APPENDIX A

DESCRIPTION

of

VEGETATION COVER TYPES

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DESCRIPTION OF VEGETATION COVER TYPES

These summary descriptions of the major vegetation cover types for the wildlife habitat management lands include existing as well as future cover types that will be created by the proposed management. Cover type classifications are derived from the combined perspectives of forestry and wildlife habitat. Forested cover types are separated by species composition into coniferous, deciduous and mixed forest. The coniferous forest type is separated into successional stand conditions in a manner similar to Hall et al. (1985). The wetlands fall into a number of palustrine classes as described by Cowardin et al. (1979) but they are all grouped into the single category of wetland for this plan.

CONIFEROUS FOREST COVER TYPE

Early-Successional Stand Condition

The early-successional condition is characterized by small coniferous trees, shrubs and herbaceous vegetation. Trees are generally less than 1 inch in diameter, and less than 15 feet tall, providing no greater than 30 percent canopy cover. Dominant shrub species include vine maple, salal, Oregon grape, salmonberry, red huckleberry and thimbleberry. This stage may last for 10 to 15 years after clearcutting or forest fire depending on management. Amounts of dead and down woody material vary greatly due to the type of slash treatment used. Approximately 2 acres are in the early-successional condition.

Open Canopy Sapling/Pole Stand Condition

This condition is dominated by coniferous trees between 15 and 40 feet tall. Tree canopy closure is generally less than 60 percent and a shrub understory is present. This condition usually follows early-successional forest as a result of tree height growth. Trees are generally between 10 and 30 years of age, depending on management. The amount of dead and down woody material varies greatly between stands, but most is in later stages of

decay (Class 3 or older). Snags are usually absent unless intentionally left during timber harvest. No stands are presently in this stand condition.

Closed Canopy Sapling/Pole Stand Condition

Trees in the closed canopy sapling/pole condition are generally 20 to 40 years of age and between 30 and 60 feet tall, depending on management. Canopy closure is often greater than 90 percent, resulting in a sparsely vegetated understory of low-growing shrubs such as Oregon grape and sword fern. Snags are generally absent unless intentionally left during previous timber harvests. Dead and down material is usually absent or in late stages of decay. Approximately 100 acres are presently in this stand condition.

Small Sawtimber Stand Condition

The small sawtimber condition is characterized by trees between 9 and 20 inches DBH and between 50 and 100 feet tall. Ground vegetation is usually more developed than the closed sapling/pole stage, but is still sparse. Existing unmanaged small sawtimber stands are usually between 40 and 80 years of age, while ages will range from 30 to 50 years under managed conditions. Canopy closure is generally uniform within the stand, averaging between 60 and 100 percent. Conifers are usually of a cone-bearing age. Snags are generally suppression killed and of small diameter. Dead and down woody material is often small in diameter or in late stages of decay (Class 3 or older). Approximately 1,671 acres are presently in this stand condition.

Large Sawtimber Stand Condition

Large sawtimber is generally characterized by trees greater than 20 inches DBH and an increase in the development of ground vegetation as compared to the sapling/pole and small sawtimber stand conditions. Scattered deciduous trees such as vine maple are usually present along with a distinct shrub layer. Average tree height is greater than 100 feet.

Existing unmanaged large sawtimber stands are greater than 80 years of age, while stands under managed conditions will be as young as 50 years. Large diameter snags, dead and down woody material and a multi-layered canopy are usually absent. Canopy closure is generally uniform within the stand, varying between 60 and nearly 100 percent. Approximately 27 acres are presently in this stand condition.

Old-Growth Stand Condition

Characteristics of the old-growth condition include live trees, snags and dead and down woody material greater than 24 inches DBH, a multi-layered canopy with understory trees between 10 and 40 feet tall and highly variable canopy closure, ranging from 30 to 90 percent within a stand. Shrub layers are well developed and composed of both tall and low-growing species. Average age of dominant overstory trees is 200 years or older. Scattered deciduous trees, such as vine maple, black cottonwood and bigleaf maple are often present. Approximately 327 acres are presently in this stand condition.

MIXED DECIDUOUS/CONIFEROUS FOREST COVER TYPE

Mixed deciduous/coniferous forests are composed of deciduous trees such as alder, bigleaf maple and black cottonwood, interspersed with Douglas-fir, western hemlock, Pacific silver fir and western red cedar. Deciduous trees provide between 30 and 70 percent of the canopy cover. A dense and varied shrub layer often dominates the understory. The combination of taller coniferous trees and shorter, co-dominant deciduous trees creates a unique overstory layer. Stands are defined as mixed deciduous/coniferous forest when trees are approximately 15 to 20 years old, and remain in this cover type until coniferous trees dominate the stand, generally when dominant trees are between 100 and 150 years old. Densities of snags and logs vary widely in mixed deciduous/coniferous forest stands. Approximately 428 acres are presently in this cover type.

DECIDUOUS FOREST COVER TYPE

Deciduous forests within proposed management lands are composed of greater than 70 percent deciduous species, including red alder, bigleaf maple and black cottonwood. Conifers are often scattered through both the overstory and understory and a tall, dense shrub layer is usually present. Canopy closure ranges from 50 to 90 percent. Soils are often saturated and/or unstable. Snags and dead and down woody material are generally small in diameter and uncommon. Individual stand area does not exceed 20 acres. Approximately 57 acres are presently in this cover type.

YOUNG RIPARIAN FOREST COVER TYPE

Young riparian forest within proposed mitigation lands is primarily composed of deciduous and coniferous trees and shrubs such as alder, western red cedar, black cottonwood, vine maple, bigleaf maple, red huckleberry, snowberry and salal. The canopy is fairly open, allowing development of the shrub layer. Stand age ranges from 1 to 20 years. Because these stands are associated with waterways, soils are usually either saturated and/or unstable. Frequent disturbance (i.e., flooding) is common. Approximately 50 acres around Spada Lake are within this cover type.

MATURE RIPARIAN FOREST COVER TYPE

Mature riparian forests are similar to young riparian forests except that stands are generally older than 20 years of age. Average tree DBH ranges from 10 to 15 inches. Larger (15 to 50 inches DBH) black cottonwood and bigleaf maple are often interspersed with smaller alder. Snags and dead and down woody material are generally small in diameter but common. Approximately 52 acres are within this cover type.

MIXED SHRUB/BRUSH COVER TYPE

This cover type is primarily composed of small deciduous trees and shrubs. Shrubs generally dominate the stand, varying widely in species composition. Alder is the dominant tree species present. Coniferous trees make up less than 5 percent of the canopy cover. Trees are generally less than 20 feet tall and less than 15 years of age. Larger trees may be present, but they will be widely scattered throughout the stand. This stand condition often occurs after timber harvest when the clearcut area has not been replanted and coniferous trees have not re-established themselves naturally. Approximately 33 acres are presently in this cover type.

