffic on SR 20.

The Gorge powerhouse, switchyard, conductors and insulators connecting the two, and the Skagit Service Center are visually prominent from SR 20 and from within Newhalem. The powerhouse and Service Center are visible from foreground views and the switchyard is visible from middleground views from SR 20. The surge tank has little or no visibility from SR 20. The gravel parking lot for Ladder Creek Falls, the access road bridge, and the footbridge are visible to eastbound SR 20 traffic. The landscaped J.D. Ross crypt on the north shoulder of SR 20 is the only visually distracting feature for the large cleared area represented by the switchyard, the parking lot, and Skagit Service Center. The distribution line to Gorge dam is moderately prominent along SR 20 eastbound traffic for about one-half mile at milepost 120.9, at milepost 123 at the Gorge dam, and at informal pulloffs at those points. The maintenance shops are prominent in the foreground from the Gorge access road, which follows the river from the powerhouse to the Gorge Inn.

### 2.3.4 Transmission Lines

The Skagit Project transmission lines are most consistently visible along SR 20 from Bacon Creek to Ross dam. The position of the lines in these views fluctuates from the foreground at Bacon Creek and Gorge Lake to the middleground at Diablo Lake and Thornton Creek. The visibility of the transmission structures and conductors from the Skagit River tend to be the reverse of their visibility from SR 20 in this section as the line winds between them. The most visible expanses of towers and conductors along the Skagit River are in the viewsheds from Thornton Creek to Sky Creek, at the mouth of Bacon Creek, and at the Skagit River crossing near Corkindale Creek. In most of these views, the transmission lines are strongly prominent. Less prominent middleground and background views occur with lower frequency from Bacon Creek south to the Sauk River and Darrington.

The ROW is visible from a number of locations along public highways, roads, and waterways from Darrington to Bothell. South of Darrington, the landscape is increasingly more modified as well as flatter topographically, the ROW becomes a less prominent element for the viewer in most cases. Most of the ROW in this area is not fee-owned by the City.

### 2.3.5 Diablo and Newhalem Townsites

Diablo is viewed primarily by residents and Skagit Tour participants. The townsite can be seen briefly in the middleground view from SR 20 at an informal pulloff at milepost 127 and for about one-mile to the east.

Newhalem townsite is located on a narrow terrace at the foot of Mount Ross, extending a mile along the Skagit River below the Gorge powerhouse where the river emerges from the Gorge by-pass reach canyon. SR 20 acts as the main street of the town of Newhalem and therefore the townsite is afforded strong visual prominence in foreground views. The main streets are landscaped with large flower beds and flower boxes; landscaped open spaces and buildings are intensely landscaped and maintained.

## 2.4 VISUAL IMPACT ASSESSMENT OF FACILITIES

Table 2-1 summarizes the ratings of Skagit Project dams, shorelines, and transmission lines for each landscape unit. The ratings are based upon the four assessment characteristics presented in Section 2.2. In conducting the aesthetic impact assessment, it was presumed that moderate or high viewer exposure was a necessary component of an adverse visual impact determination. As recommended by intervenors, this evaluation is not based on the relative numbers of viewers in

**Table 2-1. Existing visual impacts of Skagit Project facilities on affected landscape units** 

| Landscape Zone/Unit | Visual Quality | Visual Contrast | Viewer Exposure | Viewer Sensitivity | Visual Impact |
|---|---|---|---|---|---|
| | | | **I. DAMS** | | |
| 1 Upper Ross Lake Zone (see Parametrix, 1989) | | | | | |
| 2 Skagit Project Facility Zone | | | | | |
| A. Ross Dam | Very high | Moderate | Moderate | Moderate | Moderate |
| B. Ross Canyon | High | High | Moderate | Low | Low |
| C. Thunder Arm | High | ---1/ | --- | Moderate | --- |
| D. Lower Diablo Lake | High | Moderate | Moderate | Moderate | Moderate |
| E. Diablo Townsite | Mod. high | Moderate | Moderate | Low | Low |
| F. Gorge Lake | Mod. low | Low | Low | Moderate | Low |
| G. Gorge Bypass Reach | Moderate | Moderate | Low | Moderate | Low |
| | | | **II. POWERHOUSES & SWITCHYARDS** | | |
| 2 Skagit Project Facility Zone | | | | | |
| A. Ross Dam | Very high | --- | --- | Moderate | --- |
| B. Ross Canyon | High | Moderate | Moderate | Low | Low |
| C. Thunder Arm | High | --- | --- | Moderate | --- |
| D. Lower Diablo Lake | High | --- | --- | Moderate | --- |
| E. Diablo Townsite | Mod. high | High | Moderate | Low | Low |
| F. Gorge Lake | Mod. low | --- | --- | Moderate | --- |
| G. Gorge Bypass Reach | Moderate | --- | --- | Moderate | --- |
| H. Newhalem Townsite | Mod. high | Moderate | High | Moderate | Moderate |
| | | | **III. SHORELINES** | | |
| 2 Skagit Project Facility Zone | | | | | |
| A. Ross Dam (see Parametrix, 1989) | | | | | |
| B. Ross Canyon | High | Moderate | Moderate | Moderate | Low |
| C. Thunder Arm | High | Moderate | High | High | Moderate |
| D. Lower Diablo Lake | High | Moderate | High | High | Moderate |
| E. Diablo Townsite | Mod. high | Moderate | Moderate | Moderate | Moderate |

**Table 2-1. Existing visual impacts of Skagit Project facilities on affected landscape units** 

| Landscape Zone/Unit | Visual Quality | Visual Contrast | Viewer Exposure | Viewer Sensitivity | Visual Impact |
|---|---|---|---|---|---|
| **Shorelines (continued)** | | | | | |
| F. Gorge Lake | Mod. low | Moderate | High | High | Moderate |
| G. Gorge Bypass Reach | Moderate | Moderate | Moderate | Moderate | Moderate |
| H. Newhalem Townsite | Mod. high | Moderate | Moderate | Moderate | Moderate |
| 4 Skagit Recreational River Zone 2/ | | | | | |
| A. Bacon Creek to Marblemount | Moderate | Moderate | High | High | Moderate |
| B. Marblemount to Rockport | Moderate | Moderate | High | High | Moderate |
| 5 Sauk Scenic River Zone 2/ | | | | | |
| A. Flume Creek to Rockport | Mod. high | Moderate | Moderate | High | Moderate |
| **IV. TOWNSITES OR BUILDINGS** | | | | | |
| 2 Skagit Project Facility Zone | | | | | |
| A. Ross Dam | Very high | — | --- | Moderate | --- |
| B. Ross Canyon | High | Low | Low | Low | Low |
| C. Thunder Arm | High | — | --- | Moderate | --- |
| D. Lower Diablo Lake | High | Low | Moderate | Moderate | Low |
| E. Diablo Townsite | Mod. high | High | Moderate | Low | Low |
| F. Gorge Lake | Mod. low | — | --- | Moderate | --- |
| G. Gorge Bypass Reach | Moderate | — | --- | Moderate | --- |
| H. Newhalem Townsite | Mod. high | High | High | Moderate | Moderate |
| **V. TRANSMISSION LINES** | | | | | |
| 2 Skagit Project Facility Zone | | | | | |
| A. Ross Dam | Very high | Low | Low | Moderate | Low |
| B. Ross Canyon | High | High | Moderate | Moderate | Moderate |
| C. Thunder Arm | High | Low | Low | Moderate | Low |

