

WESTERN WASHINGTON FRESHWATER WETLANDS

Volume VI. Mid-Montane Wetlands:
Whatcom and Skagit Counties

by

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ABSTRACT

This study identifies high quality native wetlands which occur in the mid-montane of Whatcom and Skagit Counties, Washington. It focuses on peat forming wetlands which have rooted vascular plant vegetation. A few low elevation wetlands not previously surveyed are also included in this study.

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INTRODUCTION

Over the last several years, the public has become aware of the values and functions of wetlands. At the same time, information has become available on the amount and rate of destruction of these systems. The result has been a heightened public concern about the protection of wetland systems.

The Washington Department of Ecology determined a need for wetland studies which would classify and describe wetland types and identify high quality native systems. To satisfy part of this need, the Department of Ecology contracted with the Department of Natural Resources, Natural Heritage Program to inventory mid-montane wetlands located in Whatcom and Skagit Counties.

This study identifies high quality native systems which qualify as Natural Heritage wetlands. It focuses on native, peat forming wetlands which are vegetated by rooted vascular plants. The report provides a list and descriptions of these relatively pristine native wetlands, that is, those sites which most resemble wetlands which occurred prior to European settlement.

Although a large percentage of the peat forming mid-montane wetlands located in Whatcom and Skagit Counties were reviewed, not all could be surveyed within the scope of this study. With further work, it is probable that more sites could be added to this list of high quality wetlands.

STUDY AREA

The study area includes the lands between 1,800 and 4,000 feet elevation which drain to the west in Whatcom and Skagit Counties. It includes state and privately owned lands (figure 1). A few wetlands were included which are located below 1,800 feet in the foot hills of the Cascade Mountains. These sites were not accessible or there was insufficient survey time during previous surveys of low elevation wetlands in the region.

The study area falls within the North Cascades geologic province of McKee (1972). Most of the parent materials are crystalline-intrusive granites and a variety of metamorphic rock types. They also include sedimentary and volcanic rock. The whole area was glaciated, some portions by continental glaciers and other areas by alpine glaciers. Valley floors are relatively flat and their sides are steep.

The North Cascades have cold wet winters and mild dry summers. Annual precipitation ranges from 60 to 100 inches. Most of the precipitation falls as snow. Temperature data are not available for the mid-montane zone.

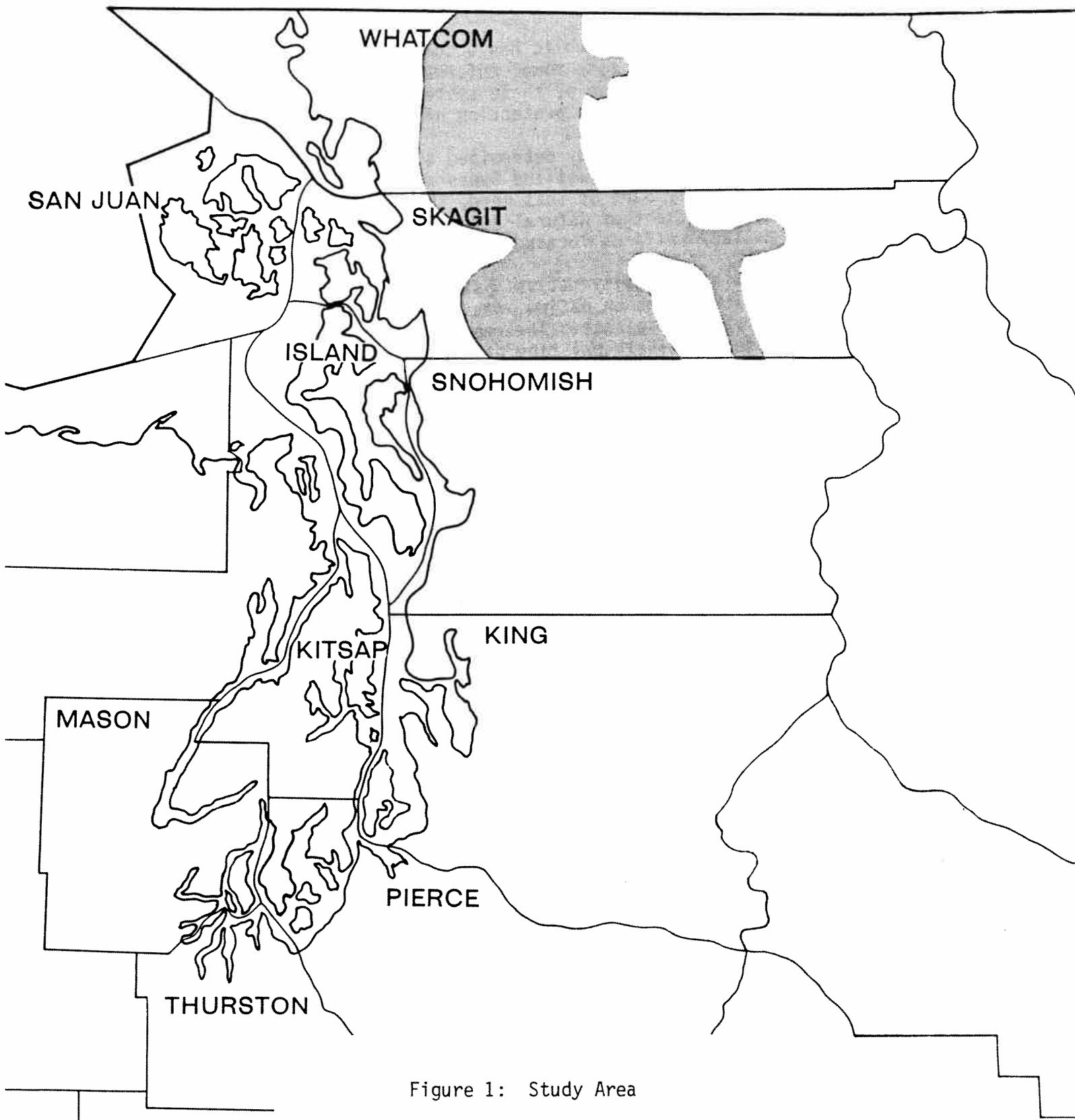


Figure 1: Study Area

METHODOLOGY

INITIAL SITE SELECTION:

Sites for study were initially selected by: 1) reviewing U.S.G.S. 7.5 and 15 minute quadrangle maps; 2) reviewing the latest available aerial photographs printed at a scale of 1:12,000; 3) retrieval of data already contained within the Natural Heritage Information System; and 4) reviewing leads provided by researchers and knowledgeable landowners.

The criteria that were used in this initial site selection were:

1. The degree of human-related physical disturbances of the wetland. Disturbances included: damming, diking, ditching, filling, draining, logging, other vegetation removal or mining of the substrate. A site continued to be considered for survey if the disturbance appeared to be relatively minor or isolated. Otherwise, the existence of any of these disturbances resulted in the elimination of a site from further consideration.
2. Adjacent land use. Some adjacent land uses are more disruptive of wetlands than are others. Adjacent land uses include: timber production, pasture, mining, powerline right-of-ways, roads, railroads and recreation. If an adjacent land use was highly disruptive, the wetland may have been eliminated from further consideration.
3. The presence and quality of an upland buffer. Assessment of the quality of a buffer was based on 1) the width of the buffer in relationship to adjacent land uses, 2) the composition and age of the buffer, and 3) current uses within the buffer. If a buffer did not exist between a wetland and a disruptive adjacent land use, and the wetland appeared disturbed, then the site was usually eliminated from further consideration for field survey. If, on the other hand, the site appeared undisturbed or most or all wetlands in the area had no buffer, it continued to be considered for field surveys despite the absence of a buffer.
4. The minimum size for sites to be considered was arbitrarily set at two acres.

Sites selected through this process were then ranked according to their apparent quality, and scheduled for field surveys.

FIELD SURVEYS:

Field surveys were conducted during the summer of 1990. Existing data from the Natural Heritage Information System were collected in previous years.

Upon visiting a site, a preliminary determination was made to include or eliminate the site from further consideration. Inclusion of a site in the survey was based on the cover and frequency values of exotic (non-native) plant species, apparent historical use of the wetland (for instance as pasture or for timber harvest), along with the criteria for initial site selection outlined above. Degraded sites were surveyed if they represented relatively better examples of wetland types that have been degraded throughout the region.

For all survey sites, data were collected on physical and biotic features, hydrology, soils, adjacent land use, and historic use. Physical features included topography, elevation, exposure, special climatic conditions, kind or means of impoundment, and wetland configuration. Data on hydrology included water depth, apparent water level fluctuation, drainage patterns within the wetland's basin, and water source.

Soils generally were classified in the field as: sphagnum peat, fibrous peat, heath peat, woody peat, muck, clays, silts, sands, glacial till, or outwash. Soils data were also gathered from the U.S. Department of Agriculture, Soil Conservation Service (1989). Peat soil definitions follow Rigg (1958).

Adjacent land use and historic uses were determined through site observation, talking with owners of a site or adjacent areas, agency personnel, people involved with the timber industry, historical records, and aerial photographs.

The biological evaluation of a site included a detailed description of the vegetation. Assemblages of native plant species were identified during a reconnaissance of each wetland. Lists of species and their percent cover values were recorded for each assemblage. Plant species nomenclature follows Hitchcock and Cronquist (1973). Wildlife species or their sign were noted.

NATURAL HERITAGE WETLAND SITE SELECTION CRITERIA:

Following the field inventories, wetland sites were evaluated against a set of criteria to determine if they qualified as Natural Heritage wetlands. Natural Heritage wetlands contain examples of one or more relatively pristine native wetland types. They closely resemble wetlands which are believed to have existed prior to European settlement. Their physical characteristics, biota, ecosystem functions, processes and settings are essentially natural.

The following criteria, all of which must be met, are the lowest standards for a wetland site to be a Natural Heritage wetland:

1. The wetland contains a native wetland type considered important for preservation within the state (Washington Department of Natural Resources, 1991);
2. there is little or no evidence of human-caused changes to the wetland topography or soils;

3. there are no human-caused changes to the hydrology of the wetland, or else the wetland appears to have recovered from any changes;
4. the wetland has few or no exotic plant species;
5. there is little human-caused disturbance of the native vegetation, or the vegetation has recovered from past disturbance; and
6. there are no known major water quality problems.

These criteria are applied based on the amount of disturbance present in all examples of a given wetland type. A fairly disturbed wetland may be a Natural Heritage wetland if it contains one of the highest quality examples remaining of a wetland type. On the other hand, an equally disturbed site may not be a Natural Heritage wetland if it contains wetland types which have many undisturbed examples. A severe degree of disturbance would exclude a site from being a Natural Heritage wetland even if no better examples of that wetland type exist.

NATURAL HERITAGE ELEMENT RANKS:

Native wetland types considered by the Natural Heritage Program as important for preservation within the state are called elements. Each occurrence of a wetland type (element occurrence) which meets the above Natural Heritage wetland criteria is evaluated for its *quality*, *condition*, *viability* and *defensibility*. This evaluation results in a *rank* of A, B, C or D. The element occurrence's name and rank are listed under "Features" in the site descriptions.

Element occurrence *quality* considers how representative the particular occurrence of the wetland type is. It considers the size of the occurrence, how much of the diversity of the type is represented on the site and how characteristic it is of the type.

Element occurrence *condition* considers how disturbed or degraded the occurrence is. It considers physical alteration of the soils, topography and hydrology, the occurrence and effects of exotic species, and the degree of recovery of an occurrence from past disturbance.

Element occurrence *viability* considers the prospects for long-term existence of the occurrence. It considers on- and off-site factors such as how aggressive any exotic species which occur on or near the site are, adjacent disruptive land uses, and water supply quantity and quality.

Element occurrence *defensibility* considers whether the occurrence can be protected from human-caused alteration. It considers gene pool isolation, and the ability to sufficiently buffer the occurrence from off-site disturbances.

The Element occurrence *rank* integrates the evaluation of the occurrence quality, condition, viability and defensibility. The ranks are:

- A - excellent
- B - good
- C - marginal
- D - poor

The element occurrence rank is assigned at the time a site is surveyed and can change as conditions within the site and drainage change.

CONDITION

Mid-montane wetlands are in questionable condition west of the Cascade crest in Whatcom and Skagit Counties. The region has been under particularly intense logging pressure over the past five to ten years and that pressure continues today. Much of this landscape has been recently roaded and logged for the first time. Although wetlands seldom appear to have been entered with logging or road building equipment, roads often lie adjacent to wetlands or just upslope. In general, buffers have not been left around wetlands and streams, and logging occurs to the wetland or stream edge. Trees and debris from road building and logging frequently are deposited within the wetlands.

The effects of logging and road building must still be evaluated. Clearcut logging and disturbance of upslope drainages appear to be altering the microclimates and hydrology of mid-montane wetlands. Removing the forests around wetlands reduces shading, increases temperature and increases air movement. Among other things, this increases evapotranspiration within the wetland. Clearcutting around wetlands may increase the total amount of water delivered to a wetland, but the increases in evaporation may result in a net reduction of water in the wetland (Jim Ryan, pers. com.).