GRASS/MEADOW COVER TYPE

The grass/meadow cover type is composed of both naturally occurring meadow areas with shallow soils and areas maintained artificially in low growing vegetation. It is included as a separate cover type from early-successional forest because it is often permanently maintained in the grass/meadow condition and is generally not associated with timber harvest. Grasses, forbs and scattered low-growing shrubs are characteristic of this cover type. Dead and down woody material is usually absent. Approximately 94 acres are presently in this cover type.

WETLAND COVER TYPES

Wetlands are transitional lands between terrestrial and aquatic habitats, where the water table is at or near the surface or the land is covered by shallow water. Both forested and non-forested wetlands are found on the proposed management lands. Non-forested wetlands contain open water, emergent and scrub-shrub habitat types resulting in high structural diversity. The amount and distribution of the habitat types varies due to a number of factors, including beaver activity and road construction. Wetland vegetation includes cat-tail, sedges, rushes, hardhack spirea, devil's club,

skunk cabbage, red-osier dogwood and pondweed. Yellow water-lily is present in several wetlands. Devil's club and skunk cabbage are common among forested wetlands. Willow, alder, black cottonwood, vine maple and western red cedar are common plants found at the wetland perimeter. Approximately 98 acres are presently identified as wetlands.

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APPENDIX B

HABITAT REQUIREMENTS

of

HEP EVALUATION SPECIES

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BLACK-TAILED DEER

(Odocoileus hemionus columbianus)

General Life History

The black-tailed deer is a common year-round resident in the deciduous and mixed forests of western Washington. It also inhabits lowland riparian areas of willow and brush along streams and wetlands. Areas below 2,200 feet are used year-round. Migratory populations use areas above 2,200 feet as summer range while non-migratory populations remain at lower elevations (Ruediger and Garcia 1980).

Existing Use of Project Area

The black-tailed deer is a year-round resident commonly found throughout the Sultan Basin. Estimates of winter concentrations vary from 21 per square mile in alder forests of the Lower Sultan River to 52 per square mile surrounding beaver ponds and wetlands near Spada Lake (WDG 1982).

Habitat Requirements

- Important forage species include trailing blackberry, huckleberry, cottonwood, thimbleberry, clover and fireweed.
- During winter, deer feed heavily on arboreal lichens and other litterfall (Jones 1974, Rochelle 1980) and forage (Brown 1961).
- Forest openings and early successional stages are used most commonly for feeding areas in the Cascades of western Washington and Oregon (Wallmo 1981).
- Forest stands at least 40 feet high with a tree canopy closure of at least 70 percent provide adequate thermal cover (Thomas et al., 1979, Witmer et al., 1985).

- Warm exposures, gentle slopes with low woody vegetation and areas with succulent forage and water within 600 feet are used for fawning (Black et al., 1975).

- Greatest use of cover is between 200 and 800 feet from the cover edge (Witmer et al., 1985).

- Use of forage areas is greatest within 600 feet of the forest-cover edge (Hanley 1983).

Potential Habitat Management and Enhancement Measures

- Timber harvest activity should be distributed in time to provide a continual supply of forage and cover (Witmer et al., 1985).

- A maximum cutting unit size of 26 acres will allow optimal use of available forage and cover areas (Witmer et al., 1985, Hanley 1983).

- Planting at low tree densities (250 trees/acre) after harvest will promote the development and maintenance of herbaceous and shrub layers.

- Stocking adjustment should be performed when trees are less than 10 years old to maintain forage production and reduce potential for heavy slash that might accumulate if thinning occurred at a later date (Witmer et al., 1985).

- Commercial thinning should be performed to enhance forage areas by reducing crown closure to approximately 50 to 60 percent (Witmer et al., 1985).

- Harvest operations should be minimized during peak wintering and fawning months (December 1 through March 1 and May 1 through July 1).

- Secondary roads and landings should be seeded with palatable grass and forb species (Campbell and Johnson 1981).

- Units should not be harvested until trees in the adjacent units are at least 15 years old or capable of providing adequate hiding and thermal cover.

Associated Species

Ruffed grouse will benefit from many of the enhancement measures for black-tailed deer, including forage enhancement, small cutting unit size, pre-commercial and commercial thinning. Many bird species will benefit from greater stand diversity and increased amounts of edge due to the greater structural diversity of edge vegetation.

RUFFED GROUSE

(Bonasa umbellus)

General Life History

The ruffed grouse is a year-round resident in deciduous and mixed deciduous/coniferous forests of western Washington (Brewer 1980).

Existing Use of Project Area

Ruffed grouse densities vary between 5.2 and 15.3 birds per 26 acres over mixed and deciduous riparian forest habitats in the Sultan Basin (WDG 1982). Sightings of grouse were made in the Lost Lake Tract during the HEP field work in September and October 1986.

Habitat Requirements

- Diet consists of a variety of plant and animal foods. Buds and twigs of black cottonwood, birch and cherry and buttercup leaves are important winter food items in western Washington (Brewer 1980).

- Inhabits early to middle aged (40-70 years) mixed forests, deciduous and riparian communities (Edminister 1947).

- Generally found below 2,000 feet in western Washington (Brewer 1980).

- Optimal drumming habitat is predominantly deciduous forest with scattered conifers, vine maple, mature black cottonwood and bigleaf maple; ground cover between 16 inches and 47 inches tall, providing 20 - 50 percent vertical obscurity, at least one other log within 32 feet of the drumming stage, and proximity to an edge between mature forest and early-successional stages (Gullion and Marshall 1968, Brewer 1980, Johnsgaard 1983).

- Nest sites are typically at the bases of trees in open hardwood stands, bases of stumps, bushes or brush piles (Bump et al., 1947).

- Small clearings (less than 5 acres) in mixed forests may enhance brood habitat (Sharp 1963, Brewer 1980).

- Grouse require a high degree of interspersion of cover types to meet seasonal food and cover needs (Edminister 1947, Sharp 1963, Brewer 1980).

Potential Habitat Management and Enhancement Measures

- Optimal cutting unit size is between 4 and 10 acres in mixed forest and deciduous cover types (Sharp 1963, Brewer 1980).

- Plant black cottonwood in disturbed riparian areas (Brewer 1980).

- Maintain deciduous and mixed forest buffers adjacent to lakes, wetland and other riparian areas (Oakley et al., 1985).