**Table 2-1. Existing visual impacts of Skagit Project facilities on affected landscape units** 

| Landscape Zone/Unit | Visual Quality | Visual Contrast | Viewer Exposure | Viewer Sensitivity | Visual Impact |
|---|---|---|---|---|---|
| **Transmission Lines (Continued)** | | | | | |
| D. Lower Diablo Lake | High | High | High | Moderate | High |
| E. Diablo Townsite | Mod. high | Moderate | Moderate | Low | Low |
| F. Gorge Lake | Mod. low | High | High | Moderate | High |
| G. Gorge Bypass Reach | Moderate | High | High | Moderate | High |
| H. Newhalem Townsite | Mod. high | High | High | Moderate | High |
| 3 North Cascades National Recreation Area: West Entry Zone | | | | | |
| A. Goodell Creek to Babcock Creek | Mod. low | High | High | High | High |
| B. Babcock Creek to Damnation Creek | Low | High | High | High | High |
| C. Damnation Creek to Bacon Creek | Mod. low | High | High | High | High |
| 4 Skagit Recreational River Zone | | | | | |
| A. Bacon Creek to Marblemount 2/ | Moderate | High | High | High | High |
| B. Marblemount to Rockport 2/ | Moderate | Moderate | High | High | Moderate |
| 5 Sauk Scenic River Zone | | | | | |
| A. Flume Creek to Rockport 2/ | Mod. high | Moderate | Moderate | High | Moderate |
| B. Suiattle River to Flume Creek. 2/ | Mod. high | High | High | High | High |
| C. Darrington to Suiattle River 2/ | Moderate | Moderate | Moderate | High | Moderate |

1/ Facilities not visible in this landscape unit.

2/ Shoreline impacts in these units are limited to vegetation clearings under the transmission lines, particularly at river crossings.

Source: SCL, 1989.

different viewer groups, but on significant exposure for the groups considered on an equal basis. Finally, moderate or high viewer sensitivity also was considered a necessary component of adverse visual impacts.

In general, the visual impacts of the Skagit Project dams are moderate to low because of their limited visibility to viewers who visited the area without the purpose and expectation of seeing the dams. The access routes to the dams are generally inconspicuous, helping to reduce the overall visual impacts of the dam installations. The visual impacts of the powerhouses and switchyards are also moderate to low. Viewer exposure to Ross and Diablo facilities of this type is moderate, but exposure to the Newhalem powerhouse and switchyard is high. However, the visual contrast of the latter facilities is moderate and their location in the town of Gorge is consistent with many viewers' expectations, so their visual impact is also moderate.

The visual impacts of the Ross Lake shoreline are reported as part of the Ross Lake Visual Quality Assessment (Parametrix, 1989). The visual impacts of the Diablo and Gorge lake shorelines are moderate because the fluctuation of the two reservoirs averages 3 to 4 feet. A large portion of the impacts on both lakes is due to unvegetated road edges along the lake shores. In the Gorge bypass reach, the dry appearance of the channel introduces moderate visual contrast and visual impacts. In Newhalem, the rip rap along the riverbank also imposes moderate visual impacts.

Townsites and miscellaneous buildings associated with the Project impose low to moderate visual impacts. These impacts are greatest in Newhalem, where the Skagit Maintenance Center and extensive gravel parking areas along SR 20 and the eastern end of the townsite introduce a high level of contrast. The neatly maintained rows of houses and extensive lawn areas also contrast sharply with the surrounding natural environment. The lawns contribute to the foreground visual quality in the townsites but may be incompatible with the visual management objectives from backcountry viewpoints. Diablo imposes low visual impacts because it is viewed primarily by residents and Skagit Tour participants; this is also true of the miscellaneous buildings that are associated with the Project and located in the Ross Canyon and Upper Diablo Lake landscape units.

The visual impacts of the transmission lines are the greatest of all the project facilities. Viewer exposure to the transmission lines is high in many of the landscape units because lines closely parallel the river and road, which are areas of high visitor activity. Viewer sensitivity is also high along the river, particularly from Goodell Creek to Rockport and along the Sauk River, because of whitewater rafting, eagle watching, and fishing. The overall visual impacts of the transmission lines are high in a number of the landscape units, including Lower Diablo Lake, Gorge Lake, Goodell Creek to Bacon Creek on the Skagit River, and Suiattle River to Flume Creek on the Sauk River.

The visual impact of the ROW south and west of Darrington is lower because of the increasingly modified character of the landscape and the decreased overall exposure of the ROW in a flatter landscape.

# 3.0 POTENTIAL MITIGATION MEASURES

Prior to deciding upon alternative mitigation measures for analysis, the City established two selection criteria for aesthetic mitigation measures:

1) Each measure must be related to specifically identified Project impacts. The City will not undertake mitigation or enhancement measures to address impacts not created or displaced by the Project.

2) Each measure must not create more problems than it solves. In particular, the City will not undertake measures that decrease the safety of the City employees or the public, or which violate applicable safety and health laws and regulations.

Based upon these criteria, the City held meetings with intervenors to create a list of potential mitigation measures that could be organized into alternatives and evaluated for their effectiveness. These measures are briefly presented below and discussed in detail under the alternatives presented in Section 4.

## 3.1 CANDIDATE MEASURES CONSIDERED

The City's studies have identified and analyzed the impacts of Project facilities on visual quality in the study area. Table 3-1 presents the major potential aesthetic mitigation measures considered during the alternatives evaluation process for those facilities. The table shows the facilities and sites for mitigative measures, the magnitude and extent of implementation, estimated effectiveness in mitigating project visual impacts, potential adverse environmental impacts which could result from implementing the measures, and the relative or estimated cost of implementation (when it is known).

Table 3-1 also categorizes candidate aesthetic mitigation measures into components of project facilities, including reservoirs and river shorelines, dams, powerhouses and switchyards, and high-voltage transmission lines. Candidate mitigation measures for reservoirs and shorelines would include removing logbooms, stabilizing and revegetating cuts and fills along dam roads and SR 20, assessing visual impacts of measures to reduce sedimentation and erosion problems, reservoir pool and minimum Gorge bypass reach flow levels, and developing viewpoints and improving the graphics of warning signs along SR 20. Shoreline impacts would also be mitigated by improved ROW vegetation management, particularly at river crossings. Mitigation measures for dams would consist of screening views of dams and modifying the color of the faces, relocating or redesigning maintenance and support facilities, planting trees to screen a burn dump and access roads, developing a viewpoint at Gorge dam, paving the Gorge dam access road and repainting the bridge, and shielding and altering the intensity of exterior facility lighting. In addition to relocating and redesigning support facilities for dams, mitigation of impacts from powerhouses and switchyards would include repainting surge tanks, replacing or repainting highly

Table 3-1. Candidate Visual Impact Mitigation Measures



| Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|
| **R Reservoir and/or River Shorelines** | | | | | |
| 1 Remove logbooms or replace with less obtrusive configuration at dams and feeder creeks | Ross, Diablo, and Gorge lakes | Five booms, length to be determined | Low; booms unobtrusive from water and consistent with viewer expectation at dams | Public safety if booms removed | Two barges at Buster Brown boom are used for moving freight and burning trash. At that location because protected from wind. Can't move closer to shore due to shallow water. The FERC requires some logbooms for safety and to keep debris out of the navigable channel. |
| 2 Stabilize and revegetate cuts and fills along dam access roads | Lower Ross Lake, lower Diablo Lake | Length to be determined | High; moderate to low/SCL | None. Beneficial effect on habitat and sedimentation | — |
| 3 Stabilize and revegetate cuts and fills along SR 20 | Lower Diablo Lake, Gorge Lake, Gorge bypass reach | Length to be determined | High | None. Beneficial effect on habitat and sedimentation | Not part of the Project. |
| 4 Remove stumps within drawdown zone of reservoirs | Upper Ross Lake and Upper Gorge Lake | Upper ends of reservoirs | High; safety issue more than visibility | Moderate; fisheries habitat | Stumps are hard to remove in some locations due to collected sediments. Disposal problem with removed stumps - soaked so won't burn. D9 cat for 15-20 minutes per stump. |
| 5 Measures to reduce sedimentation and erosion problems | Ross, Diablo, and Gorge lakes (throughout) | | See Note | See Note | These measures are addressed in the Erosion Control Plan. |

| | Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|---|
| 6 | Maintain reservoirs at full pool during peak recreation season (specify begin and end dates) | Primarily Ross; Diablo and Gorge lakes are not storage reservoirs | 3-4 months | High | High; impacts on downstream fisheries and firm power generation | To reach full pool June 1, loss of revenues is $300,000 - $1.7 million annually. See Ross Lake Levels analysis. |
| 7 | Provide minimum river flows during daylight hours in summer recreation season | Gorge bypass reach | (500 cfs) x (1/2 day) x 90 days | High-moderate; dependent on minimum flow level | Safety; creates "attractive nuisance" | Annual cost $350,000 |
| 8 | Develop viewpoint(s) along SR 20 for river flows | Gorge bypass reach | 1 or 2 sites along SR 20 | High-moderate; dependent on minimum flow level | High-moderate; safety problems | Public safety, rockfall. The one safe site is being developed pursuant to the Recreation Plan; the primary view is of the lake, not the bypass reach. |
| 9 | Improve graphic design of warning signs along SR 20 | Gorge Lake and Gorge bypass reach | Spot locations throughout | Low; signs noticeable only at close hand | None | — |

**Table 3-1. Candidate Visual Impact Mitigation Measures**



| Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|
| **D Dams** | | | | | |
| 1 Screen views of dams, except from developed viewpoints and Skagit Tour route. Eliminate Gorge pulloff. | Ross, Diablo, and Gorge lakes | Length to be determined | Low based on present impact, primarily from SR 20 | Negligible | — |
| 2 Modify color of dams, especially faces | Ross, Diablo, and Gorge dams | Faces of dams | Low based on present impact | Short-term; cleaning debris | — |
| 3 Relocate/redesign maintenance and support facilities at dam sites | Ross, Diablo, and Gorge lakes | At abutments | Low based on present impact and consistency with viewer expectation | Low; dependent on design quality and construction | Floating camp can't move - only place; other facilities could be reskinned or reconfigured - e.g., Broome Gate House on top Ross dam |
| 4 Plant trees to screen views of burn dump and access road | Gorge bypass reach | Length to be determined | Moderate | Negligible | The distribution powerline prohibits planting larger screen. |

**Table 3-1. Candidate Visual Impact Mitigation Measures**



| | Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|---|
| 5 | Develop viewpoint(s) of Gorge dam | Gorge bypass reach | 1 site at bridge | Moderate-low | Low, because sites are affected by dam construction and transmission lines | See item 8 under Reservoir. |
| 6 | Pave access road to Gorge dam | Gorge bypass reach | Less than 1 mile | Low under existing conditions (no minimum flows the bypass reach) | Negligible | If paved, create attractive nuisance, access to plunge pool at bottom of dam; site is currently closed to the public. |
| 7 | Repaint access bridge at Gorge dam | Gorge bypass reach | 1 _____ feet bridge | Low under existing conditions | Negligible | Bridge won architectural award. Handrail could be painted dark recessive color. No new cost if painted on maintenance cycle. |
| 8 | Provide high angle cut-off shielding for all exterior lighting | Ross, Diablo, and Gorge dams | Number of fixtures | Moderate | Negligible | Ross powerhouse has single 200 watt high pressure sodium, illuminates yard only. Diablo - historic lighting, 75 watt sodium vapor. Gorge - emergency light when tripped only, also light at gate - shielded, incandescent. |
| 9 | Continue to employ low-wattage exterior lighting | Ross, Diablo, and Gorge dams | Number of lamps | Moderate | Negligible | — |
| 10 | Replace mercury or low-intensity sodium lamps with high-intensity sodium lamps for exterior lighting | Ross, Diablo, and Gorge dams | Number of lamps | Moderate | Negligible | — |

**Table 3-1. Candidate Visual Impact Mitigation Measures**



| | Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|---|
| **P** | **Powerhouses and Switchyards** | | | | | |
| 1 | Repaint surge tanks | Diablo and Gorge powerhouses | 2 tanks | High | Sandblasting generates waste | Recently painted surge tanks green aluminum paint, good paint to last for sunshine and durability, have to drain system to paint, shutdown powerhouse to drain because of condensation. 6-10 weeks to sandblast and paint, weather dependent, paint will last 20 years - 20 year rotation. |
| 2 | Replace galvanized or aluminum roofing/siding with material having low-gloss color coating | Diablo | Number of buildings | High | Negligible | Already replacing roofing with brown. Manlift to be removed. Incline machine building scheduled to be resided. End of powerhouse wall is low priority. |
| 3 | Underground distribution lines within highway or transmission ROW | Gorge powerhouse to Gorge dam | 3 miles | Moderate | Dependent on route | Infeasible, rocky and unstable topography. Hard to maintain. |
| 4 | Consolidate distribution lines within transmission line ROW | Gorge powerhouse to Gorge dam | 3 miles | Moderate | Dependent on clearing | Spanning tower 13 to 14 and tunnel difficult due to distances. |
| 5 | Plant trees to screen views of switchyards | Newhalem and Diablo | Switchyard perimeters | High | Negligible | Some locations have insufficient space or clearance from transmission lines to put in plantings. |
| 6 | Restore historic character of Ladder Creek Falls trail and lighting | Newhalem | Scope to be determined | Dependent on visitor use | Dependent on extent of action | Addressed in the Historic Resource Mitigation Management Plan. |
| 7 | Provide high angle cut-off shielding for all exterior lighting | Ross, Diablo, and Gorge powerhouses | Number of fixtures | Moderate | Negligible | Equipment in place. |

| | Project Types & Facility Mitigation Potential Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|---|
| 8 | Continue to employ low-wattage exterior lighting | Ross, Diablo, and Gorge powerhouses | Number of lamps | Moderate | Negligible | — |
| 9 | Replace mercury or low-intensity sodium lamps with high-intensity sodium lamps for exterior lighting | Ross, Diablo, and Gorge powerhouses | Number of lamps | Moderate | Negligible | — |

**Table 3-1. Candidate Visual Impact Mitigation Measures**



| Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|
| **H High-Voltage Transmission Lines** | | | | | |
| 1 Underground transmission lines throughout study area | Ross Lake NRA, Skagit Scenic & Recreational River | 21 miles | High - moderate; dependent on route and offsetting visual impacts | High; ROW clearing and related facilities; pumped oil system for cooling | Very high installation cost and greater time for repairs. Can't underground in current ROW because of rock; would have to create a second ROW. Problem with Newhalem to Marblemount - WDOT ROW, have to cross stream, on buried ROW can't have anything but grass - no trees. |
| 2 Underground transmission lines in key areas | Upper Diablo Lake, Gorge Lake, Newhalem, Goodell Creek, Bacon Creek | Newhalem, 2 or 3 miles | High-moderate; dependent on route and offsetting visual impacts | High; ROW clearing and related facilities; pumped oil system for cooling | High installation cost and greater time for repairs. |
| 3 Rebuild transmission lines at higher voltage (500 KV) throughout study area (to be considered if four circuits can be consolidated onto one set of towers instead of two) | Ross Lake NRA, Skagit Scenic & Recreational river | 21 miles | High-moderate, dependent on route and offsetting visual impacts | High; construction and revegetation time for old ROW; ROW clearing for new ROW in some area | Lower reliability and higher cost. 500 KV increases the clearance requirements so it doesn't result in narrower ROW, tower has to be larger, insulator is twice as big. Must be determined if number of lines can be reduced. Otherwise fire or problem with one line would require project to shut down and reduced capacity. |