Upslope roads can divert surface and subsurface water reducing or increasing water delivery to the wetland. Either increasing or decreasing water delivery changes the hydrology of the system. Upslope roads and clearcutting to the wetland edge are a source of sediment and debris in wetlands.

As yet there are very few introductions of exotic plant species which are of concern to wetlands in this area.

Wetlands located in the lowlands within river valleys or at lower elevations in the mountains generally have a longer history of human use and list of disturbances than do the mid-montane wetlands. Logging is occurring around most of them for the second time. Many had forested wetland communities that have been logged. The hydrology of many has been altered. Exotic plant species, particularly reed canarygrass, are wide spread. A few were ditched in the past or used for pasture. There are very few of these low elevation wetlands which qualify as Natural Heritage Wetlands.

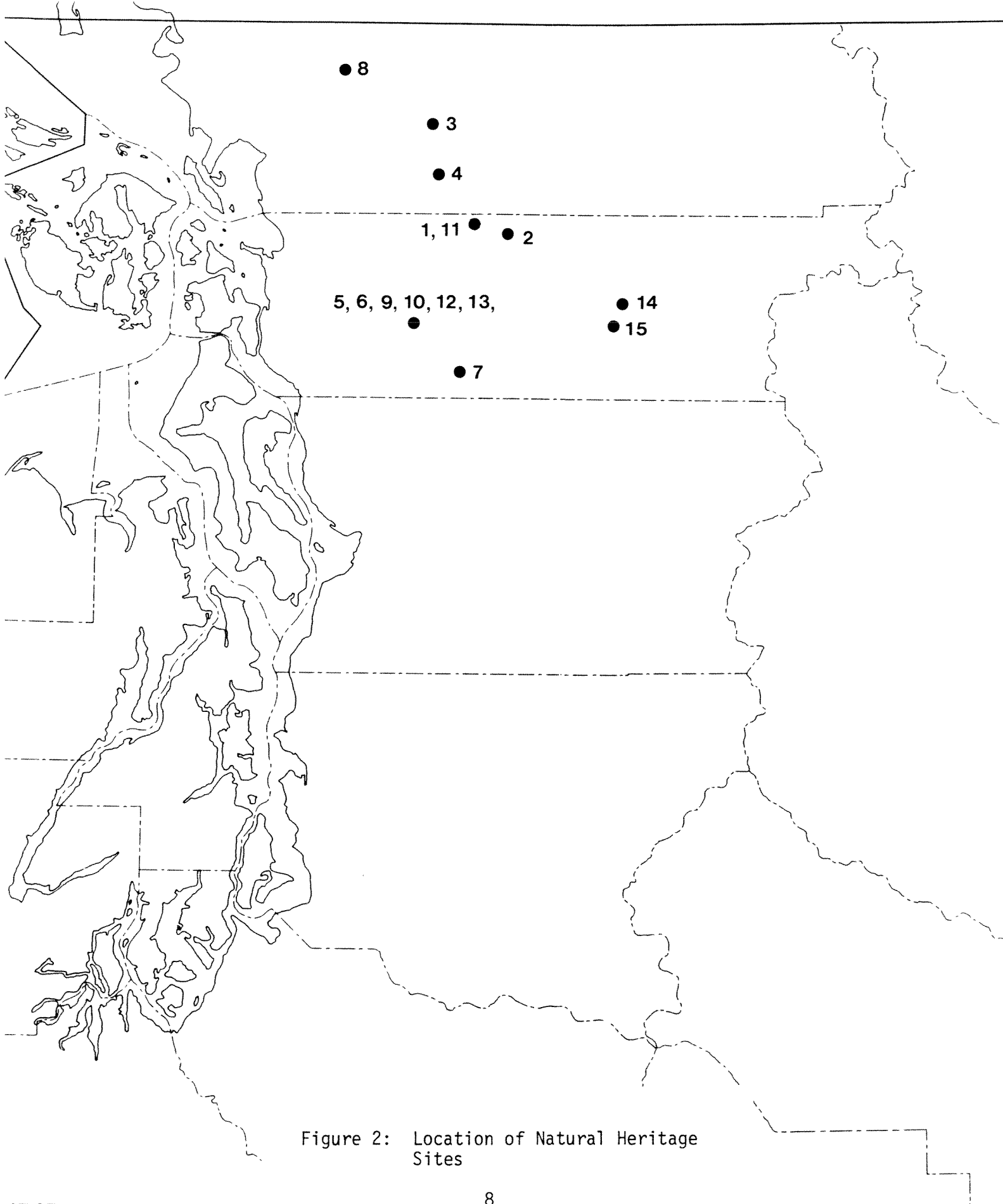


Figure 2: Location of Natural Heritage Sites

NATURAL HERITAGE WETLAND SITE LIST

Mid-montane Sites:

1. Bear Lake
2. Bear Meadows
3. Clearwater-Canyon Divide
4. Dailey Prairie
5. Dixie Lake
6. Gordon Lake
7. Larch Lake
8. Lost Lake
9. Nookachamps-Gilligan Divide
10. RB Lake
11. Respite Pond
12. Split Rock
13. Wagner Lake

Low Elevation Sites:

14. Hilt Creek Swamp
15. Sauk Bench

MID-MONTANE SITE DESCRIPTIONS

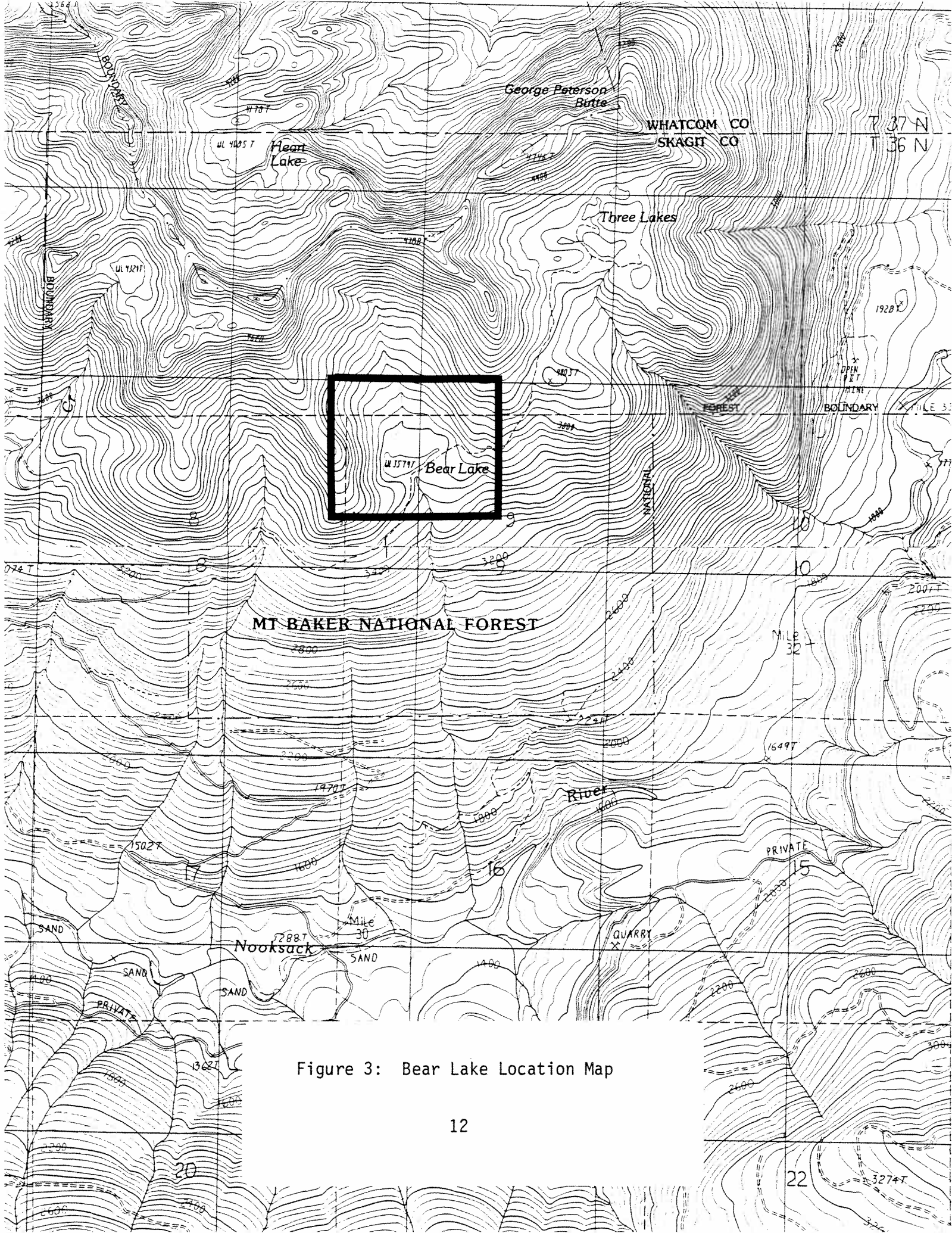


Figure 3: Bear Lake Location Map

BEAR LAKE

LOCATION:

Skagit County; Section 9, Township 36 North, Range 7 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation freshwater wetland	B

DESCRIPTION:

Physical: Bear Lake is located on the south slope of Three Sisters Mountain at an elevation of about 3,550 feet. It sits in a small, steep sided basin which has a protected southern exposure and is the headwaters of a creek which flows into the South Fork Nooksack River. Bear Lake consists of a three acre pond and three acres of wetlands.

Most of the wetland area is seasonally flooded and then supersaturated. The lake is shallow and permanently flooded. Several small streams and seeps flow through the wetland and into the lake. The outflow is a small perennial stream. The system is fed by surface flow, snowmelt and precipitation.

The lake bottom is composed of boulder to silt sized particles and has areas of muck and peat. The wetland soils are composed of fibrous peat and muck.

Biological: The lake has a few patches of aquatic vegetation dominated by Nuphar polysepalum and Sparganium sp. Along the lake margin is a zone of wetland vegetation dominated by Carex lenticularis, Eriophorum polystachion and Carex interior complex. A third, unidentified species of sedge is abundant in this zone as well. Landward of the latter zone and adjacent to the upland vegetation is a species rich zone dominated by Eleocharis pauciflora. Most of the wetland vegetation occurs along the north and east sides of the lake.

CONDITION:

Bear Lake is in relatively good condition and is located in an uncut basin. The area receives recreational use, most of which is focused along the southern edge of the lake away from most of the wetland. A road is located along the south side of the lake, crossing the outflow and a portion of the wetland. There are campsites near the lake and one in the wetland adjacent to the road. There is litter, horse manure, ORV tracks, weedy plant species and trampling by humans associated with the road and campsites. Any fish in the lake are probably planted and not native to the system. Access to Bear Lake has been disrupted by recent logging activities and erosion of the road. Current access is limited to foot traffic, horses and some ATVs.

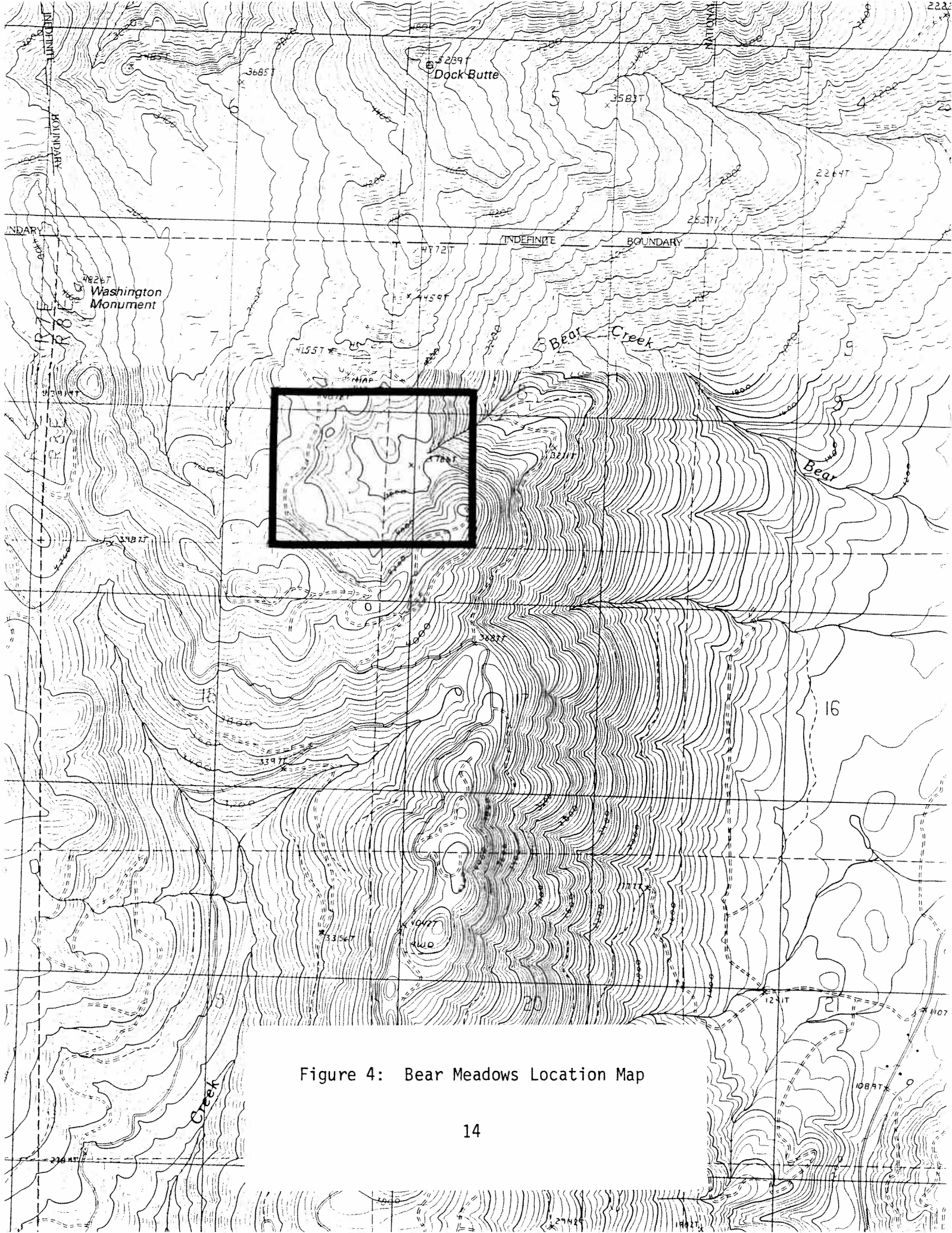


Figure 4: Bear Meadows Location Map

BEAR MEADOWS

LOCATION:

Skagit County; Sections 7, 8 and 18, Township 36 North, Range 8 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:

1. Mid-elevation freshwater wetland

Rank:

B

DESCRIPTION:

Physical: Bear Meadows is a series of connected wetlands located just below a ridge top west of Lake Shannon. The wetlands total about twenty-one acres. They occur at an elevation of about 3,900 feet and are the headwaters of Bear Creek which flows into Lake Shannon. The wetlands are sloping and have a northeast aspect.