Associated Species

Black-tailed deer will benefit from many of the management and enhancement measures for ruffed grouse including cutting unit size, permanent areas of early successional forest, planting black cottonwood and maintaining deciduous and mixed forest buffers adjacent to lakes, wetlands and other riparian areas.

The small cutting units will provide a high degree of contrast or edge between stand conditions. Many bird species are attracted to edges because of the greater structural diversity of edge vegetation (Logan et al., 1985).

BLACK-CAPPED CHICKADEE

(Parus atricapillus)

General Life History

The black-capped chickadee is a common year-round resident in deciduous and mixed conifer forests (Gabrielson and Jewett 1940, Brown 1985). It also inhabits lowland riparian areas of willow and brush along streams (Larrison and Sonnenberg 1968).

Existing Use of Project Area

The black-capped chickadee and the closely related chestnut-backed chickadee are commonly found throughout the Sultan Basin (WDG 1982).

Habitat Requirements

- Over 50 percent of the diet is animal matter, including insects and their eggs, caterpillars and moths (Pearson 1936).
- 30 to 40 percent of fall and winter foraging occurs in shrubs (Anderson 1970).
- Most foraging is done within 30 feet of the ground (Brewer 1963).
- The black-capped chickadee is a primary cavity excavator in decayed or soft wood; also a secondary cavity nester (Brown 1985, Brewer 1963).
- Optimum canopy closure for foraging occurs between 50 and 75 percent. Optimum habitats contain overstory trees 49 feet or more in height (Schroeder 1982a).

Potential Habitat Management and Enhancement Measures

- Promote the growth of shrubs adjacent to lakes, wetlands and riparian areas (Anderson 1970).

- Provide at least two snags/acre with a minimum DBH of 9 inches (Schroeder 1982, Neitro et al., 1985).

- Maintain uncut mixed forest and forested wetland stands as well as 100 to 200-foot uncut buffers surrounding wetlands, lakes and stream drainages (Brewer 1963, Oakley et al., 1985).

Associated Species

The black-capped chickadee uses habitat suitable for many species that nest in decayed or soft wood such as swallows, chipmunks, nuthatches and many species of bats. Maintaining deciduous and mixed forest stands also provides habitat for species that use deciduous vegetation during certain parts of their life cycle (Neitro et al., 1985).

PILEATED WOODPECKER

(Dryocopus pileatus)

General Life History

The pileated woodpecker is a primary cavity excavator residing year-round in dense mature and old-growth coniferous forests of western Washington.

Existing Use of Project Area

Signs of the pileated woodpecker and sightings have been observed throughout forested cover types of the proposed management lands (WDG 1982).

Habitat Requirements

- Animal matter comprises 75 percent of their diet (Terres 1980).
- Feeding habitat includes areas with high densities of logs and snags, dense canopies and tall shrub cover (Bull and Meslow 1977).
- Optimum habitat contains snags at least 40 feet tall with DBH at least 20 inches at densities of six to 15 snags per 100 acres (Bull 1977, Nietro et al., 1985).
- Foraging time is divided between snags (29%), live trees (35%) and logs (36%) (Bull cited in Schroeder 1982b).
- Home range varies from 300 to 600 acres (Brown 1985).
- Optimum habitat has 75 percent or greater canopy closure. Stands with less than 25 percent canopy closure are unsuitable (Schroeder 1982b).

- Logs greater than 10 inches in diameter and greater than 49 feet in length are preferred for foraging (Bull cited in Schroeder 1982b).

Potential Habitat Management and Enhancement Measures

- Protect contiguous stands of mature and old-growth timber at least 200 acres in size (Brown 1985, Temple 1986).

- Provide approximately six snags per 100 acres (Neitro et al., 1985).

- Leave four Class 1 or 2 logs greater than 24 inches in diameter and greater than 20 feet long per acre when available in harvest units (Bartels et al., 1985).

Associated Species

Other primary excavators found on management lands include the red-breasted sapsucker, downy woodpecker, hairy woodpecker and northern flicker. Snags are utilized by nearly 100 species in western Washington (Neitro et al., 1985). The protection of old-growth forests and snag management will provide habitat for many of these species. Fifty-three species commonly found in western Washington (39 birds and 14 mammals) are cavity-dependent and would benefit from cavity excavation.

PINE MARTEN

(Martes americana)

General Life History

The pine marten is a member of the mustelid family, found in forested areas from low elevations to timberline in western Washington. The pine marten is active throughout the day but rarely seen.

Existing Use of Project Area

The pine marten is thought to occur in the Sultan Basin. Historic records indicate that it has been trapped throughout the basin (WDG 1982).

Habitat Requirements

- Primary habitat is mature and old growth coniferous forests with greater than 40 percent canopy closure (Spencer et al., 1983).
- Small mammals, invertebrates, berries and passerine birds are common food items from spring through fall. Voles are consumed more than any other species in winter (Weckwerth and Hawley 1962, Koehler and Hornocker 1977, Zielinski et al., 1983).
- Forest openings are usually avoided in winter (Spencer et al., 1983) though crossings of up to 180 yards in winter have been recorded in Maine (Soutierre 1979).
- Dens are commonly in hollow trees or tree cavities (Allen 1982b).
- Tree limbs and branches that have fallen to the ground allow marten access to rodent prey under deep snow (Steventon and Major 1982).

Potential Habitat Management and Enhancement Measures

- Provide snags in all forested areas (including cutting units) (Maser et al., 1981, Neitro et al., 1985).

- Protect large contiguous areas of old-growth and mature forest (Steventon and Major 1982, Hawley and Newby 1957).

- Leave four Class 1 or 2 logs greater than 24 inches in diameter and greater than 20 feet long per acre when available in cutting units (Bartels et al., 1985).

- Leave slash piles (approximately 20 feet in diameter) per acre when logs of the desired width and length are unavailable.

Associated Species

Providing snags for pine marten also would benefit up to 52 species commonly found in western Washington (39 birds and 13 mammals) that require cavities during some part or stage of their life cycle (Neitro et al., 1985). A variety of small mammals and birds that are important foods of the pine marten will benefit from the protection of old-growth forest. Providing logs for pine marten could benefit approximately 150 other terrestrial species commonly found in the western Cascades that use logs (Bartels et al., 1985).

DOUGLAS SQUIRREL

(Tamiasciurus douglasii)

General Life History

Douglas squirrels are primarily associated with mature Douglas-fir forests, although they occur in mixed stands of coniferous and deciduous trees as well (Bailey 1936, Ingles 1965). Cone production is the most important factor influencing habitat suitability (Smith 1965 and 1968).

Existing Use of Project Area

Douglas squirrel are commonly found in mature coniferous and mixed forests of the Sultan Basin (WDG 1982).