**Table 3-1. Candidate Visual Impact Mitigation Measures**



| Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|
| 4 Relocate transmission lines in key areas | Upper Diablo Lake, Gorge Lake, Goodell Creek, Bacon Creek | 3 mi. at Diablo Lake; 2 mi. at Diablo town; 4.5 mi. at Gorge Lake | High-moderate, dependent on extent and offsetting visual impacts | High; construction and revegetation time for old ROW; ROW clearing for new ROW in some areas | High cost. Recovery time of vegetation is very slow here. Problem with color is air traffic safety. Diablo - can't run T-line over or near resort. New ROW equals new visual contrast. Gorge - question whether enough room to relocate. Need to look from both road and lake because may create new problem - view to Jack. May greatly increase long-term maintenance cost by placing towers where they are difficult to get to. One proposed tower located in snow slide area. Have to have road to towers so have to build new maintenance road. Proposed relocation below Damnation Creek would create new ROW. Cost of new towers high. Vegetation management may be preferable in some areas; SCL is letting woody vegetation grow back in. |
| 5 Consolidate existing transmission lines and ROWs in key areas where existing ROW splits | Upper Diablo Lake, Gorge Lake, and Bacon Creek | 0.8 mi at Diablo; 3 mi. at Gorge Lake | Moderate, dependent on route and offsetting visual impacts | Construction in currently undisturbed areas; vegetation time for old ROW | High cost |
| 6 Relocate individual transmission structures at key locations | Upper Diablo Lake and Gorge Lake | Up to 17 new structures | Moderate, dependent on location(s) and offsetting visual impacts | Construction in currently undisturbed areas; revegetation time for old ROW | High cost |

**Table 3-1. Candidate Visual Impact Mitigation Measures**



| | Project Facility Types & Potential Mitigation Measures | Application | Magnitude & Extent | Probable Effectiveness | Potential Adverse Impacts | Cost/Other Notes |
|---|---|---|---|---|---|---|
| 7 | Paint towers less visually contrasting color | Throughout | Numerous structures | Moderate | Negligible | Can be done during the regular maintenance cycle |
| 8 | ROW vegetation management, special effort on identified visual quality problem areas | Seven aesthetic target areas, primarily in RLNRA | A few acres of ROW to be treated | Moderate to high, depending on ability of each site to be successfully treated | Small risk of siltation at one or two steep sites | Moderate to high cost, depending on speed of implementation |
| 9 | ROW vegetation management, determinate growth, emphasize native species | Throughout | Impacts entire City ROW management program for Project | High-moderate | Negligible | Moderate increase in cost due to increaselingly labor intensive program |
| 10 | ROW vegetation management, indeterminate growth, emphasize native species | Throughout | Impacts entire City ROW management program for Project | Moderate | Negligible | Moderate increase in cost due to increaselingly labor intensive program |

visible metal siding and roofs, decreasing the impacts of electrical distribution transmission lines, planting trees to screen switchyards (see Appendix B), and altering the exterior lighting of these facilities. Mitigation of electrical transmission lines, excluding distribution lines, would include burying, rebuilding and upgrading, relocating the lines, or painting towers a different color.

## 3.2 MEASURES ADDRESSED IN OTHER PLANS

Several studies have been conducted to develop mitigation measures which also affect the visual impacts of Project facilities on the study area. The Ross Lake Levels Analysis (SCL, 1991a) describes options for and impacts of increasing Ross Lake reservoir levels earlier in the year. Because of the high costs associated with this action and the adverse impacts on fisheries, the City proposed maintaining existing reservoir operations (as presented in the Selective Mitigation Alternative in Section 4.2.3).

An Erosion Control Plan (SCL, 1991b) was also developed to address erosion and sedimentation impacts resulting from Project facilities and operation. Thirty-four recreation and Project facility sites and 16 road sites were recommended for active erosion control measures (e.g., vegetation, logs, rocks walls, and cribbing). An additional 38 sites were recommended for implementing passive control measures or monitoring. Of the total 72 sites, 46 are on Ross Lake, 5 on Diablo Lake, and 1 is on Gorge Lake. These measures will improve the visual characteristics of the sites where they are implemented.

A Transmission Rights-of-Way Vegetation Management Plan prepared for the City (SCL, 1990) investigates options for mitigating a 20-mile segment of Project transmission lines that transect the Ross Lake National Recreation Area (along SR 20 between Bacon Creek and Ross dam). Various management options are considered which would reduce the visual impacts of Project transmission lines in the NRA. Relevant portions of that plan have been incorporated into the Settlement Agreement on Recreation and Aesthetics, Section 4 of which is the agreed upon Project Visual Quality Mitigation Plan including a ROW vegetation management plan at Section 4.2.3 (SCL, 1991c).

A Historic Resources Management Plan has been prepared to identify resources and discuss routine maintenance, structure and property alterations, alterations to the study areas setting, and destruction of structures (SCL, 1991d). Implementing the proposed measures may alleviate some of the visual impacts of Project facilities.

## 3.3 MEASURES BEYOND THE CITY'S AUTHORITY

Several candidate visual mitigation measures were initially considered but were later eliminated because they were not within the City's jurisdiction for implementation. Some of the most prominent visual impacts identified in the project study area resulted from the cuts and fills

resulting from and along SR 20. Stabilizing and revegetating these scars would require work within the right-of-way for SR 20 and, therefore, lie within Washington Department of Transportation (WDOT) jurisdiction and responsibility. Similarly, screening views of dams, except from developed viewpoints and the Skagit Tour route, and eliminating the Gorge pulloff would require working within the right-of-way with WDOT approval. Because measures such as these are within WDOT jurisdiction and beyond the City and NPS jurisdiction, they are not included in the alternatives described in Section 4.

The City has also eliminated consideration of application of stringent ROW vegetation management standards to non-City (or federally) owned portions of the ROW. The City may be able to manage the ROW to these standards permissibly, but may not be required to do so due to lack of control over the actions of the fee owners. The City will work with landowners under the ROW where possible to improve visual quality.

# 4.0 ALTERNATIVE AESTHETIC MITIGATION MEASURES

This section discusses the process used to develop the visual mitigation alternatives and describes those alternatives in detail.

## 4.1 DEFINITION OF ALTERNATIVES

The potential mitigation measures outlined in Section 3 were generally divided into four alternatives. A No Action Alternative (continuing with existing facilities, operational procedures, and programs) was not considered because both the City and the intervenors felt that some additional mitigation of visual impacts was desirable and appropriate. The criteria used to categorize candidate measures into the alternatives included their effectiveness in mitigating visual impacts, when the measures would be carried out and the amount of time it would take to do so, the potential adverse environmental impacts resulting from implementing those measures, and the cost of implementation.

Alternative 1, the Comprehensive Structural and Operations Mitigation Alternative, includes implementation of the most extensive mitigation measures outlined in Section 3.0 to maximally reduce the visual impact of Skagit Hydroelectric Project facilities. This alternative was developed with minimal consideration of the cost or relative effectiveness of implementing the measures. Technically infeasible actions were not included. Alternative 2, the Comprehensive Structural Mitigation Alternative, is similar to Alternative 1 but excludes early reservoir fill and pool maintenance requirements, minimum Gorge bypass reach flow requirements, transmission line burial and relocation, and paving the access road to Gorge dam. Alternative 3, the Selective Mitigation Alternative, focuses upon the measures which would be moderate to least costly, are technically and procedurally feasible to implement, and would be the most effective in mitigating the visual impacts of the Project. Alternative 4, the Minimal Mitigation Alternative, includes only the least costly set of measures that could be used to address the most easily mitigated impacts of the project facilities.