The wetlands are seasonally flooded and then supersaturated. Small streams and seeps flow through the wetland system and there is one small permanent pool near the wetland's outflow. The wetland is fed from small streams, seeps, snowmelt and precipitation. The outflow is a waterfall at the northeast end of the wetland system.

Wetland soils are fibrous peat and muck. Streams have sand and gravel bottoms.

Biological: Overall the wetland vegetation is dominated by Carex nigricans, Carex lenticularis, Carex illota and a small Epilobium sp. Carex illota, Carex lenticularis and Caltha biflora are dominant along the streams and seeps. Carex lenticularis is dominant in a very wet area adjacent to the pond. Elsewhere, the four dominant species generally co-occur.

CONDITION:

Bear Meadows appears to be in good condition. There was little evidence of human use of the wetlands and the vegetation was composed of native plant species.

The steep upland slopes to the south and east have been clearcut, in two places to the wetland edge. The slopes to the west were being logged at the time of the survey. As yet, there had been no logging activity in the areas between the individual wetlands within the system.

A logging road extends along the southwest and west sides of the basin coming within 250 feet of the wetland and crossing several small streams and seeps which flow into the wetland. There is evidence of past soil and vegetation slides in the area of the road. The road may precipitate more slides into the wetland. Exotic and weedy plant species may spread from the up-slope road and logged areas into the wetland system. Another survey is needed to assess the extent and effects of the latest logging operation on the wetland system.

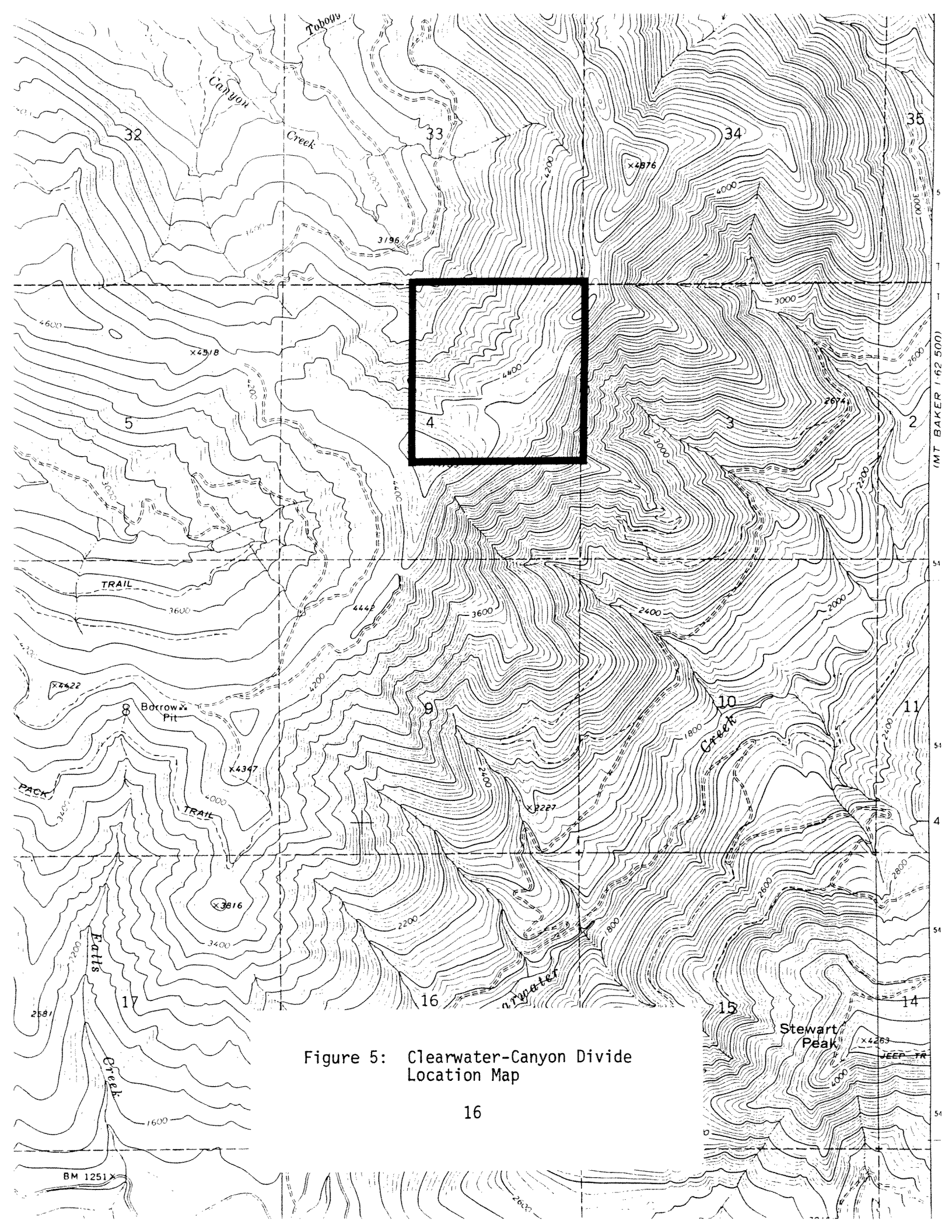


Figure 5: Clearwater-Canyon Divide
Location Map

CLEARWATER-CANYON DIVIDE

LOCATION:

Whatcom County; Section 4, Township 38 North, Range 6 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation sphagnum bog	B
2. Mid-elevation freshwater wetland	B

DESCRIPTION:

Physical: This series of wetlands is located at an elevation of about 4,400 feet on the ridge between the Clearwater Creek and Canyon Creek drainages. Some of the wetlands occur on slopes and others in saddles, all within uncut forests. Some of the wetlands have two outlets and drain into both of the creek drainages. The wetland areas total about four acres.

The wetland soils are supersaturated to saturated year round. They are fed by small seeps, surface sheet flow, snowmelt and precipitation. All of the wetlands have tiny perennial streams flowing through them that usually originate in them. Many have tiny perennial pools.

The soils are fibrous peat with areas of sphagnum peat.

Biological: Most of the wetlands are dominated by Carex nigricans. Areas dominated by C. nigricans without Sphagnum spp. have high percent cover of either Mitella pentandra and Carex spectabilis, or Hippuris montana, Aster sp., Senecio triangularis and Caltha biflora. Those areas codominated by C. nigricans and Sphagnum spp. have high percent cover of Luetkea pectinata, Hippuris montana and Carex cf. lenticularis.

Drier areas within the wetlands are dominated by either Luetkea pectinata and Carex spectabilis or Caltha biflora with high percent cover of Vaccinium cf. deliciosum.

CONDITION:

This series of wetlands is in excellent condition but is small. It occurs within an as yet uncut forested ridge and has no visible signs of disturbance. However, a logging spur has been built into the area, above three small wetlands in the series, and an area of forest has been clearcut for a possible landing. The quality of the wetlands would be degraded if the areas around the wetlands are cut and adequate buffers are not left. The road above some of the wetlands is too new to assess its effects on the wetland system.

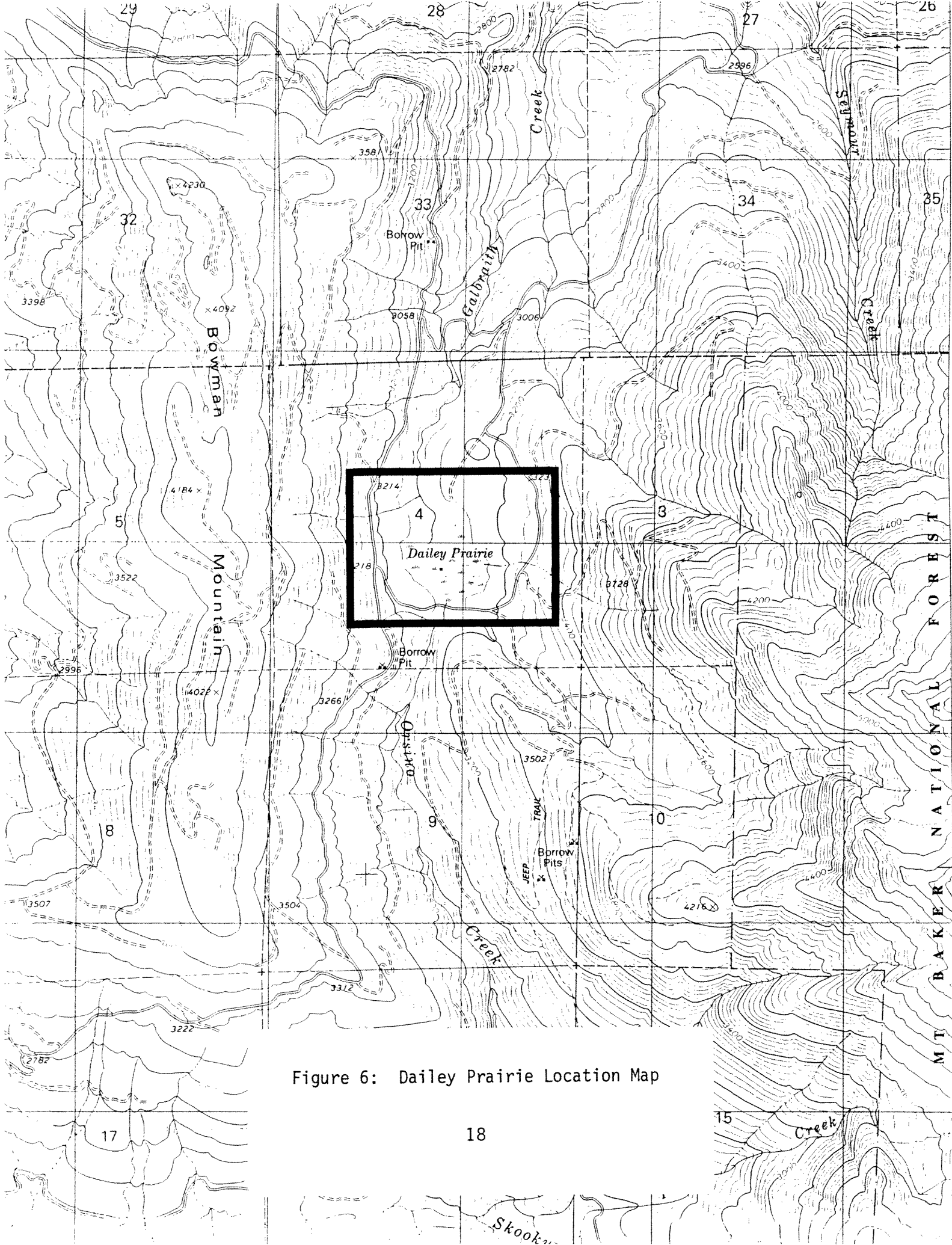


Figure 6: Dailey Prairie Location Map

DAILEY PRAIRIE

LOCATION:

Whatcom County; Section 4, Township 37 North, Range 6 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:

- | | |
|-------------------------------------|------------|
| 1. Mid-elevation sphagnum bog | Rank:
B |
| 2. Mid-elevation freshwater wetland | B |

Special Species:

3. One Sensitive plant species

DESCRIPTION:

Physical: Dailey Prairie is located in a valley between Bowman and Twin Sisters Mountains at an elevation of 3,160 feet. The nineteen acre wetland slopes slightly down the sides of each of the mountains towards a north-south mid-line and also to the north into the creek. It is one of the headwaters of Galbraith Creek which flows into the Middle Fork Nooksack River.