Habitat Requirements

- Major foods include conifer seeds. They also eat nuts, acorns, maple samaras, terminal and lateral buds of Douglas-fir and mushrooms.
- Shelter and nests are usually located in tree and snag cavities (Ingles 1965, Brown 1985).
- Globular nests may be built in crowns of trees (Ingles 1965).
- Douglas squirrel are particularly dependent on cones of Douglas-fir trees, which are relatively easy to open compared to the cones of such conifers as lodgepole pine (Smith 1965 and 1968).
- Squirrels are territorial throughout the year. Territory size varies from 1 to 2+ acres (Smith 1965 and 1968).

Potential Habitat Management and Enhancement Measures

- Provide snags in all forested areas (including cutting units) (Raphael and White 1984, Neitro et al., 1985).

- Plant Douglas-fir in cutting units to provide adequate food source in future stands (Smith 1965 and 1968).

- Maintain uncut areas in late-successional and old-growth Douglas-fir forests (Neitro et al., 1985).

Associated Species

Providing snags for Douglas squirrels will benefit 52 other species commonly found in western Washington (39 birds and 13 mammals) that require cavities during some part or stage of their life cycle (Neitro et al., 1985).

Many species utilize Douglas squirrels as a food source, including pine marten, fisher, goshawks, Cooper's hawk, barred owls, great-horned owls, red fox and occasionally coyote and bobcat.

COMMON MERGANSER

(Mergus merganser)

General Life History

The common merganser is a waterfowl species that is both a seasonal and year-round resident in western Washington.

Existing Use of Project Area

Common mergansers utilize Spada Lake throughout the year (WDG 1982). Merganser broods have been observed by Project personnel on both Spada Lake and Lake Chaplain.

Habitat Requirements

- Mergansers feed on many kinds of fish including juvenile salmon, trout, mussels, frogs and a variety of invertebrates (Bent 1923, Terres 1980).

- They must have clear water to locate food. Mated pairs will abandon streams that become turbid (Bellrose 1976).

- They are secondary cavity-nesters and utilize cavity-bearing trees near water (Brown 1985).

- Mergansers typically use mature and old-growth forest near water for nesting (Brown 1985).

- Nest height ranges from 0 to 200 feet. Nesting may occur as far as 575 feet from water (Bellrose 1976).

Potential Habitat Management and Enhancement Measures

- Create snags with a minimum DBH of 25 inches and a minimum height of 10 feet adjacent to lakes and rivers (Brown 1985).

- Use nest boxes to substitute for snags when sufficient trees of the desired height and DBH are lacking (Bellrose 1976).

- Provide mature and old-growth forest adjacent to rivers and lakes (Brown 1985).

Associated Species

Providing mature and old-growth forest adjacent to rivers and lakes will benefit many other species that require these cover types and snags for nesting including several waterfowl species, flycatchers, swallows, kingbirds, bats and mustelids. Large sawtimber and old-growth forest adjacent to riparian areas and wetlands are used for breeding by 39 percent more species than pole or small sawtimber (Oakley et al., 1985).

Creation of snags will provide habitat for as many as 53 cavity dependent species commonly found in western Washington (39 birds and 14 mammals). Other species that would likely utilize nest boxes are hooded merganser and wood duck. Nest boxes often are used by many different species on a sporadic basis.

MALLARD

(Anas platyphynchos)

General Life History

The mallard is a widespread, freshwater, waterfowl species and a common year-round resident at lower elevations in western Washington.

Existing Use of Project Area

Mallards can be found throughout the year in the Sultan Basin. They commonly breed in ponds, sloughs and marshes surrounding Lake Chaplain and Spada Lake. Wintering populations commonly occur on Spada Lake and Lake Chaplain (WDG 1982).

Habitat Requirements

- Plants comprise over 90 percent of diet (Martin et al., 1951, Pehrsson 1984).
- Mallards must have shallow, open water for feeding (Johnsgaard 1975).
- Nests are placed in relatively tall herbaceous vegetation in close proximity to water. Most nests are within 300 feet of water (Bellrose 1976).
- Broods utilize wetlands having sparse to dense emergent vegetation and open water (Berg 1956, Rumble and Flake 1983).
- A minimum of 3 acres of nesting and rearing wetland habitat is needed to support one mallard pair (Dzubin 1969).
- Long narrow sloughs, floating islands and gradually sloping shorelines are used for loafing (Girard 1941).

Potential Habitat Management and Enhancement Measures

- Create artificial and floating nesting islands (Duebbert and Lokemoen 1980).
- Expand and enlarge existing wetlands.
- Improve nesting cover near wetlands.

Associated Species

Wildlife density and diversity are greater in riparian zones and wetlands than in other habitats (Odum 1979). Of 414 western Oregon and Washington species discussed by Oakley et al. (1985), 359 use riparian zones or wetlands during some season(s) or part(s) of their life cycles.

Floating islands may facilitate nesting for other waterfowl species such as widgeon, gadwall and Canada goose.

BEAVER

(Castor canadensis)

General Life History

The beaver is a common western Washington aquatic mammal inhabiting lowland areas with suitable watercourses (Dalquest 1948). Factors affecting range potential include topography, stream gradient, adequate water, abundance of food species and land use (Dickinson 1971, Williams 1965).

Existing Use of Project Area

Beaver are commonly found in wetlands surrounding Lost Lake, Lake Chaplain and Spada Lake, as well as the Williamson Creek area (WDG 1982).

Habitat Requirements

- Diet includes a wide variety of aquatic and emergent vegetation including willow, cottonwood, alder, maple and ash (Denny 1950).
- Majority of foraging occurs within 300 feet of the water's edge (Allen 1982a).
- Stable water levels are optimal (Murray 1961).
- Trees preferred for food are between 3 and 4 inches DBH (Bradt 1947, Hodgon and Hunt 1953).
- The chief limiting factor in beaver carrying capacity is the amount of available food (MacDonald 1956).
- Actively eroding stream banks, rocky channels and sandy soils are unfavorable habitat (Hall 1960).

Potential Habitat Management and Enhancement Measures

- Promote resprouting of young growth deciduous trees by creating openings in the forest canopy (1/4 to 1 acre) adjacent to wetlands and stream courses (Allen 1982a).

- Enlarge wetland areas (MacDonald 1956).

- Planting cottonwood in disturbed wetland and riparian areas will increase food availability to beaver (Allen 1982a).

Associated Species

Many species will benefit from planting cottonwood and other deciduous trees, including ruffed grouse and black-tailed deer. Of 414 western Oregon and Washington species discussed by Oakley et al., (1985), 359 use riparian zones or wetlands during some season(s) or part(s) of their life cycle. Beaver activity alone can increase wetland size, fish populations, deciduous forests and populations dependent on these habitat components.