Although Table 3-1 shows that options for burying transmission lines underground were considered, these candidate mitigation measures were dropped from consideration during the formation and analysis of Alternatives 2, 3 and 4. Burying transmission lines is very expensive, may not be possible in some areas (e.g., rock slopes), and could have significant adverse environmental impacts from siting/clearing a new right-of-way and later potential operational loss of oil pumped through the line to cool it. Thus, undergrounding the transmission line was only included in Alternative 1, as this was the only alternative in which financial and environmental costs were not used as deciding criteria.

Removing or replacing the logbooms at the three dams was not included in any of the alternatives. The logbooms are required as public safety measures, are used to keep debris out of the navigable

channel, and in some cases are placed in the only feasible location (because of the impacts of wind if they are located further from shore, or the lack of water depth to move them closer to the shoreline).

As stated in Section 3.2, some visual mitigation measures are not within the City's jurisdiction for implementation, including stabilizing and revegetating cuts and fills along SR 20 and screening views of the dams from all but the developed viewpoints and the Skagit Tour route. Because these measures are not within the City's jurisdiction and would require coordination with WDOT, they also were not included in the alternatives.

## 4.2 ALTERNATIVES

The following sections discuss specific potential measures that are included in each alternative (see Table 4-1).

### 4.2.1 Comprehensive Structural and Operations Mitigation—Alternative 1

Alterations to project structures under the Comprehensive Mitigation Alternative would include several measures to quickly limit the visual contrast of project structures. These include repainting the two surge tanks at the Diablo and Gorge powerhouses as well as the structural steel access bridge at Gorge dam. In addition, the galvanized or aluminum roofing/siding on buildings at the Diablo site would be replaced with material having low-gloss color coating, and maintenance and support facilities at the three damsite abutments could be relocated or redesigned to decrease the contrast with the surrounding areas. All but repainting the bridge would be highly effective in mitigating the contrast of project structures. Finally, the color of the three dam faces would be modified to reduce their obtrusiveness, although the effectiveness is lessened by the existing blended weathering of the faces and viewer's anticipation of seeing the dams.

For night-time visual impacts, high angle cut-off shielding for all exterior lighting would be provided and/or the mercury or low-intensity sodium exterior lamps would be replaced with high-intensity sodium lamps at the three powerhouses. Also, the historic character of Ladder Creek Falls Trail and lighting in Newhalem would be restored. These measures would be moderately effective in mitigating visual impacts without associated environmental impacts.

Vegetation also would be planted to minimize visual impacts. Trees would be planted to screen views of the burn dump and access road for the Gorge bypass reach. Cuts and fills along the dam access roads for lower Ross Lake and lower Diablo Lake also would be stabilized and revegetated. Landscaping of Diablo and Newhalem would be improved by screening switchyards and improving the tour parking/shoreline area at Diablo. Related to revegetation, measures would be

Table 4-1. Visual Impact Mitigation Alternatives



| Project Facility Types & Potential Mitigation Measures | Comprehensive Structural and Operations Mitigation | Comprehensive Structural Mitigation | Selective Mitigation | Minimal Mitigation |
|---|---|---|---|---|
| **R Reservoir and/or River Shorelines** | | | | |
| 1 Remove logbooms or replace with less obtrusive configuration at dams and feeder creeks | | | | |
| 2 Stabilize and revegetate cuts and fills along dam access roads | X | X | X | X |
| 3 Stabilize and revegetate cuts and fills along SR 20 | | | | |
| 4 Remove stumps within drawdown zone of reservoirs | X | X | | |
| 5 Measures to reduce sedimentation and erosion problems | X | X | X | X |
| 6 Maintain reservoirs at full pool during peak recreation season (specify begin and end dates) | X (3 to 4 months) | | X (as soon as possible after 4/15; no later than 7/31) | |
| 7 Provide minimum river flows during daylight hours in summer recreation season | X (500 cfs for 1/2 day over 90 days) | | | |
| 8 Develop viewpoint(s) along SR 20 for river flows (A recreation plan proposal) | X | X | X | |
| 9 Improve graphic design of warning signs along SR 20 | X | X | X | X |
| **D Dams** | | | | |

**Table 4-1. Visual Impact Mitigation Alternatives**



| | Project Facility Types & Potential Mitigation Measures | Comprehensive Structural and Operations Mitigation (Alternative 1) | Comprehensive Structural Mitigation (Alternative 2) | Selective Mitigation (Alternative 3) | Minimal Mitigation (Alternative 4) |
|---|---|---|---|---|---|
| 1 | Screen views of dams, except from developed viewpoints and Skagit Tour route. Eliminate Gorge pulloff. | | | | |
| 2 | Modify color of dams, especially faces | X | X | | |
| 3 | Relocate/redesign maintenance and support facilities at dam sites | X | X | X (Broome Gate House, Ross) | |
| 4 | Plant trees to screen views of burn dump and access road | X | X | X | X |
| 5 | Develop viewpoint(s) of Gorge dam (A recreation plan proposal) | X | X | X | |
| 6 | Pave access road to Gorge dam | X | | | |
| 7 | Repaint access bridge at Gorge dam | X (immediately) | X (immediately) | X (maintenance cycle) | X (maintenance cycle) |
| 8 | Provide high angle cut-off shielding for all exterior lighting | X | X | X | |
| 9 | Continue to employ low-wattage exterior lighting | | | | X |
| 10 | Replace mercury or low-intensity sodium lamps with high-intensity sodium lamps for exterior lighting | X | X | X | |
| **P** | **Powerhouses and Switchyards** | | | | |
| 1 | Repaint surge tanks | X (immediately) | X (immediately) | X (maintenance cycle) | X (maintenance cycle) |

**Table 4-1. Visual Impact Mitigation Alternatives**



| | Project Facility Types & Potential Mitigation Measures | Comprehensive Structural and Operations Mitigation (Alternative 1) | Comprehensive Structural Mitigation (Alternative 2) | Selective Mitigation (Alternative 3) | Minimal Mitigation (Alternative 4) |
|---|---|---|---|---|---|
| 2 | Replace galvanized or aluminum roofing/siding with material having low-gloss color coating | X (immediately) | X (immediately) | X (maintenance cycle) | X (maintenance cycle) |
| 3 | Underground distribution lines within highway or transmission ROW | | | | |
| 4 | Consolidate distribution lines within transmission line ROW | X | X | | |
| 5 | Plant trees to screen views of switchyards | X | X | X | X |
| 6 | Restore historic character of Ladder Creek Falls trail and lighting | X | X | X | |
| 7 | Provide high angle cut-off shielding for all exterior lighting | X | X | X | |
| 8 | Continue to employ low-wattage exterior lighting | | | | X |
| 9 | Replace mercury or low-intensity sodium lamps with high-intensity sodium lamps for exterior lighting | X | X | X | |
| **H** | **High-Voltage Transmission Lines** | | | | |
| 1 | Underground transmission lines throughout study area | | | | |
| 2 | Underground transmission lines in key areas | X | | | |
| 3 | Rebuild transmission lines at higher voltage (500 KV) throughout study area (to be considered if four circuits can be consolidated onto one set of towers instead of two) | | | | |

**Table 4-1. Visual Impact Mitigation Alternatives**



| | Project Facility Types & Potential Mitigation Measures | Comprehensive Structural and Operations Mitigation (Alternative 1) | Comprehensive Structural Mitigation (Alternative 2) | Selective Mitigation (Alternative 3) | Minimal Mitigation (Alternative 4) |
|---|---|---|---|---|---|
| 4 | Relocate transmission lines in key areas | X | | | |
| 5 | Consolidate existing transmission lines and ROWs in key areas where existing ROW splits | | | | |
| 6 | Relocate individual transmission structures at key locations | | X | | |
| 7 | Paint towers less visually contrasting color | | | X | X |
| 8 | ROW vegetation management, special effort on identified visual quality problem areas | X | X | X | |
| 9 | ROW vegetation management, determinate growth, emphasize native species | X | X | X | |
| 10 | ROW vegetation management, indeterminate growth, emphasize native species | | | | X |

implemented to reduce sedimentation and erosion problems for Ross, Diablo, and Gorge lakes. These vegetative measures would, for the most part, be highly effective in mitigating visual impacts while having negligible negative and some positive environmental effects.