The wetland appears to be seasonally flooded and then supersaturated the rest of the year. There are several small streams and seeps that flow through the wetland at least seasonally and there are a few tiny permanent pools. The area is fed by surface runoff, springs, seeps, snowmelt and precipitation.

The soils are mostly sphagnum and fibrous peat with a little heath peat in places.

Biological: Dailey Prairie was surveyed too late in the season to distinguish plant communities. It is a mixture of sphagnum and non-sphagnum vegetation. Overall it appears to be codominated by Calamagrostis canadensis, Carex lanuginosa, Carex pluriflora and Aster sp. Carex sitchensis is dominant along what appear to be permanent seeps and small streams. A few small areas of relatively dry sphagnum are dominated by Kalmia sp.

CONDITION:

The field survey was conducted too late in the season to thoroughly assess the site's condition. It appears to be in relatively good condition. Although the entire drainage basin has been roaded and cut, a large forested buffer surrounds most of the wetland. The vegetation appears to be composed of native plant species with the exception of two small populations of Juncus effusus located near two areas of intensive human use.

A dilapidated log cabin is located in the forest on the wetland margin. Currently the wetland, cabin and surrounding forest receive recreational use, at least some related to hunting. There are foot and ATV trails

through the wetland, mostly between a nearby logging road and the cabin. The wetland vegetation, soils and hydrology have been disturbed where there has been ATV use. Some garbage has been strewn in the wetland in the areas of intensive human use. The garbage is composed of bottles, cans, styrofoam, spent shells and remnants of the cabin.

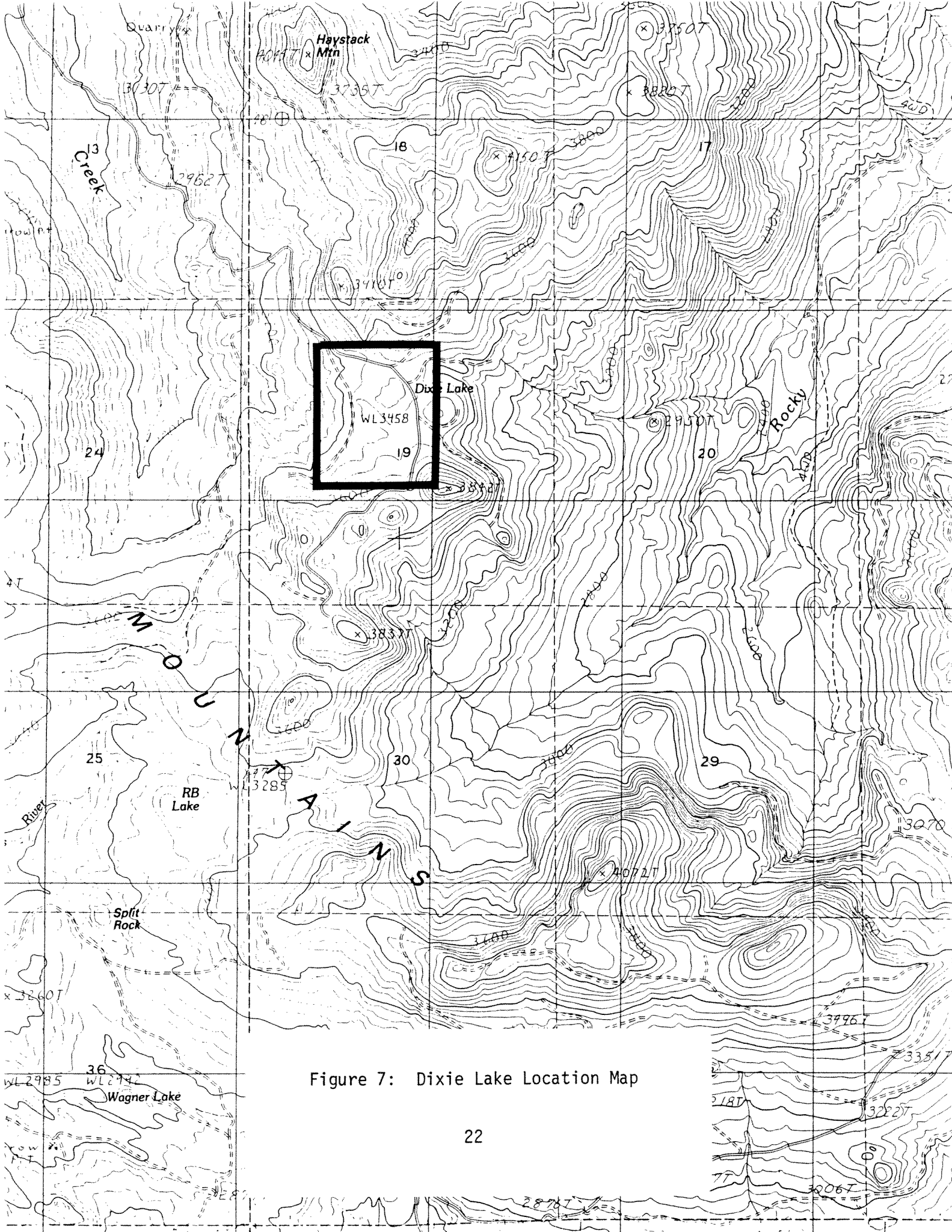


Figure 7: Dixie Lake Location Map

DIXIE LAKE

LOCATION:

Skagit County; Section 19, Township 34 North, Range 6 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation sphagnum bog	D

DESCRIPTION:

Physical: Dixie Lake is located in the Cultus Mountains at an elevation of 3,460 feet. It is one of the headwaters of Gilligan Creek which flows north into the Skagit River. The site is composed of Dixie Lake and its associated wetlands, and two nearby wetlands. The lake is five acres and the wetlands total eight acres. This system is located near the top of a ridge and has a western aspect. The wetlands slope to the west and northwest.

The wetlands are supersaturated and may be seasonally flooded. Water flows through the wetlands year round, in some places as definable seeps or small streams. They are fed by surface runoff, seeps, snowmelt and precipitation. The small lake is relatively deep. It has a small permanent outflow.

Wetland soils are a mixture of sphagnum and fibrous peat. The pond bottom appears to be rocky with a layer of silt.

Biological: Dixie Lake contains fish and has a little vegetation along its margin. The vegetation shifts landward from Menyanthes trifoliata to Potentilla palustris and Juncus ensifolius.

The wetlands are generally dominated by Sphagnum spp., Carex sitchensis and Caltha biflora, but there is microsite variation in the vegetation. There are two primary "communities". One is dominated by Sphagnum spp., Carex sitchensis, Caltha biflora, Potentilla palustris and Carex cf. nigricans. The second community is similar but has very little Carex sitchensis and has additional dominant species, Calamagrostis canadensis and Carex cf. lenticularis. Eriophorum polystachion is abundant.

There are small areas near the lake that are characterized by the occurrence of Kalmia sp. In addition to the generally dominant plant species the area has high abundance of Tofieldia glutinosa, Cornus canadensis, Carex sp., Vaccinium sp. and Agrostis spp. A second area around the lake is dominated by Sphagnum spp., Carex cf. nigricans and Carex cf. illota, and has high abundance of Trientalis arctica and Carex interior.

CONDITION:

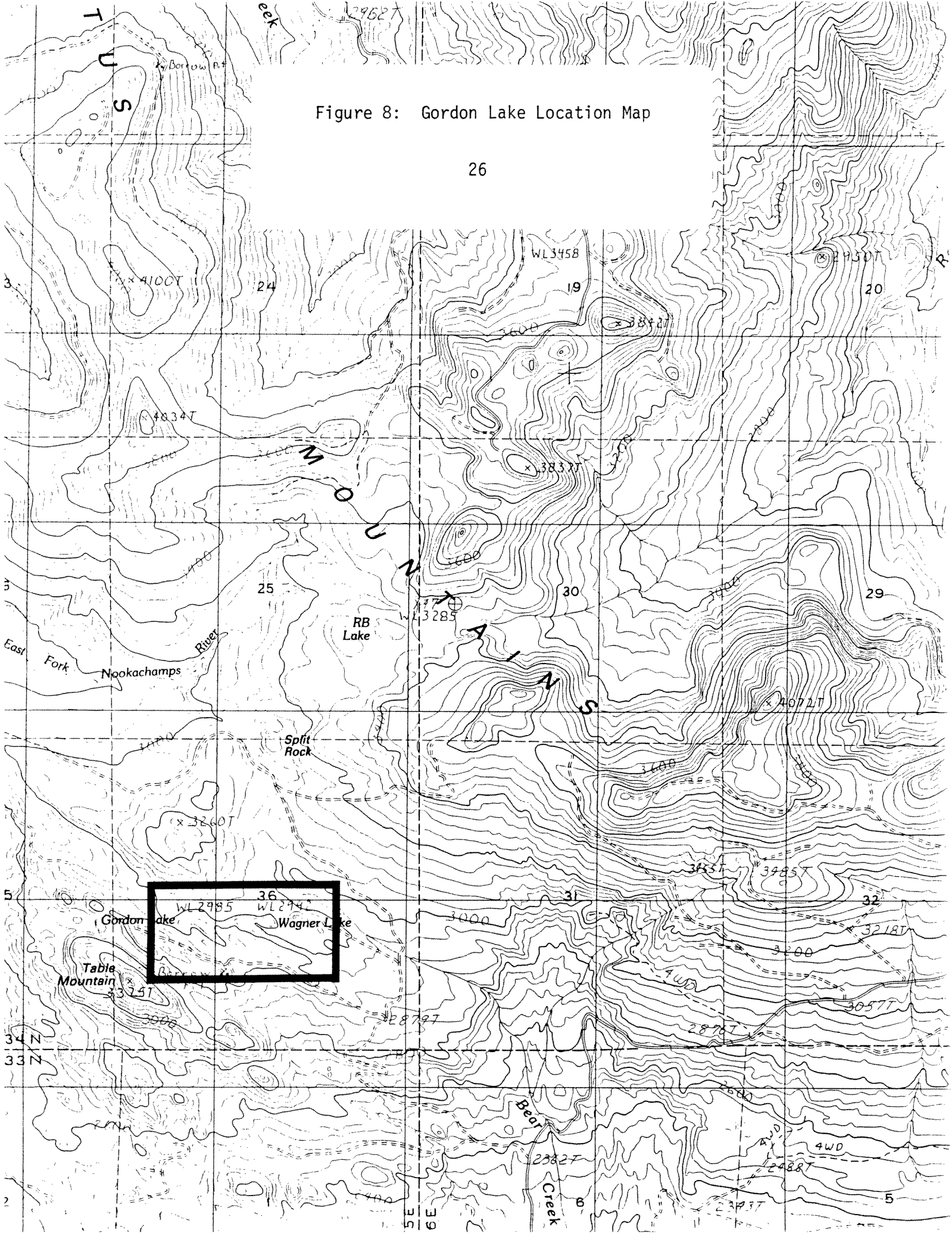
Dixie Lake is in questionable condition. The site is located within a completely clearcut landscape. A partially cut buffer was left around most of the lake, but no buffers were left around the wetlands. The removal of all of the trees affects the microclimate and hydrology of the wetlands by increasing wind, temperature, evaporation and transpiration.

The amount and timing of water delivered to the wetland may be altered by the logging road located up-slope of the lake and wetlands and by the lack of trees. The road separates the lake from an adjacent wetland and crosses all of the surface drainages into the lake and wetlands. These changes may result in altered hydrology of the wetland and physiological stress for some plant species. They may result in a reduction of the wetland's ability to sustain stream flows, and deterioration of the peat soils. The result is reduced size and water holding capacity of the wetland.

The lake has been stocked with fish which probably has altered its species composition. There is a campsite, boat ramp and associated garbage on the northeast side of the lake. A grass tentatively identified as reed canarygrass (Phalaris arundinacea) was found growing in the pullout at the campsite. Reed canarygrass is an aggressive exotic plant species capable of invading and degrading the biological condition of the wetlands and lake shore.

Figure 8: Gordon Lake Location Map

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GORDON LAKE

LOCATION:

Skagit County; Section 36, Township 34 North, Range 5 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation ponds	-
2. Mid-elevation sphagnum bog	C
3. Mid-elevation freshwater wetland	BC

Special Species:

Three Sensitive plant species

DESCRIPTION:

Physical: Gordon Lake is located in the Cultus Mountains at an elevation of about 2,985 feet. It includes fourteen acres of ponds and wetlands in a saddle between the Walker Creek and Bear Creek drainages. The system appears to drain primarily into Walker Creek.

The five ponds are permanently flooded, but their water levels are controlled by beaver and appear to fluctuate over time. The wetlands are supersaturated and at least some are seasonally flooded. Some of the wetlands have seeps and small streams flowing through them. Most of the wetlands don't have flowing water but are associated with the ponds. The system is fed by surface flow, seeps, snowmelt and precipitation. A small permanent stream flows from the system into Walker Creek.