OSPREY

(Pandion haliaetus)

General Life History

The osprey is a migratory raptor commonly found near lakes, reservoirs and rivers from April through September in western Washington.

Existing Use of Project Area

One active osprey nest is located adjacent to Lake Chaplain. Osprey have also been sighted on the lower Sultan River and in the Sultan River Gorge area (WDG 1982).

Habitat Requirements

- Ospreys feed almost exclusively on fish (Bent 1937, Hughes 1983).
- Nest sites are usually in the tallest trees or snags that extend above the canopy and nearly always in the open and offer a clear view of the surroundings (Garber 1972, Van Daele and Van Daele 1982).
- Individual nest sites are used yearly by the same breeding pair (Bent 1937).
- Osprey regularly nest in forest adjacent to lakes, ponds and streams that are ice-free by mid-April (Van Daele and Van Daele 1982).
- Ospreys nesting in areas of heavy recreational use have experienced significant population declines through reproductive failure (Swenson 1979, Levenson and Koplin 1984).

Potential Habitat Management and Enhancement Measures

- Provide suitable nesting habitat (mature and old-growth forest) in close proximity to fishing habitat (Garber 1972, Bent 1937, Brown 1985).

- Create large diameter snags that extend above the surrounding forest canopy (Van Daele and Van Daele 1982).

- Create artificial nest platforms to increase productivity (Westall 1983, Van Daele and Van Daele 1982, Henny 1983).

- Limit human access and reduce disturbance during nesting periods (March 1 through August 1) (Levenson and Koplin 1984, Swenson 1979, Van Daele and Van Daele 1983).

- Provide at least 20 suitable perches per mile of lake or river shoreline. A suitable perch is a broken-top live tree, open-crowned live tree or snag at least 50 feet tall and within 200 feet of the shoreline (USFWS 1984).

- Provide at least two pilot trees within 500 feet of each nest site. A pilot tree is a perch tree with a clear view of a nest site (Garber 1972).

Associated Species

Providing old-growth forest habitat and creating large diameter snags adjacent to lakes and reservoirs will provide habitat for many species associated with old-growth forest and mature riparian forest. Other raptors such as accipiters and red-tailed hawks should benefit. Cavity excavators, secondary cavity nesters and a wide variety of mammals including black-tailed deer, should benefit.

Limiting human access and reducing disturbance during nesting will benefit many other species sensitive to human disturbance, including common loons and accipiters, and will promote greater use of forage areas by black-tailed deer.

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APPENDIX C

REGULATORY REQUIREMENTS

TABLE OF CONTENTS

STATE ENVIRONMENTAL POLICY ACT (SEPA); WAC 197-11

Applicability

SEPA compliance is required for any activity, "entirely or partly financed, assisted, conducted, regulated, licensed or approved," by a public agency in the State of Washington. Minor activities with little potential for environmental impact are exempt from SEPA, including some activities proposed in the management plan. The plan itself may not be exempt, however, because of the large area of land it will affect, the amount of money it will cost and the inclusion of non-exempt activity (the erection of an osprey nest at Spada Lake may not be exempt).

Procedure

The lead agency must be determined between the City and the District. The SEPA official from the appropriate lead agency will determine the applicability of SEPA. If SEPA compliance is required, an Environmental Checklist will be prepared and a threshold determination will be made. It is unlikely that an Environmental Impact Statement will be required. SEPA should be satisfied at least 30 days prior to any activity under the plan to ensure adequate time for public comment. If SEPA compliance is not required at the program level, it could be required during the permit acquisition process for osprey nest construction and test plantings at Spada Lake.

FOREST PRACTICES RULES AND REGULATIONS; WAC-222-08 THROUGH 50

Applicability

All forest activities (e.g. harvesting, planting, seeding, etc.) are governed by the Forest Practices Rules and Regulations. Some activities must simply conform to specified standards and guidelines, while others can proceed only after the acquisition of a permit. All forest practices proposed in the management plan are listed in Table C-1.

Table C-1. Forest practice activities included in the Jackson Project wildlife habitat management plan.

Activity
final harvest
commercial thin
pre-commercial thin
slash burning
planting/seeding
fertilization
road construction
culvert installation
snag creation

Procedure

Permit requirements under the Forest Practices Rules and Regulations specific to this plan will be established at annual meetings between DNR and the co-licensees. Other applicable statutes (i.e., RCW 70.94, 76.04, 79.94, 78, 84 and 17 and WAC 332, 173 and 222 which relate to forest protection, burning, smoke management, forest chemicals and taxation) will be discussed at the annual meeting.

Notifications must be filed with the Sedro Wooley office of the DNR prior to the onset of any Class II forest practice (e.g., final harvest, commercial thin or snag creation). Notifications cannot be filed more than one year prior to the activity. Several activities of the same type (several harvests) can be combined on a single notification. Completed applications must be filed for all Class III Forest practices (e.g., culvert installation in Type 4 streams) at least 30 days prior to the activity.

SNOHOMISH COUNTY SHORELINE MANAGEMENT MASTER PROGRAM

Applicability

According to the Snohomish County Planning Department, the shoreline of Spada Lake is a Shoreline of Statewide Significance and a Conservancy Shoreline under the Master Program. Lake Chaplain and the Sultan River are also Conservancy Shorelines. According to the Master Program, all activities within 200 feet landward of the mean high water mark of these water bodies covered by the Master Program are subject to permitting by the County (or City if within municipal limits). Applicability will be made on a case-by-case basis by the respective governmental body. However, the USFS does not agree that Spada Lake is included in the Master Program because it is on federal land in the Mt. Baker-Snoqualmie National Forest. Thus, a potential conflict could arise when State/local governmental regulatory requirements regarding plan implementation differ with those of the USFS.

Procedure

The respective governmental body should be contacted prior to any activity within a shoreline to determine applicability. If necessary, a completed application should be submitted at least 4 months prior to the planned starting date of the activity.

SAFETY STANDARDS FOR LOGGING OPERATIONS; WAC 296-54

Applicability

All forest practice activities must comply with State standards for worker safety, as administered by Washington Department of Labor and Industries (WDLI).

Procedure

Each harvest plan should be evaluated by WDLI, Division of Industrial Safety and Health prior to final sale, however, no notification or permit is required. All contracts for forest activities should specify that the requirements of WAC 296-54 will be met. Safety of workers will be the deciding factor for final plans.