Measures also would be taken to improve recreational access to scenic views in the study area, including paving the access road to Gorge dam and improving the graphic design of warning signs at stop locations along SR 20 for Gorge Lake and the Gorge bypass reach. These measures would have low effectiveness in mitigating impacts.

Visual mitigation measures would also be taken in project reservoirs and river reaches. First, stumps would be removed within the drawdown zone at the upper end of reservoirs (near Hozemeen in Ross Lake and in Gorge Lake) to reduce visual obtrusiveness during low-water periods. Reservoirs would be maintained at full pool from June 1 through Labor Day. Minimum river flows (500 cfs) would be provided in the Gorge bypass reach during daylight hours (1/2 day) in the summer recreational season (for 90 days) to replace the dry reach often viewed under current conditions.

To reduce the high obtrusiveness of transmission lines, about three miles of distribution lines would be consolidated (if studies indicate it is feasible) within the transmission line right-of-way from the Gorge powerhouse to the Gorge dam. Transmission lines would be relocated in key areas, including three miles at Diablo Lake, two miles at the Diablo townsite, and 4-1/2 miles at Gorge Lake. Finally, in the one where it appears to be technically feasible (some distance from Newhalem west along SR 20), the transmission lines would be buried. The technology to do this is proven; the City has a few miles of similar lines in place with the City of Seattle. These mitigation measures would be highly to moderately effective in reducing the visual obtrusiveness of the lines.

### 4.2.2 Comprehensive Structural Mitigation—Alternative 2

The Comprehensive Structural Mitigation Alternative includes all of the measures described above for Alternative 1, with the exception of obtaining very early full pool levels on Ross Lake for the peak recreational season, providing minimum Gorge bypass reach flows during the summer recreational season, and paving the Gorge dam access road. The water level mitigation measures are excluded because this alternative was designed to address structural mitigation measures only and to avoid the very high costs associated with loss of generation capacity caused by the lake level and flow release measures. Paving the access road was excluded because of the low effectiveness it would have in comparison to the cost of implementing the measure.

Mitigation for transmission lines also varies slightly from the first alternative. As with the first alternative, about three miles of distribution lines would be consolidated within the transmission line right-of-way. However, rather than relocating transmission lines in key areas and burying the

line in other locations, as in the first alternative, up to 17 individual transmission structures would be relocated in key areas. Both of these measures would be moderately effective in mitigating transmission line visual impacts.

Thus, alternative 2 represents a somewhat less encompassing but more efficient set of measures, overall, for mitigating the visual impacts of Skagit Project facilities than the Comprehensive Structural and Operations Alternative.

### 4.2.3 Selective Mitigation—Alternative 3

The Selective Mitigation Alternative includes many of the mitigation measures discussed in the first two alternatives, but in some cases decreases the extent or timing of the measures. For instance, under this alternative the two surge tanks at the Diablo and Gorge powerhouses and the structural steel access bridge at Gorge dam would be repainted during the normal maintenance cycle rather than immediately. Thus, the cost for implementing this measure would be included in the regular maintenance budget rather than as a separate, new item under relicensing mitigation. In addition, the galvanized or aluminum roofing/siding on buildings at the Diablo site would be replaced and maintenance and support facilities at the damsite abutments (such as the Ross Dam Broome shed and the Diablo person lift) would be removed, relocated, or redesigned to decrease contrast during regular maintenance of those structures. Modifying the color of the dam faces would not be included under this alternative.

As with the first two alternatives, high angle cut-off shielding for all exterior lighting would be provided and/or the mercury or low-intensity sodium exterior lamps would be replaced with high-intensity sodium lamps at the three powerhouses, and the historic character of Ladder Creek Falls Trail and lighting in Newhalem would be restored.

Vegetation management would also occur in this alternative to minimize visual impacts. The City would implement the Transmission Rights-of-Way Vegetation Management Plan (SCL, 1990) as incorporated into the Settlement Agreement on Recreation and Aesthetics (SCL, 1991c), with particular emphasis on seven sites in the Ross Lake National Recreation Area. Trees would be planted to screen views of the burn dump and access road for the Gorge bypass reach, cuts and fills along the dam access roads for lower Ross Lake and lower Diablo Lake would be stabilized and revegetated, landscaping would be used to improve screening of the switchyards at Diablo and Newhalem, and the tour parking/shoreline area at Diablo would be improved. Measures also would be implemented to reduce sedimentation or erosion problems for Ross, Diablo, and Gorge lakes (SCL, 1991b). As with the Comprehensive Structural Mitigation Alternative, the Gorge dam access road would not be paved under this alternative.

Visual mitigation measures would also be taken in Project reservoirs and river reaches. Rather than provide full pool in the three lakes for 3 to 4 months during the peak recreation season, the

City would fill Ross Lake as early and as full as possible after April 15, subject to adequate runoff, anadromous fisheries protection flows, flood protection, minimized spill, and firm power generation needs. Hydraulic conditions permitting, the City would achieve full pool by July 31.

Mitigation of transmission line visual impacts under this alternative would be substantially less extensive than those proposed under the first two alternatives. The measures included in alternatives 1 and 2 are high in cost, financial and environmental, relative to the obtained visual quality benefit. The mitigation proposed for transmission lines in this alternative is to paint towers a less visually contrasting color.

### 4.2.4 Minimal Mitigation—Alternative 4

The Minimal Mitigation Alternative represents mitigation of only those impacts which are the easiest and least expensive to correct. As with the Selective Mitigation Alternative, the two surge tanks at the Diablo and Gorge powerhouses and the structural steel access bridge at Gorge dam would be repainted a less contrasting color during the normal maintenance cycle. Maintenance and support facilities would be relocated or redesigned under this alternative only as the City's normal maintenance budget allowed. In contrast to the previous three alternatives, the City would continue to employ low-wattage exterior lighting for the Ross, Diablo, and Gorge dams without the shielding.

The visual impacts of project facilities would be reduced by implementing the vegetation management measures described in the Selective Mitigation Alternative, including implementing the Transmission Rights-of-Way Vegetation Management Plan (SCL, 1990), planting trees to screen views of the burn dump and access road for the Gorge bypass reach, stabilizing and revegetating cuts and fills along the dam access roads to lower Ross Lake and lower Diablo Lake, improving screening of the switchyards at Diablo and Newhalem, and improving the tour parking/shoreline area at Diablo. Measures would also be taken to reduce sedimentation or erosion problems at Ross, Diablo, and Gorge lakes (SCL, 1991c). The City would mitigate the Gorge bypass reach with other mitigation measures besides flows and would not remove stumps in drawdown zones under this alternative.

Minimal mitigation of transmission line impacts would occur under this alternative. As in the Selective Alternative, the City would paint transmission line towers a less visually contrasting color on the normal maintenance cycle.

# 5.0 EVALUATION OF MITIGATION MEASURES AND ALTERNATIVES

## 5.1 EVALUATION OF INDIVIDUAL MEASURES

As stated in Section 4, the visual quality mitigation alternatives were developed by categorizing the individual potential mitigation measures based upon an assessment of four criteria: (1) the effectiveness of the measures in mitigating visual impacts of project facilities, (2) the timing for initiation of measures and amount of time required for implementation, (3) the potential adverse environmental impacts of implementation, and (4) the cost of implementation. Some discussion about the alternatives regarding these criteria has already been provided in Section 4. To evaluate the above alternatives and select the preferred alternative for implementation, Seattle City Light conducted detailed analyses of the alternatives based on these same four criteria. A discussion of the individual measures is provided below.