Soils around the pond margins are peat and muck. The wetland soils are mostly fibrous and sphagnum peat, with one area of heath peat. The surrounding upland soils are mapped as Wollard-Springsteen gravelly silt loams.

Biological: The ponds have some rooted aquatic and emergent vegetation, mostly composed of Nuphar polysepalum, Equisetum fluviatile, Potentilla palustris and Carex cf. sitchensis. Lush wet meadow areas are characterized by Carex sitchensis, Calamagrostis canadensis, Scirpus microcarpus, Caltha biflora and an unidentified species of either Potentilla or Sanguisorba. Areas of sphagnum bog are variable in species composition but are generally dominated by Sphagnum spp., Caltha biflora, Hypericum anagalloides, and Carex nigricans. There is one willow thicket, most likely composed of Salix sitchensis.

CONDITION:

Gordon Lake is in relatively good condition. The vegetation is mostly composed of native non-weedy plant species. There are a few areas which have been disturbed. The uplands along the south side of the system were recently clearcut leaving virtually no buffer. Debris and trees were deposited in some of the wetlands. The lack of buffer has probably changed the microclimates within the wetlands and may result in change

in wetland vegetation. One campsite is located next to the largest of the ponds but there doesn't appear to be much recreational use of the ponds and wetlands.

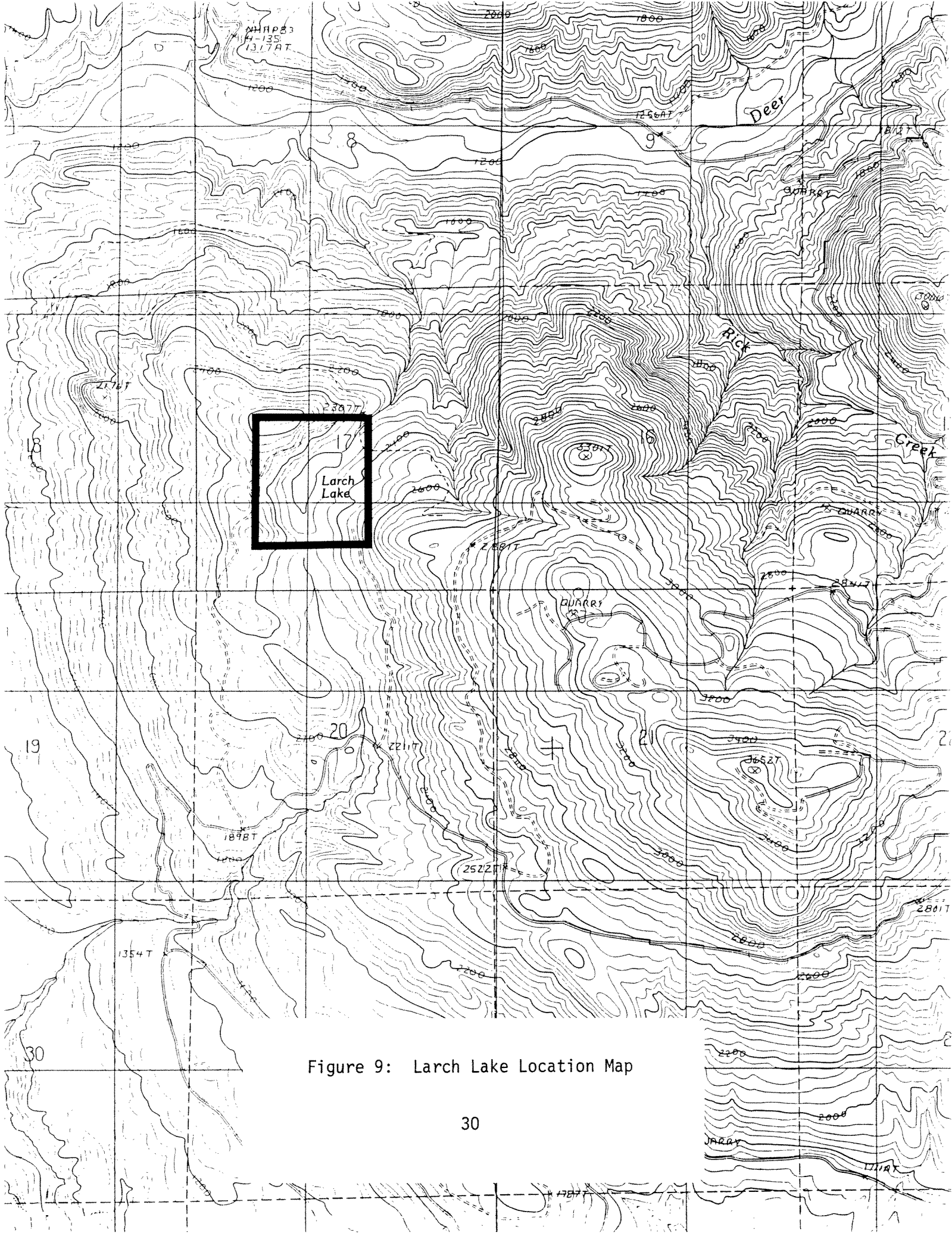


Figure 9: Larch Lake Location Map

LARCH LAKE

LOCATION:

Skagit County; Section 17, Township 33 North, Range 7 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation freshwater wetland	D

DESCRIPTION:

Physical: Larch Lake is located in an area of unnamed peaks south of Big Deer Peak and west of Mt. Higgins. It occurs at 2,300 feet elevation in a small steep-sided basin and is the headwater of a tributary of Deer Creek. Larch Lake is oriented roughly north-south and consists of a seven acre lake and seven acres of associated wetlands.

The lake and wetlands are fed by a few small streams, seeps, surface runoff, precipitation and snowmelt. The outflow is a small perennial stream whose flow is controlled by beaver. The lake level appears to fluctuate, possibly in response to beaver activity and/or human caused alteration of the outflow. Currently the water level is below the wetland soil surface at least during the growing season. The wetland soils are saturated to supersaturated. Some wetland areas are flooded year round.

The wetland soils are peat and muck with large woody material providing a substrate elevated above the wetland soils. The peat forms a shelf which encircles the lake except at the outflow. The waterward edge of the wetland shelf is abrupt. The surrounding upland soils are mapped as Kindy gravelly silt loam.

Biological: The wetland vegetation around Larch Lake is intermediate between low elevation and mid-elevation systems. The wetland appears to be recovering from flooding which killed most of the vegetation. There are cedar snags throughout the wetland shelf and some juvenile conifers and hardwoods. The most abundant plant species are Spiraea douglasii, Juncus supiniformis, Lycopus uniflorus, Carex lenticularis and Carex rostrata. Sphagnum spp., Viola palustris, Potentilla palustris, Calamagrostis canadensis, Hypericum anagalloides, Salix spp. and Carex leptalea are locally abundant.

CONDITION:

The wetlands around Larch Lake appear to be recovering from past disturbance. The system appears to have flooded, killing all of the conifers and most of the other wetland plant species which occupied the peat shelf around the open water of the lake. The water level appears to have returned to its pre-flood level. There is a beaver dam across the lake's outflow which may be responsible for the altered water level. There is an accumulation of large woody debris from past logging of the

drainage and an old road which crosses the outflow either of which could have temporarily blocked the outflow and caused the lake level to rise.

The area receives some recreational use. There are some foot trails and an old row boat along the lake margin. The uplands were all logged about 40 years ago, including selective removal of cedar from the wetland. No buffers were left around the wetland. There are no roads near the wetland except for the section of a road which crosses the lake's outflow. All of the roads into the area are in poor condition and are only passible by foot, pack animal or ORV.

A weedy plant species, Juncus effusus, is scattered throughout the wetland.

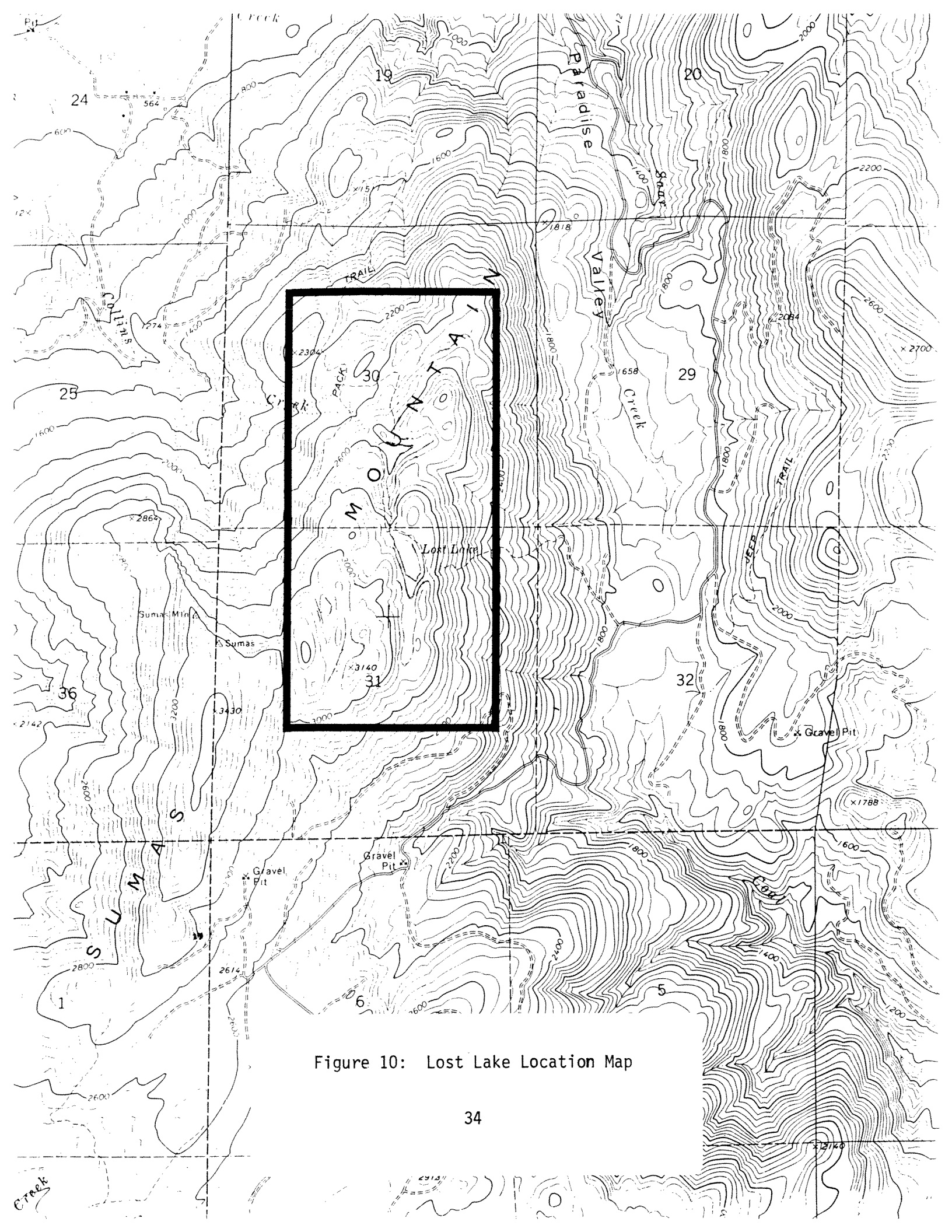


Figure 10: Lost Lake Location Map

LOST LAKE

LOCATION:

Whatcom County; Sections 30 and 31, Township 40 North, Range 5 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation sphagnum bog	A
3. Mid-elevation freshwater wetland	A

DESCRIPTION:

Physical: Lost Lake is located between 2,440 and 3,040 feet along the ridge of Sumas Mountain. It consists of several wetlands (totalling eighteen acres), Lost Lake proper and three ponds (totalling six acres). The wetlands and water bodies occur in small depressions. They are the headwaters of Collins Creek.

The ponds and lake are permanently flooded. The wetlands are probably seasonally flooded and then supersaturated to saturated the rest of the year. Some of the wetlands occur along Collins Creek and have some channeled stream flow. Some of the wetlands appear to have neither an inflow nor outflow. The wetlands are fed by surface runoff, snowmelt, precipitation and some stream flow.

The wetland soils are fibrous and sphagnum peat and muck. There is woody debris and down trees in some areas.

Biological: The ponds and lake have small populations of Nuphar polysepalum. Seasonally flooded areas which have muck soils are dominated by Lysichitum americanum or Eriophorum chamissonis. Areas of sphagnum peat are dominated by Sphagnum spp., Ledum groenlandicum, Eriophorum chamissonis and Lysichitum americanum. Low terraces with up to 25% cover of Sphagnum spp. are species rich and dominated by Carex interior complex. Relatively high areas of wetland are dominated by Senecio triangularis, Glyceria elata and Calamagrostis canadensis. The forested wetland is dominated by Picea sitchensis, Tsuga heterophylla and Lysichitum americanum.