HYDRAULIC CODE RULES; WAC 222-110

Applicability:

A Hydraulic Project Approval (HPA) is required from the Washington Departments of Fisheries and Wildlife for any activity that will alter or disturb the stream bed of any perennial or intermittent stream. This will primarily involve culvert installations under the management plan. Erection of osprey nests will require an HPA if poles are set in the lake bottom.

Procedure

Culvert installation associated with logging road construction will require a Forest Practices Permit, which will be forwarded by the DNR to the WDF/WDW. No separate permit is required. Culvert installation not associated with a forest practice will require a separate hydraulic project application submitted directly to the WDF at least 45 days prior to the scheduled date for the activity.

ORDER AMENDING LICENSE AND PROVIDING FOR HEARING FOR PROJECT NO. 2157, 17 FERC ¶ 61,056, ARTICLE 51

Applicability

Article 51 required the District to prepare an Erosion, Sedimentation and Slope Stability Control Plan (ESSSCP) prior to construction of the Project. All activities related to the Project, including the wildlife habitat management plan, must conform to the ESSSCP.

Procedure

The management plan was designed to comply with the ESSSCP. Agency reviews of the plan should include verification of this. No additional consultation will be required with the agencies.

APPENDIX D

LANDOWNER AGREEMENTS

Lake Chaplain Tract

The Lake Chaplain Tract is owned by the City of Everett (City) with the exception of certain parcels currently owned by the Department of Natural Resources (DNR) (Figure D.1) which will be exchanged to the City in a pending agreement expected to be completed in 1988. Present City-owned lands to be exchanged for State land are not presented as proposed mitigation lands in the plan. They were excluded during plan development due to the pending exchange.

Lost Lake Tract

The Lost Lake Tract was purchased by the District in January, 1988 (Figures D.2 and D.3).

Project Facility Lands Tract

The Project Facility Lands include the powerhouse site, the power pipeline right-of-way between the power tunnel lower portal and the powerhouse, a portion of the transmission line right-of-way and a wedge-shaped parcel of land adjacent to the powerhouse access road. The powerhouse site and wedge-shaped parcel are owned by the District. The District has permanent easements from DNR (Agreement No. 44332), Lake Bronson Associates, Inc., Town of Sultan, and Stollenmayer for the power pipeline and transmission line rights-of-way.

Spada Lake Tract

The portion of the Spada Lake Tract including the reservoir to elevation 1,460 feet MSL is within the Project boundary and controlled by the co-licensees under regulatory authority of the Federal Energy Regulatory Commission (FERC). The remaining portion of the tract will include at least 700 acres, if and when the co-licensees obtain them in a pending land exchange with the U.S. Forest Service (USFS) (refer to Interim Recreation Plan, Annual Report to FERC on Activities, dated February 18, 1988).

Williamson Creek Tract

The Williamson Creek Tract is currently under the control of DNR and USFS. The District is in the process of obtaining control of the property from DNR (Figure D.4). The parcels administered by USFS would be included in the pending land exchange referred to under the Spada Lake Tract.

FIGURE D.1

WASHINGTON STATE DEPARTMENT OF
Natural Resources

BRIAN BOYLE
Commissioner of Public Lands

OLYMPIA, WA 98504

June 9, 1987

Mr. Roy Metzgar
Snohomish County P.U.D.
2320 California
Everett, WA 98201

Dear Mr. Metzgar:

The Department of Natural Resources will hold a Public Hearing at Monroe PUD Auditorium, 120 East Freemont in Monroe on July 15, 1987. The hearing will convene at 7:30 p.m.

The purpose of the hearing is to receive testimony on a proposed land exchange between the State and the City of Everett.

The state lands comprise 367 acres, more or less and the City of Everett lands 521 acres, more or less. The attached map shows the properties in the proposed trade.

Written testimony will be accepted by mail until July 25, 1987. Address to Department of Natural Resources, Division of Timber Sales, Olympia, WA 98504, REF: Exchange No. 378 testimony.

The final determination of lands to be exchanged will be based on equal values.

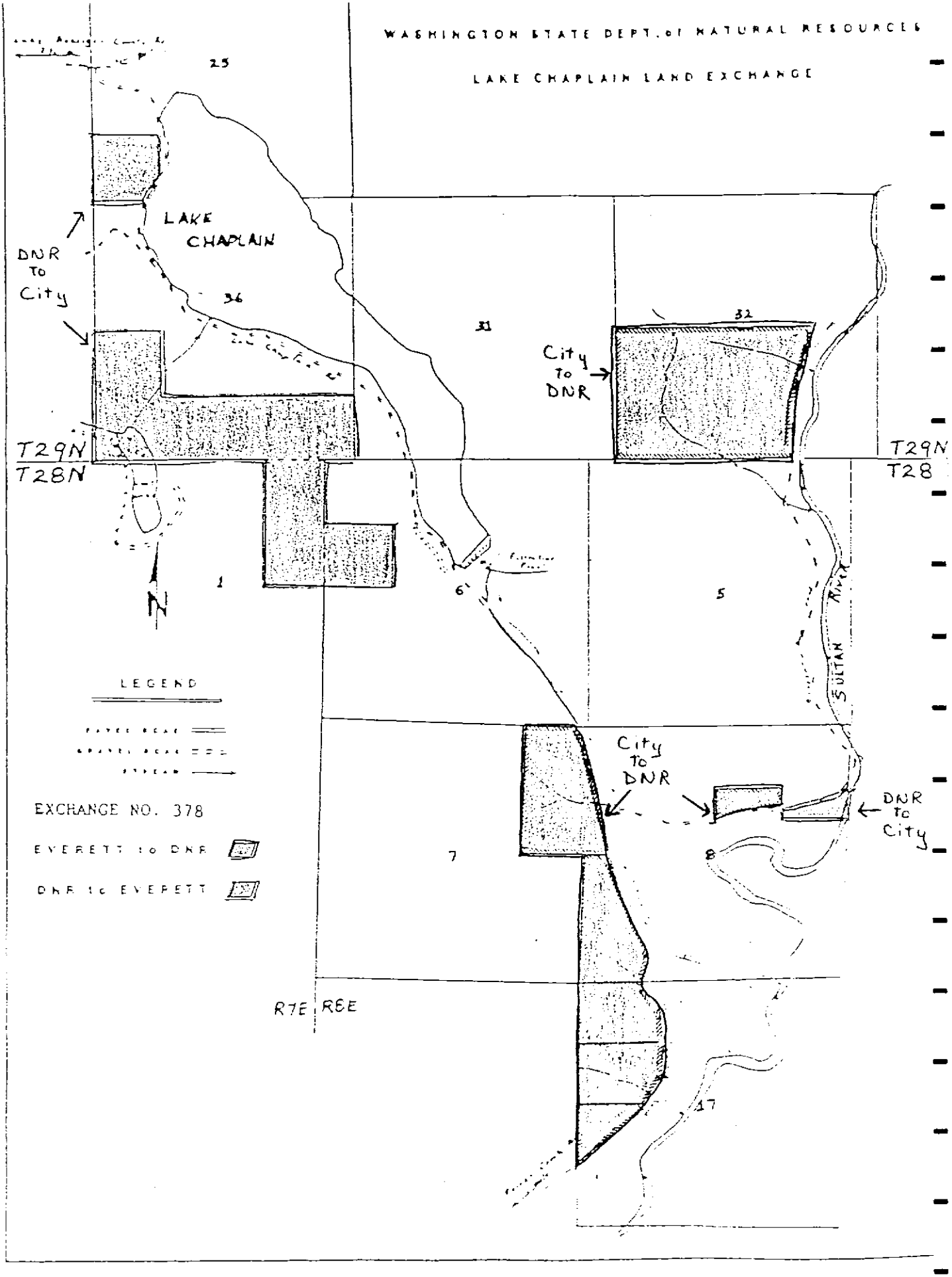
Additional information may be obtained by contacting the Department office in Sedro Woolley, (206-856-0083) or Olympia (206-753-5334).