Removing five logbooms or replacing them with less obtrusive configurations at dams and feeder creeks for the three lakes would have little effectiveness because they are currently fairly unobtrusive. The logbooms are required by the FERC to assure public safety near project facilities and operations, and to keep debris out of the navigable channel. Two barges located near Buster Brown boom are used to move freight and burn trash. In addition, that boom was sited at its present location to protect it from the wind and could not be moved closer to shore because of the shallowness of the water.

Most of the measures that would be taken to mitigate the contrast of project structures with the surrounding environment would generally be highly effective. Repainting the two surge tanks at the Diablo and Gorge powerhouses would be highly effective in reducing their visibility. However, this process requires shutting down the powerhouses, draining the tanks, sandblasting them (with possible negative environmental impacts to the areas surrounding the tanks), and takes 6 to 10 weeks to complete. Painting the tanks at this time would be costly because they were recently painted and are not due for further maintenance for a number of years (on a 20-year maintenance cycle), and because revenues would be lost from decreased power generation. Repainting the structural steel access bridge to the Gorge dam would be minimally effective because of the existing visual character of the architectural, award-winning design.

In addition, replacing galvanized or aluminum roofing/siding on buildings at the Diablo site with material having low-gloss color coating would be highly effective in mitigating the contrast of the facilities and would result in negligible environmental impacts. The roofing material of these structures is already being replaced with brown material and the incline machine building is scheduled to be resided. The manlift is scheduled for removal but repainting the end of the powerhouse is a low priority. Relocating or redesigning other maintenance and support facilities at the three damsite abutments (such as the Broome Gate House on Ross dam) would have little

effectiveness in reducing their contrast with the surrounding areas and little environmental impact, depending upon the design and construction of the facilities. The floating camp could be moved to decrease its visual impact but was eliminated as an option because it is located in the only feasible site; additionally, the City does not have jurisdiction over its location.

Finally, modifying the color of the three dam faces would have little effectiveness because they already blend with their surroundings, due to weathering and the growth of lichens, and because of viewers' anticipation of seeing the dams. Color modification would involve short-term impacts from debris clearance and would be costly.

For night-time visual impacts, providing high angle cut-off shielding and replacing low-intensity lamps with high-intensity lamps for exterior lighting at the three powerhouses and associated facilities would be moderately effective with negligible environmental impacts.

Vegetation planted to minimize visual impacts would primarily be highly effective while having negligible negative and some positive environmental impacts. Trees planted to screen views of the burn dump and access road for the Gorge bypass reach would be moderately effective and result in negligible environmental impacts. Cuts and fills stabilized and revegetated along the dam access roads for lower Ross Lake and lower Diablo Lake would be highly to moderately effective and would have beneficial effects by improving habitat and reducing river sedimentation.

Landscaping in Diablo and Newhalem to improve screening of the switchyards and the tour parking/shoreline area at Diablo would be highly effective and have negligible environmental impacts. However, implementation is made difficult by inadequately-sized areas for planting along SR 20, the 17-foot safety clearance for transmission line corridors, and snowdrift problems resulting from planting vegetation around switchyards.

Potential visual impacts of revegetation measures to reduce sedimentation or erosion problems for Ross, Diablo, and Gorge lakes would be highly effective with unknown environmental impacts. Details, including costs, are in the Erosion Control Plan (SCL, 1991c).

Measures also can be taken to improve recreational access to views in the study area, including developing viewpoints along SR 20 for Gorge Lake and the Gorge bypass reach, paving the access road to Gorge dam, and improving the graphic design of warning signs at stop locations along SR 20 for Gorge Lake and the Gorge bypass reach. The first measure would be highly to moderately effective and the remaining two would have low effectiveness in mitigating impacts. The greatest drawback to these measures is that they could create traffic problems or hazards along SR 20 or could facilitate access where the public is not wanted.

Visual mitigation measures for Project reservoirs and the Gorge bypass reach would have variable effectiveness. First, stumps removed within the drawdown zone at the upper end of reservoirs,

near Hozemeen and in Gorge Lake, would have moderate offsetting environmental impacts because of the effects on sedimentation, fish habitat, and fisheries. The stumps would be difficult to remove in some locations because of the sediment accumulated around them, requiring a D9 Caterpillar to take 15 to 20 minutes for each stump. Once the stumps are removed, the question remains as to what to do with them because they are too saturated to burn.

Maintaining Ross Lake at full pool throughout the summer recreation season would provide minor benefit in terms of additional recreational opportunities. However, this would restrict the timing of water releases available for downstream anadromous fisheries, which could be adversely affected by flushing the affected reaches with snowmelt runoffs and then later stranding fish, or by providing inadequate spawning and incubation flows relative to the total habitat. The economic impacts of these measures could be substantial, estimated at $300,000 to $1.7 million lost annually to obtain full pool by June 1 (SCL, 1991a). Minimum river flows (500 cfs) provided in the Gorge bypass reach during daylight hours (1/2 day) in the summer recreational season (for 90 days) to replace the dry reach often viewed would be highly to moderately effective, depending upon the minimum flow levels, would create an "attractive nuisance" traffic safety hazard, and would cost an estimated $350,000 annually.

Proposed measures to mitigate the visual impacts of distribution lines are moderately effective and those for transmission lines could be highly effective. The negative environmental impacts of relocating existing corridors would be dependent upon the alternative route selected and the amount of land that would be cleared. However, this would be offset somewhat by revegetating the old corridors.

## 5.2 EVALUATION OF ALTERNATIVES

### 5.2.1 Comprehensive Structural and Operations Mitigation—Alternative 1

Implementing the Comprehensive Structural and Operations Mitigation Alternative would be the most costly option studied by the City and would encompass the environmental impacts noted in Section 5.1. This alternative would mitigate the moderate to low visual impacts identified (see Table 1) for shorelines in the Skagit Project Facility, Skagit Recreational River, and Sauk Scenic River zones; Skagit Project Facility Zone powerhouses and switchyards; and for Skagit Project Facility Zone townsites and buildings. The high to moderate visual impacts of transmission lines in the four zones studied would be somewhat mitigated by relocating and burying transmission lines in key areas at Diablo Lake, Diablo townsite, and Gorge Lake.

### 5.2.2 Comprehensive Structural Mitigation—Alternative 2

The Comprehensive Structural Mitigation Alternative would be less costly to implement than the above alternative. Maintaining the gravel access road to the Gorge dam, rather than paving it, would eliminate the costs associated with this minimally-effective measure. Eliminating operational mitigation measures, such as an increase in the number of days of full-pool levels and minimum Gorge bypass reach flows, would retain the existing average generating capacity of the Skagit Project dams. However, this would eliminate major mitigation measures for the moderate to low visual impacts identified for shorelines in the Skagit Project Facility, Skagit Recreational River, and Sauk Scenic River zones. In addition, relocating individual transmission line structures at key locations in the four zones, rather than whole lines as in the first alternative, would mitigate the high visual impacts of those structures less than the first alternative.

### 5.2.3 Selective Mitigation—Alternative 3

This alternative eliminates the most costly and environmentally degrading measures described in the Comprehensive Structural and Operations and the Comprehensive Structural alternatives. Minimally effective measures for mitigating the visual impacts of reservoirs/shorelines and dams would not be implemented, such as removing or relocating the logbooms, removing stumps in the reservoirs, and dam faces would not be recolored to reduce their contrast. Most of the costs and environmental impacts of increasing Ross Lake levels earlier in the year would be reduced, in comparison to the first alternative, by reaching full-pool levels later in the year.