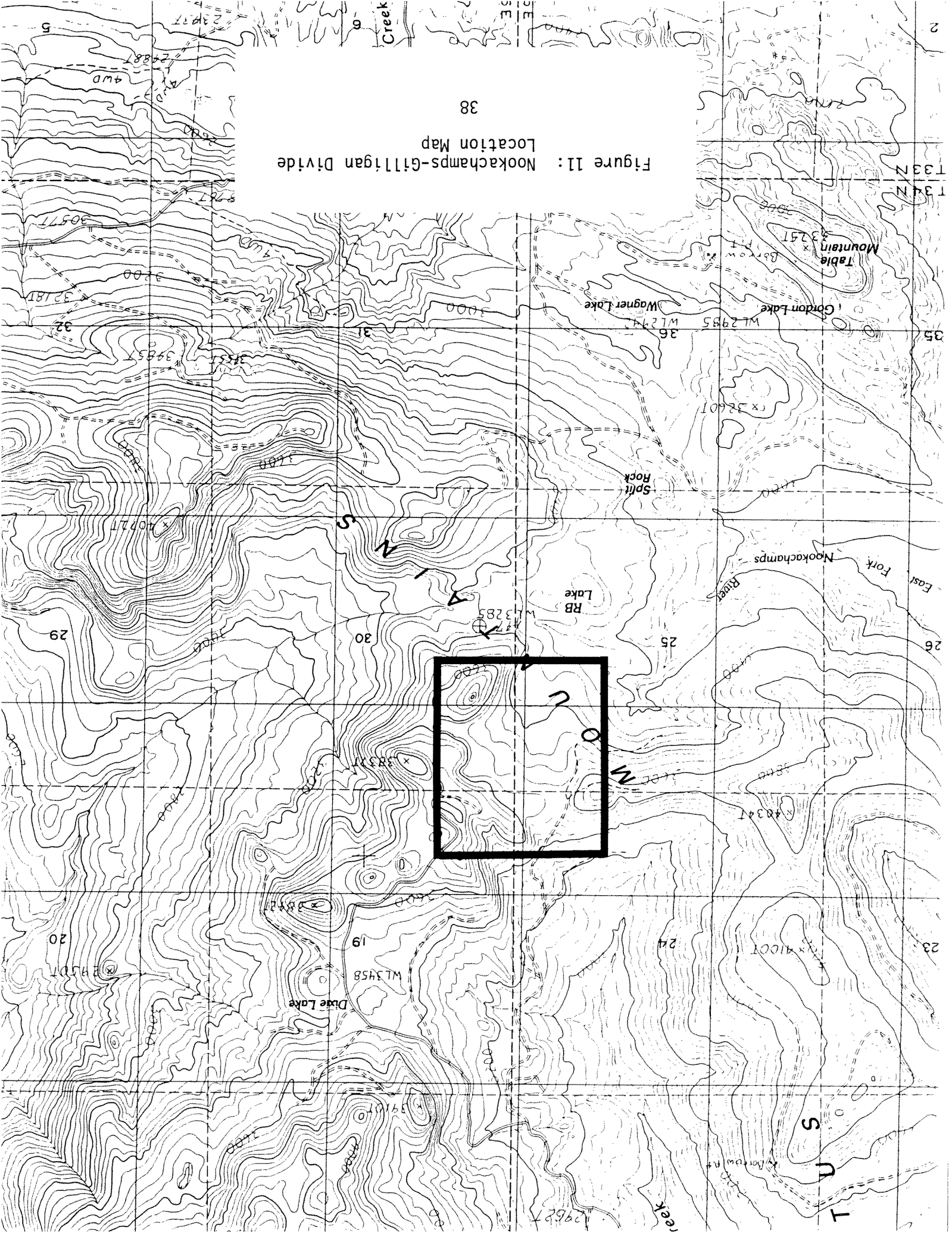
The wetland vegetation is lacking many species which are commonly found in mid-montane wetlands elsewhere in Whatcom and Skagit Counties.

CONDITION:

The Lost Lake area is in good condition. The wetlands and area receive a variety of recreational uses including hiking, botanizing, fishing and hunting. A temporary camp and beginnings of a cabin were located near the lake. One of the wetlands has two shallow ditches running through it but the vegetation is composed of native species and the hydrology appears to be minimally affected.

The area appears to have burned in the past 100 years and may not have been logged. Recent logging is encroaching on the southend of the wetland system.

Figure 11: Nookachamps-Gilligan Divide
Location Map



NOOKACHAMPS-GILLIGAN DIVIDE

LOCATION:

Skagit County; Sections 19 and 30, Township 34 North, Range 6 East, and Sections 24 and 25, Township 34 North, Range 5 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation sphagnum bog	C
3. Mid-elevation freshwater wetland	CD

Special Species:

Two Sensitive plant species

DESCRIPTION:

Physical: Nookachamps-Gilligan Divide wetlands are located between 3,360 and 3,600 feet elevation in the Cultus Mountains. The wetlands occur near a ridge top. Most of the wetlands drain into the East Fork Nookachamps River, but one drains into Gilligan Creek. The wetlands total about eleven acres and include a small pond.

The wetlands are supersaturated to saturated year round and some areas may be seasonally flooded. They are fed by seeps, surface sheet flow, snowmelt and precipitation. Small streams originate in and flow through the wetlands.

The wetland soils are fibrous and sphagnum peat. The surrounding upland soils are mapped as Crinker-Rock outcrop complex and Saar gravelly silt loam.

Biological: Most of the wetlands are dominated by Sphagnum spp. and Carex nigricans. Kalmia sp. is abundant and often codominant. Caltha biflora and Carex laevisulmis are abundant. Areas with little or no Sphagnum spp. are dominated by Caltha biflora and have high percent cover of Carex nigricans, Carex laevisulmis, Lysichitum americanum and Potentilla palustris. There are lush patches dominated by Calamagrostis canadensis, Caltha biflora and often Sphagnum spp.

CONDITION:

Nookachamps-Gilligan Divide is in mediocre condition. Portions of the area have been clearcut to the wetland edge leaving no buffers, and other portions have not been logged. The phenology and hydrology of wetlands surrounded by clearcuts is different from those adjacent to forest. Those wetlands in the clearcuts were drier and warmer, the plants flowered earlier, and the leaf edges were discolored and dried as compared with those among the trees.

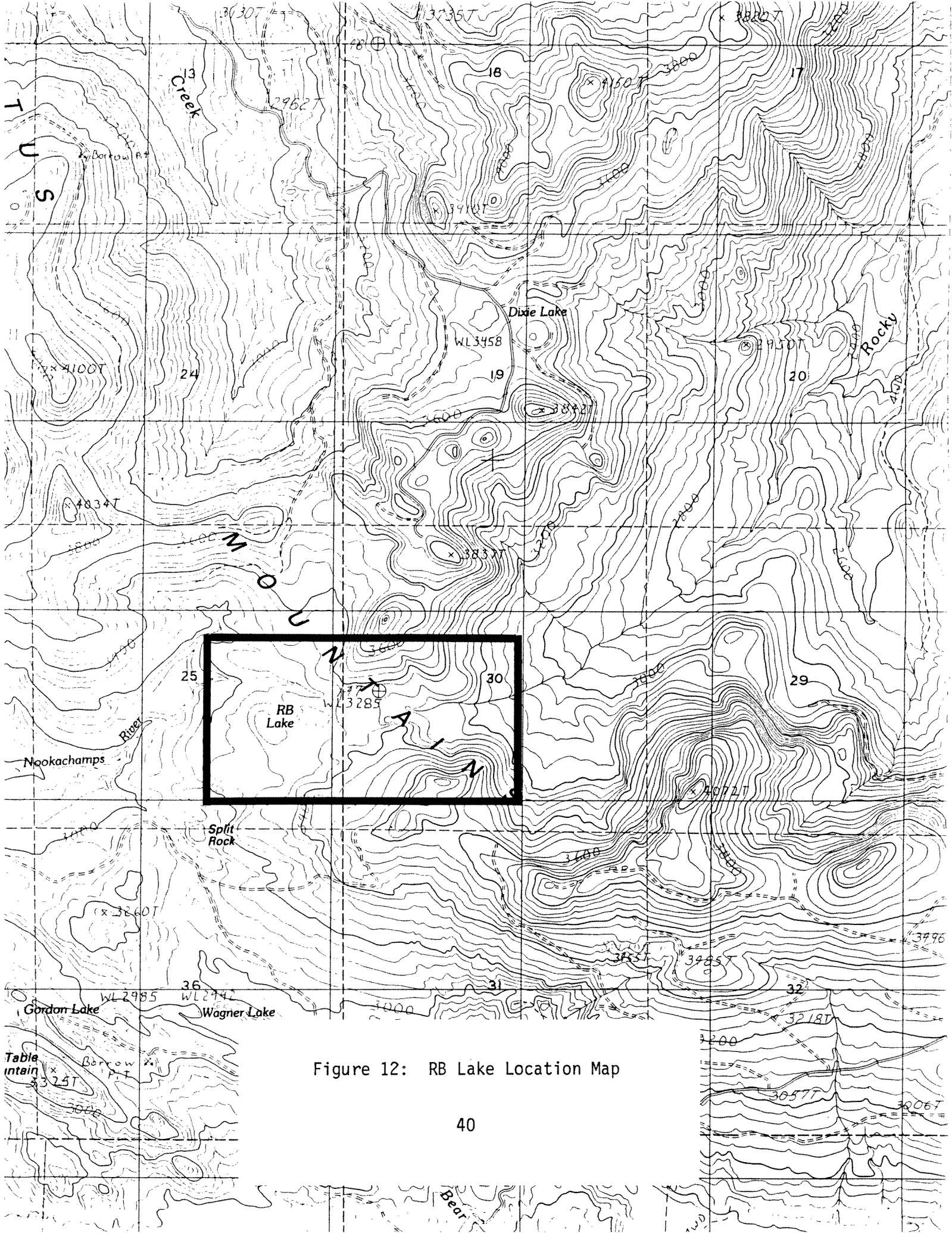


Figure 12: RB Lake Location Map

RB LAKE

LOCATION:

Skagit County; Section 25, Township 34 North, Range 5 East and Section 30, Township 34 North, Range 6 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation freshwater wetland	B

DESCRIPTION:

Physical: RB Lake includes a series of wetlands along the divide between Rock Creek and East Fork Nookachamps River drainages. It is located in the Cultus Mountains between 3,200 and 3,300 feet elevation. Approximately twenty acres of ponds and wetlands from this system drain into the East Fork Nookachamps River and ten acres of mostly wetlands drain into Rock Creek. These are headwaters of the two drainages. The wetlands are sloping, some have western exposures, some northern and some eastern.

RB Lake proper is a shallow, permanent lake. It has a cobble-gravel bottom and around the lake margins is muck. There are several tiny (a few square meters) relatively deep pockets of water elsewhere in the wetland system. These are often in series and have peat and muck sides and bottoms.

The wetlands mostly have fibrous peat soils and some muck. Seeps and small streams flow through the wetlands. Some of the streams have definable channels, but most of the water flows over the soil surface and seeps through the peat. Some areas of wetland, mostly around the margin of RB Lake proper, are seasonally flooded and then supersaturated. The rest of the wetland area appears to be supersaturated year round.

Biological: The wetland vegetation in this area is complex and species rich. Most of the wetland vegetation occurs in very wet areas along seeps and streams and is dominated by Caltha biflora. Usually either Carex sitchensis, Carex nigricans, Scirpus microcarpus, Viola palustris or Calamagrostis canadensis are codominant with C. biflora. A few small relatively dry areas are characterized by Kalmia sp. and 50-100% cover of living Sphagnum spp. One wetland area is dominated by Carex illota, Carex sp., Trientalis arctica and either a species of Potentilla or Sanguisorba. Several plant species most commonly occur in and characterize the wetland zone near the forest margin: Senecio triangularis, Valeriana sitchensis, Athyrium filix-femina and Glyceria elata. The seasonally flooded areas around RB Lake are either dominated by Carex sitchensis or Juncus sp. and Carex sp.

CONDITION:

The RB Lake area is in relatively good condition. However, recent logging has encroached on the area: Clearcuts extend to the margins of some of the wetlands, leaving debris and felled trees in the wetland and altering microclimates. Logging roads are located upslope of the some of the wetlands cutting across surface drainages. It is too soon to tell all of the effects of these disturbances. Further logging related activities could seriously damage the wetland system. The area appears not to receive recreational use.