Sincerely

Russ Phillips
Division of Timber Sales

RP:jc

cc: Exchange No. 378
Northwest Region


WASHINGTON STATE DEPT. of NATURAL RESOURCES
LAKE CHAPLAIN LAND EXCHANGE
LAKE CHAPLAIN
DNR To City
City to DNR
T29N
T28N
T29N
T28
R7E
R8E
SULTAN RIVER
City to DNR
DNR to City
LEGEND
EXCHANGE NO. 378
EVERETT to DNR
DNR to EVERETT

RESOLUTION NO. 3096

A RESOLUTION authorizing the purchase of certain real property for Jackson Project wildlife mitigation purposes

WHEREAS, the District and the City of Everett, as joint holders of FERC License No. 2157, for the Jackson Hydroelectric Project ("Project"), are required under Article 53 of such License to develop and implement a plan for mitigation of the effects of the Project upon terrestrial wildlife; and

WHEREAS, on September 1, 1987, the Commission approved a Wildlife Habitat Management Plan ("Plan") which incorporated the acquisition and management of a 205-acre tract containing wetlands, a lake and mixed second-growth forest, known as the "Lost Lake Property"; and

WHEREAS, THE Commission finds that acquisition of the "Lost Lake Property" is appropriate in light of its significant value in accomplishment of Plan objectives,

NOW, THEREFORE, the Commission of Public Utility District No. 1 of Snohomish County, Washington, hereby authorizes and directs the Manager to purchase on behalf of the District that 205-acre parcel of real estate known as the "Lost Lake Property," as described on Exhibit "A," attached hereto and incorporated by this reference;

Such purchase shall be in accordance with the terms and conditions of that "Option" agreement concerning such property attached hereto as Exhibit "B."

PASSED AND APPROVED this 8th day of December, 1987.

President

Vice-President

Secretary

TICOR TITLE INSURANCE

RECORDED

THIS SPACE RESERVED FOR RECORDER'S USE:

TICOR TITLE INSURANCE CO.

88 JAN -6 PM 4:33

DEAN V. WILLIAMS, AUDITOR
SNOHOMISH COUNTY, WASH.

DEPUTY

REVENUE STAMPS

REAL ESTATE EXCISE TAX
SALE PRICE 424,000
RECEIPT NO 0177
JAN 7 1988
Snohomish County Treasurer
Deputy

Filed for Record at Request of TICOR

AFTER RECORDING MAIL TO:

PUBLIC UTILITY DRISTRICT NO. 1 OF
SNOHOMISH COUNTY
P.O. Box 1107
Everett, WA 98206

Attn: RON EVERIST
F-272087

8801060283

FORM L-58 (3-84)

Statutory Warranty Deed

THE GRANTOR JEFFREY A. JOBE, ALSO KNOWN AS JEFF JOBE, AND CYNTHIA F. JOBE, ALSO KNOWN AS CYNTHIA JOBE, HUSBAND AND WIFE
for and in consideration of TEN AND NO-100 DOLLARS AND OTHER GOOD AND VALUABLE CONSIDERATION
in hand paid, conveys and warrants to PUBLIC UTILITY DISTRICT NO. 1 OF SNOHOMISH COUNTY
the following described real estate, situated in the County of SNOHOMISH, State of Washington:

SEE EXHIBIT 'A' ON ATTACHED RIDER WHICH BY THIS REFERENCE IS MADE A PART HEREOF.

SUBJECT TO: SEE EXHIBIT B, AS HERETO ATTACHED AND BY THIS REFERENCE MADE A PART HEREOF.

Dated this 31st day of DECEMBER 1987

By JEFFREY A. JOBE 1-6-88 By CYNTHIA F. JOBE

By ..... By .....

STATE OF WASHINGTON
COUNTY OF Snohomish } ss

On this day personally appeared before me Jeffrey A. Jobe and Cynthia F. Jobe to me known to be the individual described in and who executed the within and foregoing instrument, and acknowledged that they signed the same as their free and voluntary act and deed, for the uses and purposes therein mentioned.

GIVEN under my hand and official seal this 4th day of January, 19 88

Notary Public in and for the State of Washington, residing at Everett
My appointment expires on 08-30-88

STATE OF WASHINGTON
COUNTY OF .....
NOTARY PUBLIC

On this ..... day of ....., 19 ....., before me the undersigned, Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared .....
and ..... to me known to be the ..... President and ..... Secretary, respectively, of .....
the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that ..... authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

Notary Public in and for the State of Washington, residing at .....
My appointment expires on .....