Visual mitigation measures for project facilities and structures in the Skagit Project Facility Zone would be implemented but, in some cases, would be conducted over the long-term. Some of the highly effective measures identified in the first two alternatives that are the least costly or easily implemented would be implemented in the short-term. These mitigation measures include replacing galvanized or aluminum roofing and siding with material having low-gloss color coating; removing, relocating, or redesigning project structures; providing high angle cut-off shielding and replacing low-intensity lamps; and planting vegetation to minimize visual impacts of project facilities and for erosion control. Deferring repainting the surge tanks and the Gorge dam access bridge until the next regular maintenance cycle would subsume those costs under maintenance rather than as a separate, new mitigation measure (as proposed under the first two alternatives). Additional cost savings would be realized by maintaining the gravel Gorge dam access road rather then paving it as under the Comprehensive Structural Mitigation Alternative.

Painting transmission line towers under this alternative would provide minimal mitigation of their visual impacts in the four scenic zones but would result in substantial cost savings.

### 5.2.4 Minimal Mitigation—Alternative 4

The Minimal Mitigation Alternative represents mitigation of only those impacts which were the easiest and least expensive to correct, in comparison to the above three alternatives. Further cost savings would be realized, in comparison to the Selective Mitigation Alternative, by eliminating most measures to mitigate the visual impacts of project reservoirs and river reaches, not relocating or redesigning maintenance and support facilities, and continuing to employ low-wattage exterior lighting. As with the Selective Mitigation Alternative, the two surge tanks and the steel access bridge at Gorge dam would be repainted during the normal maintenance cycle, the visual impacts of project facilities would be reduced by implementing vegetation management measures, and the visual impacts of transmission towers would be reduced somewhat by repainting them only where it was determined to be effective and only during the normal maintenance cycle.

## 5.3 SELECTED ALTERNATIVE

The City and the intervenors used the foregoing analysis as the starting point for developing a visual quality mitigation plan for the Project for the new license period. In addition to the two criteria used to screen measures for the alternatives analysis (Section 3.1), the City added a third:

3. Nor will the City undertake measures which create greater financial cost or environmental harm or risk of harm than the benefits warrant.

Based upon the above analysis and negotiations, the City and the intervenors agreed on the Selective Mitigation Alternative as the basic visual quality mitigation plan. The details of the plan are in Section 4 of the Settlement Agreement on Recreation and Aesthetics (SCL, 1991c).

# 6.0 CONSULTATION AND COORDINATION WITH INTERVENORS

The City consulted frequently with the intervenors on the design and execution of visual quality evaluations and mitigation studies. These consultations occurred within the context of negotiations in a recreation and visual quality issue forum. The progress of the negotiations has been documented to the FERC by the City in quarterly reports required by the FERC's additional information request of October 31, 1988.

The negotiations in the recreation and visual quality forum successfully resulted in the execution of a Settlement Agreement on Recreation and Aesthetics (SCL, 1991c). The City and the intervenors are jointly submitting that and other settlement agreements to the FERC with an agreed upon Offer of Settlement for the relicensing of the Skagit River Hydroelectric Project No. 553 (SCL, 1991e).

# 7.0 REFERENCES


BLM (Bureau of Land Management). 1986. BLM manual handbook 8431-1: visual contrast inventory. U.S. Department of the Interior, Washington, D.C.

FS (Forest Service). 1977. National forest landscape management: volume 2. U.S. Department of Agriculture, Washington, D.C.

FS (Forest Service). 1973. National forest landscape management: volume 1. U.S. Department of Agriculture, Washington, D.C.

Jones & Jones. 1979. Aesthetics and visual resource management for highways. Federal Highway Administration, Washington, D.C.

Jones & Jones. 1975. Scenic and recreational highway study. Transportation Committee of Washington State Legislature, Olympia, Washington.

NPS (National Park Service). 1985. Ross Lake National Recreation Area, land protection plan. North Cascades National Park Service Complex. April 1985.

Parametrix. 1989. Ross Lake early season recreational activity and visual quality assessment. Prepared for Seattle City Light by Parametrix Inc., Bellevue, Washington.

SCL (Seattle City Light). 1991a. Skagit River Hydroelectric Project FERC No. 553: Ross Lake Levels Analysis. Seattle City Light, City Light Department, Seattle, Washington. April 1991.

SCL (Seattle City Light). 1991b. Skagit River Hydroelectric Project FERC No. 553: Erosion Control Plan. Seattle City Light, City Light Department, Seattle, Washington. April 1991.

SCL (Seattle City Light). 1991c. Skagit River Hydroelectric Project FERC No. 553: Settlement Agreement on Recreation and Aesthetics. Seattle City Light, City Light Department, Seattle, Washington. April 1991.

SCL (Seattle City Light). 1991d. Skagit River Hydroelectric Project FERC No. 553: Historic Resources Mitigation and Management Plan. Seattle City Light, City Light Department, Seattle, Washington. April 1991.

SCL (Seattle City Light). 1991e. Skagit River Hydroelectric Project FERC No. 553: Offer of Settlement. Seattle City Light, City Light Department, Seattle, Washington. April 1991.

SCL (Seattle City Light). 1990. Transmission Rights-of-Way Vegetation Management Plan: Final Report. Prepared for Seattle City Light by Compliance Services International, Dames & Moore, Inc., and Don Shimono Associates, Tacoma, Washington. February 1990.

SCL (Seattle City Light). 1989. Skagit River project: Submitted to the FERC in Response to a Request for Supplemental Environmental Information, FERC No. 553. City of Seattle, City Light Department, Seattle, Washington.

SCL (Seattle City Light). 1979. Copper Creek environmental assessment: technical report 7: scenic environment. City of Seattle, City Light Department, Seattle, Washington.

SCL (Seattle City Light). 1978. Application for a new license, Skagit River Project. Project 553-Washington, Volumes I and II. City of Seattle, City Light Department, Seattle, Washington. Revised December 1, 1978.

WDOT (Washington Department of Transportation). 1985. Utilities accommodation policy. Washington State Department of Transportation, Olympia, Washington.

# APPENDIX A

## FERC Additional Information Request

# ADDITIONAL INFORMATION REQUEST NO. 2— LAND MANAGEMENT AND AESTHETICS

The existing project for relicensing occurs in an area of high scenic quality which is frequently used by the public for recreation. Since the original project was completed, public use patterns and recreation experience expectations have changed. Awareness of alterations to natural landscapes has increased. There is a heightened concern for visual quality. Your application for relicensing does not adequately address how the project affects the area's visual quality. In order for the Commission's staff to evaluate the effects of relicensing your project, additional information is needed. Therefore, provide a current report on land management and aesthetics that reaches the level of detail described in § [4.51 (f)(6)], and conduct a study evaluating:

(a) the level of sensitivity that the viewers of the project area have for visual quality, including the viewer's locations, and including all facilities and the bypassed reach;

(b) The visual compatibility of your facilities with the surrounding landscape;

(c) average monthly stream flows in the bypassed reach during the last 10 years;

(d) alternative ways to enhance the visual quality of your project facilities and stream flows to reduce the visual contrast of your facilities with the surrounding landscape;

(e) the construction, operation, and maintenance costs for each alternative discussed in (d) above, and the effects of these costs on the economics of the project;

(f) a 1/2-inch, VHS, color, narrated, videocassette tape recording and color photographs of the exterior of all project facilities and stream flows in the bypassed reach; and

(g) comments on the study from the NPS, FS, and the North Cascades Conservation Council.

The revised report on land management and aesthetics should also include the following:

(h) identify and describe other existing uses of project lands, such as residential, farming, forestry, grazing, and commercial use;

(i) identify, locate, and describe nonpower uses of project waters, such as irrigation, industrial, and municipal; and

(j) identify by administering agency and respective acreage any public lands or reservations of the United States within the project boundary.