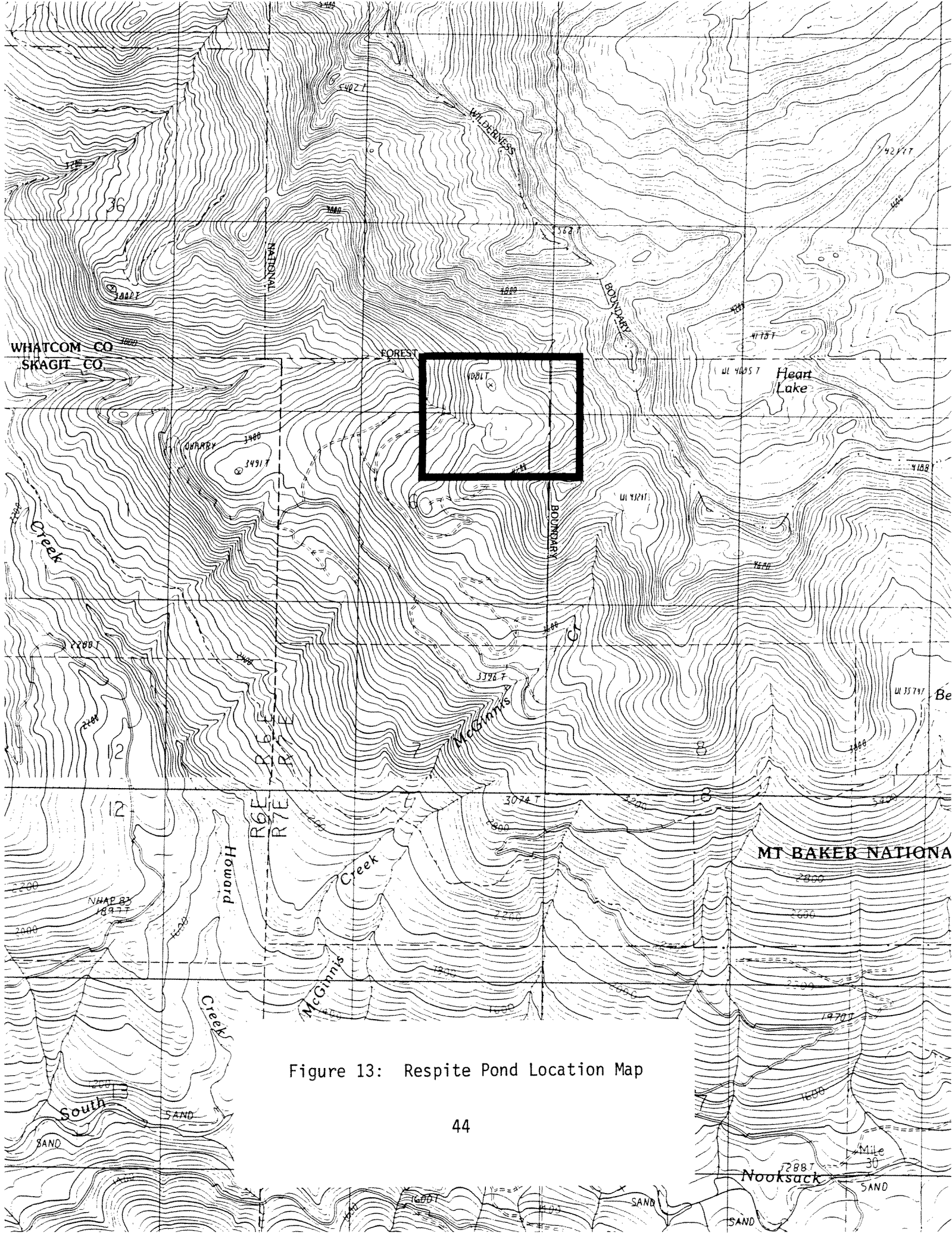


Figure 13: Respite Pond Location Map

RESPITE POND

LOCATION:

Skagit County; Section 6, Township 36 North, Range 7 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation freshwater wetland	AB

DESCRIPTION:

Physical: Respite Pond is located at the south end and near the crest of Twin Sisters Mountain. It occurs in a tiny basin at an elevation of 3,900 feet. The eight acre wetland and pond system is the head water of a stream which flows into Howard Creek and then into the South Fork Nooksack River.

The three acre pond is clear and shallow. It has a perennial outflow which drops precipitously out of the basin and down a steep slope to Howard Creek. The pond is fed by tiny perennial streams, surface flow and snowmelt. The pond bottom is covered by boulders, cobbles, gravel and some sand. There is a thin layer of silt overlaying the coarser materials.

The five acre wetland is mostly permanently flooded. There is a narrow strip of wetland adjacent to the upland which is seasonally flooded and supersaturated the rest of the year. The soil is fibrous peat and muck.

Biological: The pond is without macrophytic vegetation. It contains at least some fish, probably trout.

The permanently flooded portion of the wetland is a nearly monotypic stand of a sedge, probably Carex lenticularis. With the sedge occasionally occur Carex illota, Juncus cf. filiformis and very occasionally Sphagnum spp. The seasonally flooded strip of wetland is relatively species rich and is generally dominated by Carex illota, Viola palustris, Carex nigricans and Potentilla flabellifolia.

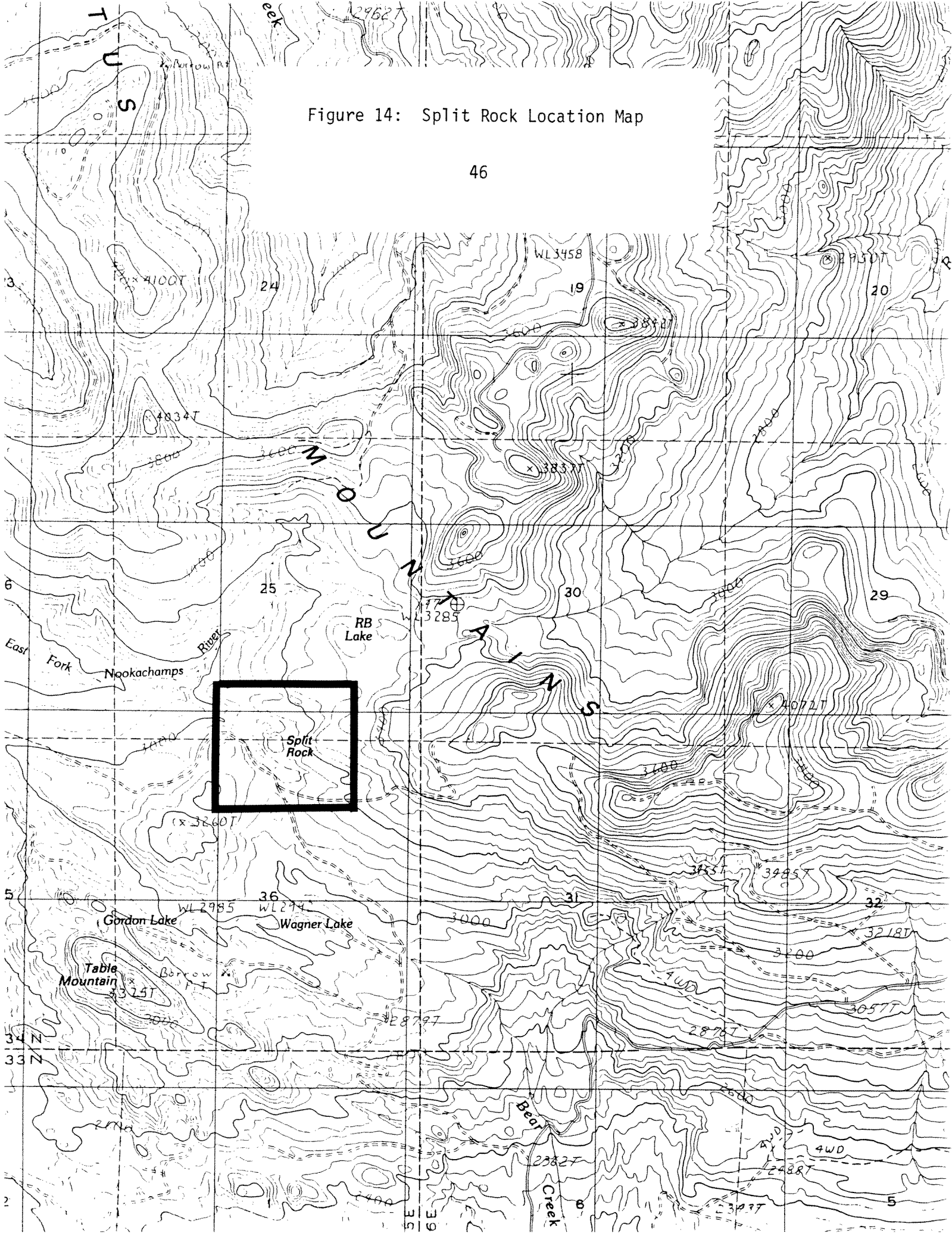
CONDITION:

Respite Pond is in exceptional condition. The tiny basin in which it occurs has not been logged and contains no roads. The wetland is composed exclusively of native plant species and there are no signs that it has been disturbed.

There is a well established foot trail into a camp site adjacent to the pond. There is some litter and remnants of fishing gear around the pond margin, mostly along the south side. The fish were probably planted since the outflow stream is too steep for fish passage and the pond probably completely freezes in some years.

Figure 14: Split Rock Location Map

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SPLIT ROCK

LOCATION:

Skagit County; Sections 25 and 36, Township 34 North, Range 5 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:

1. Mid-elevation freshwater wetland

Rank:

BC

Special Species:

Two Sensitive plant species

DESCRIPTION:

Physical: Split Rock is located in the Cultus Mountains at an elevation of about 3,080 feet. It is composed of two sloping wetlands totalling five acres on the south and northeast sides of Split Rock. The wetlands are part of the headwaters of the East Fork Nookachamps River.

The wetlands are supersaturated with water flowing and seeping through them year round. The wetlands are fed by numerous small streams, seeps, sheet flow, precipitation and snowmelt. The wetland on the south side of Split Rock has a channeled stream and series of tiny pockets of water. At least some of the pockets of water appear to have been excavated by beaver and have beaver dams which control water level.

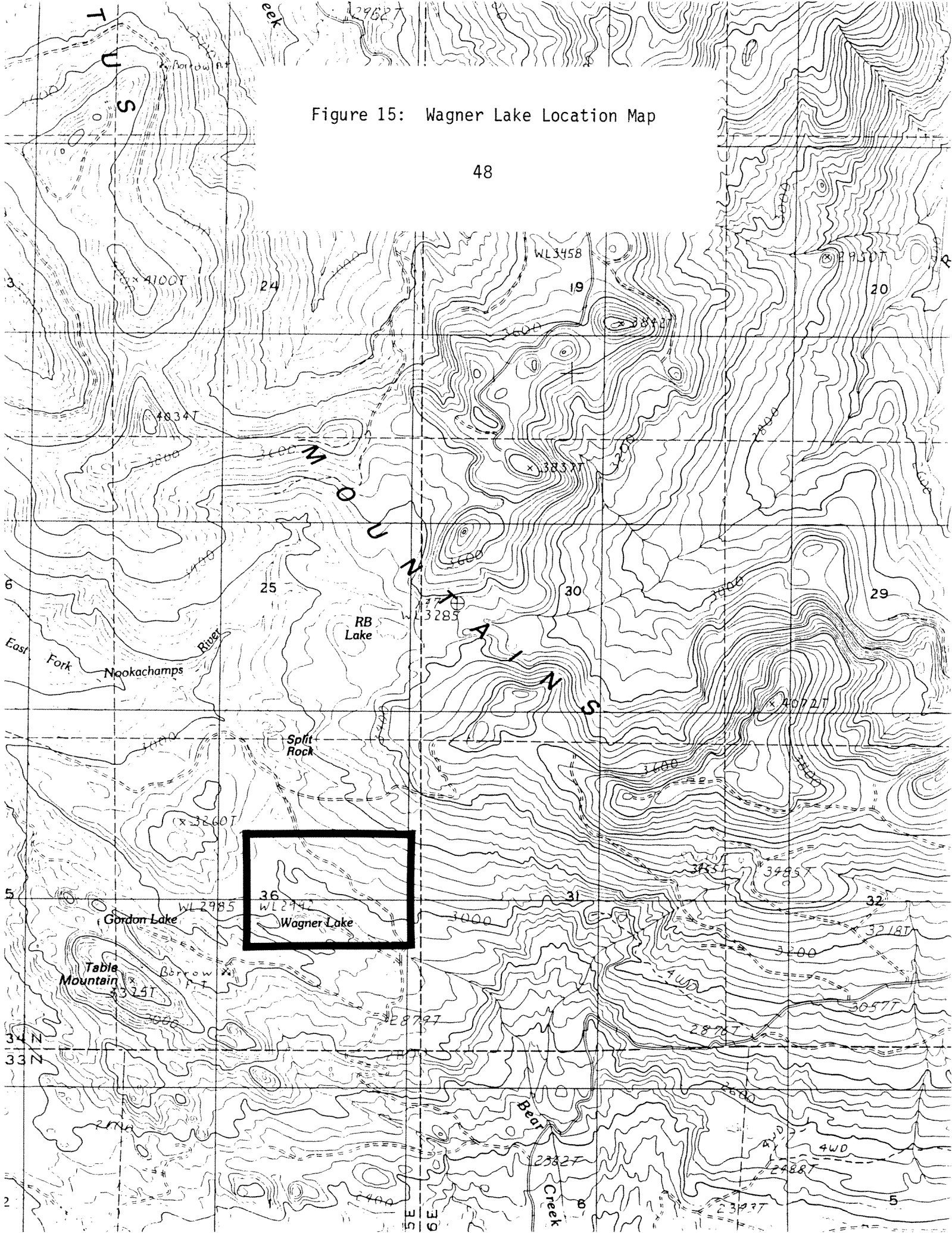
The wetland soils are mostly composed of fibrous peat with some sphagnum and heath peat too. The peat deposit is unusually deep on the south side of Split Rock. The upland soils are mapped as Clendenen gravelly silt loam.