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8801060283

EXHIBIT A -- LEGAL DESCRIPTION

THOSE PORTIONS OF SECTION 1, TOWNSHIP 28 NORTH, RANGE 7 EAST, W.M., DESCRIBED AS FOLLOWS:

PARCEL A:

GOVERNMENT LOT 4; THE NORTH HALF OF THE SOUTHWEST QUARTER OF THE NORTHWEST QUARTER; THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER; AND THAT PORTION OF GOVERNMENT LOT 3 LYING WESTERLY OF THE FOLLOWING DESCRIBED LINE:

COMMENCING AT THE NORTHWEST CORNER OF SAID GOVERNMENT LOT 3 AND RUNNING SOUTHEASTERLY TO THE SOUTHEAST CORNER OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER; AND THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER;

EXCEPT THE FOLLOWING DESCRIBED TRACT:

COMMENCING AT THE HIGHWATER MARK ON THE EASTERLY SHORE OF LOST LAKE WHERE SAID MARK INTERSECTS THE SOUTH LINE OF GOVERNMENT LOT 3; THENCE EXTENDING SOUTHERLY ALONG THE HIGHWATER MARK OF THE SHORELINE OF SAID LOST LAKE A DISTANCE OF 400 FEET; THENCE EAST AND PARALLEL TO THE SOUTH LINE OF GOVERNMENT LOT 3 A DISTANCE OF 200 FEET; THENCE NORTH AND PARALLEL TO THE HIGHWATER MARK OF LOST LAKE TO A POINT ON THE SOUTH LINE OF GOVERNMENT LOT 3 200 FEET EAST OF POINT OF BEGINNING; THENCE WEST ALONG THE SOUTH LINE OF GOVERNMENT LOT 3 200 FEET TO THE POINT OF BEGINNING.

PARCEL B:

ALL THAT PORTION OF GOVERNMENT LOT 3 (ALSO REFERRED TO AS THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER) LYING EASTERLY OF A LINE DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID GOVERNMENT LOT 3 AND RUNNING SOUTHEASTERLY TO THE SOUTHEASTERLY CORNER OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER; AND THAT CERTAIN STRIP OF LAND BEING 400 FEET IN LENGTH ALONG THE SHORELINE OF LOST LAKE AND 200 FEET AT RIGHT ANGLES THERETO, MORE SPECIFICALLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE HIGHWATER MARK ON THE EASTERLY SHORE OF LOTS LAKE WHERE SAID MARK INTERSECTS THE SOUTH LINE OF GOVERNMENT LOT 3; THENCE EXTENDING SOUTHERLY ALONG THE HIGHWATER MARK OF THE SHORELINE OF SAID LOST LAKE A DISTANCE OF 400 FEET; THENCE EAST AND PARALLEL TO THE SOUTH LINE OF GOVERNMENT LOT 3 A DISTANCE OF 200 FEET; THENCE NORTH AND PARALLEL TO THE HIGHWATER MARK OF LOST LAKE TO A POINT ON THE SOUTH LINE OF GOVERNMENT LOT 3 AND 200 FEET EAST OF POINT OF BEGINNING; THENCE WEST ALONG THE SOUTH LINE OF GOVERNMENT LOT 3 200 FEET TO THE POINT OF BEGINNING.

PARCEL C:

GOVERNMENT LOT 2 (ALSO REFERRED TO AS THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER).

PARCEL D:

THE SOUTHWEST QUARTER OF THE NORTHEAST QUARTER.

ALL SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

EXHIBIT B: SUBJECT TO THE FOLLOWING:

ANY LACK OF A RIGHT OF ACCESS TO OR FROM A PUBLIC ROADWAY.

RESERVATIONS CONTAINED IN DEED RECORDED MAY 23, 1946, UNDER AUDITOR'S FILE NO. 813195.

TERMS AND CONDITIONS OF THAT CERTAIN STIPULATION AND DECREE ENTERED INTO ON MARCH 28, 1968, IN SNOHOMISH COUNTY SUPERIOR COURT CAUSE NO. 91741.

EASEMENT (AND AGREEMENT TO MAINTAIN SAID EASEMENT) AS CREATED BY DECREE IN PARTITION ENTERED MARCH 28, 1968, IN SNOHOMISH COUNTY SUPERIOR COURT CAUSE NO. 91741.

THE STIPULATION AND DECREE ABOVE REFERRED TO, REFER TO SHORELANDS OF LOST LAKE. WE FIND NO DEED OF RECORD FROM THE STATE OF WASHINGTON FOR SHORELANDS. IF SAID LAKE IS NAVIGABLE, TITLE TO SAID SHORELANDS IS VESTED IN THE STATE OF WASHINGTON.

ANY QUESTION THAT MAY ARISE DUE TO CHANGE OF THE BOUNDARIES OF LOST LAKE.

FIGURE D.4

SNOHOMISH COUNTY
PUD
PUBLIC UTILITY DISTRICT No. 1

2320 California St., Everett, Washington 98201 258-8211
Mailing Address: P. O. Box 1107, Everett, Washington 98206

December 8, 1987
PUD-17637

Mr. William J. Wallace
Assistant Area Manager
Department of Natural Resources
Northwest Area
919 N. Township St.
Sedro Woolley, WA 98284

Dear Bill:

Jackson Project - FERC #2157
Wildlife Habitat Management Plan
Williamson Creek Tract

The District wishes to obtain control of the Williamson Creek Tract (see Attachment 1) as part of the Jackson Project Wildlife Habitat Management Plan (Plan). A copy of the timber cruise you requested (letter dated April 29, 1987) is enclosed (Attachment 2). The cruise was conducted in accord with directions from your department (letter dated September 8, 1986).

As you may recall, the Williamson Creek Tract is one of five tracts included in the Plan. A settlement offer was sent to the resource agencies on October 2, 1987. The District received only one response, which was from the U. S. Forest Service (USFS) and encouraged us to proceed with the Plan. The District interprets the response from USFS and lack of response from the other agencies and Tribes as further confirmation of the verbal acceptance of the Plan in September, 1987. In addition, the District Board of Commissioners and the Everett City Council have approved the Plan. A Final Plan draft will be submitted to the agencies and Tribes in early January. Therefore, we are ready to proceed with the steps necessary to obtain control of the Williamson Creek Tract, either by lease or acquisition.

In your letter dated April 29, 1987, you requested that the District act on our preferred option of lease or acquisition by December 31, 1987. We have not yet made a determination of our preference and request that you continue to defer management plans on the Tract. We hope that the previous information provides adequate evidence of the credibility of our intentions. We have conducted an appraisal for use in determining a mutually acceptable strategy for transferring control of the Tract to the District.

Thank you for your assistance and cooperation on the Williamson Creek Tract and Plan development. We sincerely appreciate it and look forward to hearing from you soon.

Very truly yours,

ORIGINAL SIGNED BY
M. HATSCHER
Martin Hatscher
Acting Director, Power Management

Attachments
KLB:jk
cc: J. Potter, DNR
D. Farwell, DNR
G. Engman, WDW (w/o Attachment 2)
C. Dunn, USFWS (w/o Attachment 2)
G. Ging, USFWS (w/o Attachment 2)
D. Simmons, USFS (w/o Attachment 2)
D. Somers, Tribes (w/o Attachment 2)
C. Olivers, City
W. Perry, FERC (w/o Attachment 2)
J. Hunter, FERC (w/o Attachment 2)