Biological: The wetland vegetation is composed of two major communities. The first is dominated by Caltha biflora and Carex sitchensis and the second is dominated by two low growing species of Salix, Caltha biflora and Carex sitchensis. The upslope edges of the wetland are characterized by an abundance of Calamagrostis canadensis, Senecio triangularis and Valeriana sitchensis. There are a few small areas that are relatively high and dry which are characterized by Sphagnum spp. and Kalmia sp.

CONDITION:

The wetland along the northeast side of Split Rock is in good condition. The wetland on the south side of Split Rock is being damaged. Logging roads are located along the south and east sides of the wetland and cross most of the streams and seeps which flow into it. Recently ATVs have been driven through the wetland damaging vegetation and soils and creating eroding trails from the road down into the wetland. There is a pullout along the road which is occasionally used as a campsite and is accumulating litter.

Figure 15: Wagner Lake Location Map



WAGNER LAKE

LOCATION:

Skagit County; Section 36, Township 34 North, Range 5 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Mid-elevation pond	-
2. Mid-elevation sphagnum bog	BC
3. Mid-elevation freshwater wetland	BC

Special Species:

Two Sensitive plant species

DESCRIPTION:

Physical: Wagner Lake is located in the Cultus Mountains at an elevation of 2,992 feet. It is one of the headwaters of Bear Creek, which flows into Pilchuck Creek. The site is composed of a four acre pond and two acres of associated wetlands. The pond and wetlands occur in hydrologically connected northwest- by southeast-oriented shallow troughs.

The lake is long, narrow and relatively deep. The associated wetlands range from permanently flooded to seasonally flooded and then supersaturated. Seeps and small streams flow through portions of the wetland. The lake and wetland system are fed by surface flow, seeps, precipitation and snowmelt. The pond has a small permanent outflow to the southeast.

The wetland soils are sphagnum peat, fibrous peat and muck. They overlay either dense glacial till and/or bedrock. The upland soils are mapped as Wollard-Springsteen gravelly silt loams with 20 to 55 percent slopes.

Biological: The wetland vegetation varies. Sphagnum spp., Caltha biflora, Carex cf. nigricans and Carex rostrata are dominant in a small shaded area in the trees. Sphagnum spp., Potentilla sp. and Calamagrostis canadensis are dominant in a permanently flooded area. A similar area is dominated by Sphagnum spp., Potentilla sp. and either Carex nigricans or Eriophorum polystachion. Caltha biflora, Hypericum anagalloides, Carex cf. nigricans, Viola spp. and Equisetum spp. are dominant in an area with low growing vegetation. Caltha biflora, Scirpus microcarpus, Senecio triangularis and Valeriana sitchensis are dominant adjacent to the upland.

CONDITION:

Wagner Lake is in good condition. No exotic plant species or signs of damaging recreational use were found. The uplands adjacent to the wetlands have not been logged, although they are flagged, indicating a possible future cut.

The uplands along the southeast side of the pond were clearcut and no buffer was left. Within this clearcut area is a large wetland that was excluded from this survey because of logging effects. A logging road is located along the north side of the wetland, but it is at least 300 feet away and there is an intact forested buffer between the road and wetland.

LOW ELEVATION SITE DESCRIPTIONS

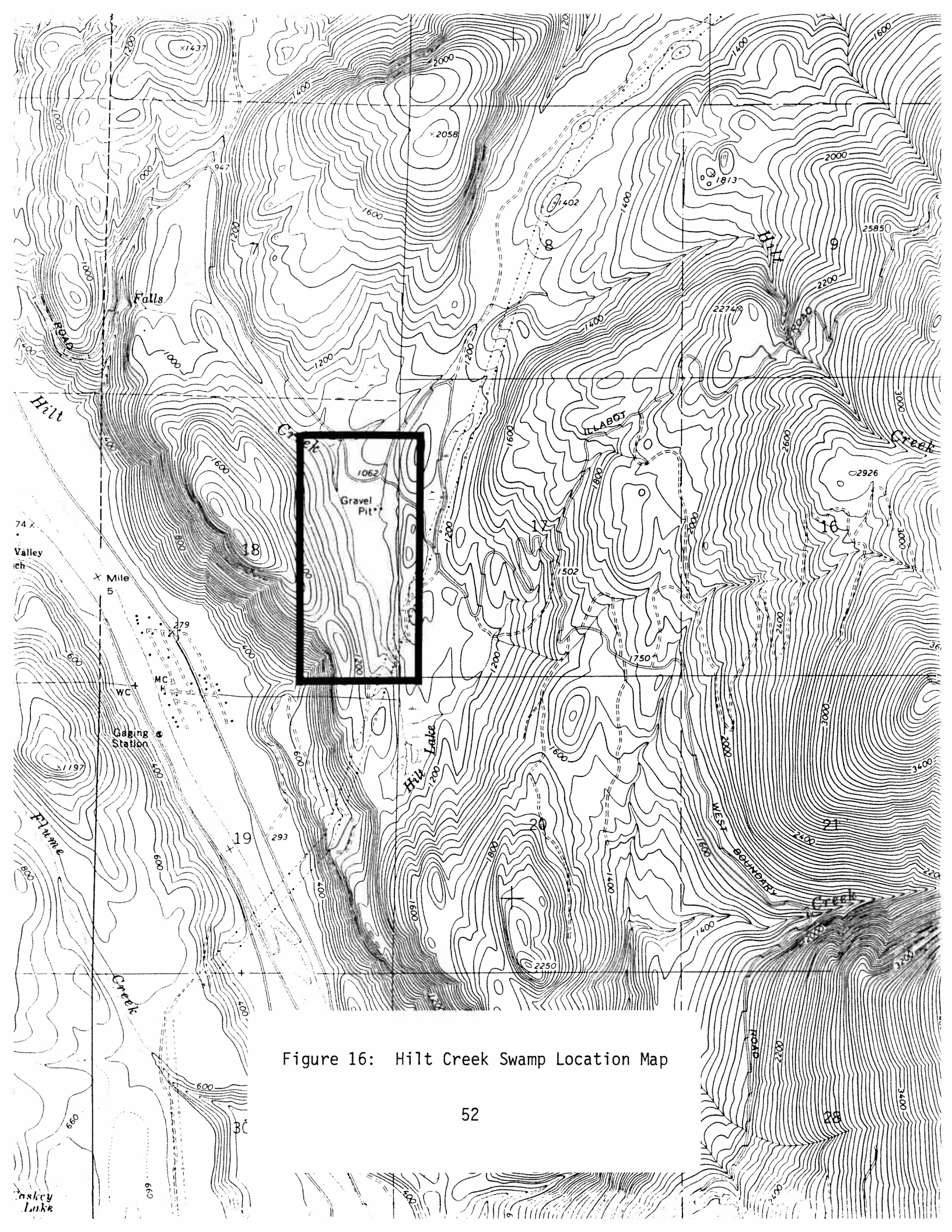


Figure 16: Hilt Creek Swamp Location Map

HILT CREEK SWAMP

LOCATION:

Skagit County; Section 18, Township 34 North, Range 10 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:

1. Low elevation freshwater wetland

Rank:

AB

DESCRIPTION:

Physical: Hilt Creek Swamp is located in the foothills above the Sauk River at an elevation of about 1,060 feet. It is an 18 acre wetland system along Hilt Creek and downstream of Hilt Lake.

Portions of the wetland are permanently flooded. Most of it appears to be seasonally flooded and then saturated to supersaturated the rest of the year. There is permanent stream inflow and outflow, but there is no stream channel through the wetland area. The wetland is fed by a stream, springs, surface sheetflow and precipitation.

The wetland soils are fibrous peat, heath peat and muck. There are large woody debris and fallen trees, some of which provide substrates elevated above the wetland soil surface. The surrounding upland soils are Andic Xerochrepts, warm-Rock outcrop complex, Montborne very gravelly silt loam, Skykomish very gravelly loam and Sorensen very gravelly silt loam.

Biological: Carex sitchensis and Aster modestus codominate the central, relatively dry wetland community. This herbaceous community is surrounded by a supersaturated to permanently flooded zone dominated by Spiraea douglasii, Viburnum edule, Carex sitchensis and Lysichitum americanum. Landward the wetland is a mosaic of supersaturated areas, pools, springs and large woody debris. The vegetation is characterized by about 20% cover of Thuja plicata and Tsuga heterophylla in the overstory, 15-20% cover in the mid-story (mostly Pyrus fusca), 25-40% cover of shrubs with no species dominant, and Lysichitum americanum dominant in the herb layer.

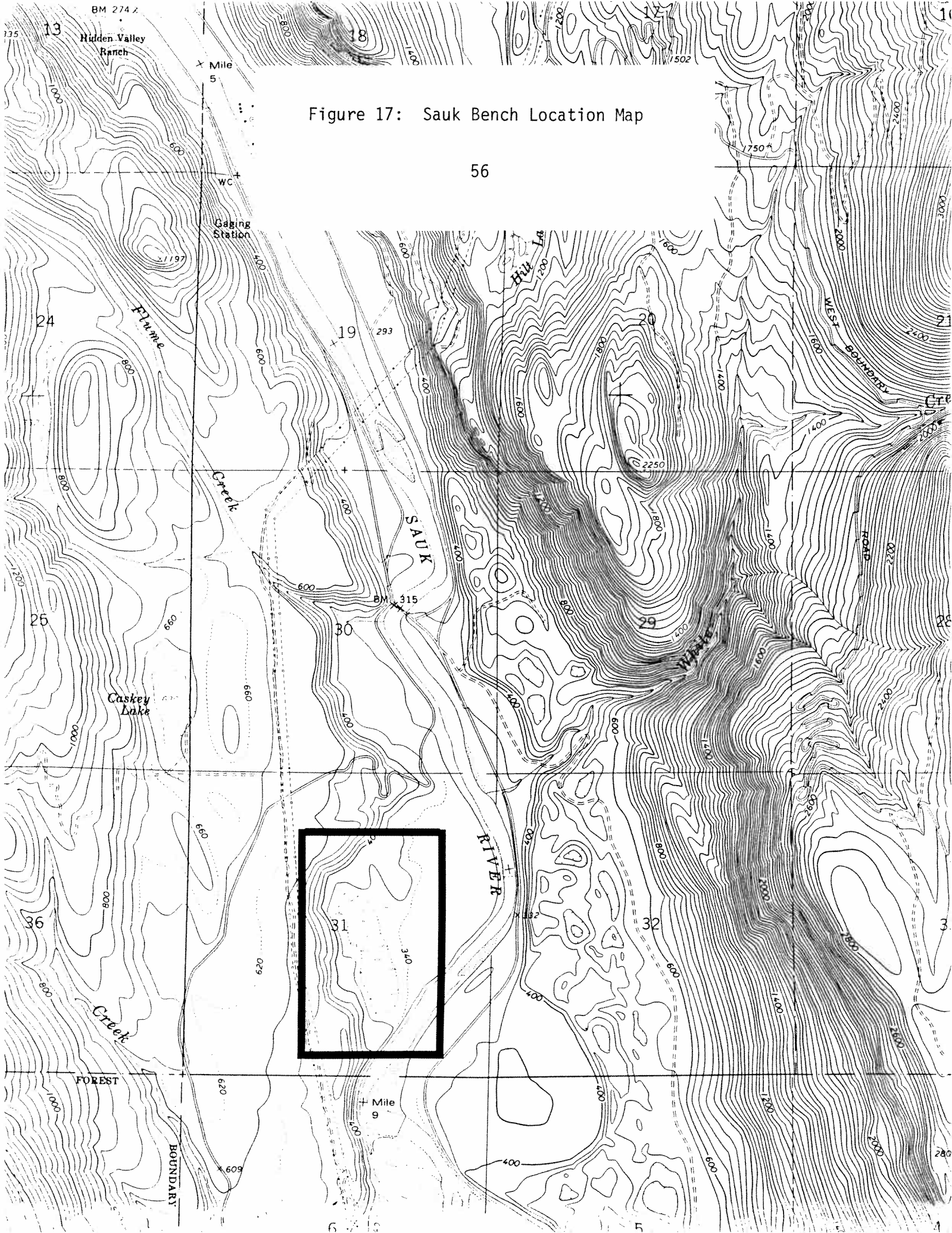
CONDITION:

Hilt Creek Swamp is in unusually good condition. Most of the other wetlands in this area have been logged and/or their hydrology has been radically altered. There are only a few cut stumps in this wetland, the water level appears not to have been altered significantly and no exotic plant species were observed. There is the remains of a railroad trestle across the outlet from the wetland, but the trestle was built on pilings rather than fill. The uplands around the wetland were logged in the past and there are two gravel pits upslope and not far from the wetland edge.

Upstream from the wetland the inflow stream is crossed by a powerline corridor and logging road. Hilt Lake, which is upstream of the swamp, has been disturbed, the water level has been severely altered in the past, and may be a future source of non-native plant species for Hilt Creek Swamp.

Figure 17: Sauk Bench Location Map

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SAUK BENCH

LOCATION:

Skagit County; Section 31, Township 34 North, Range 10 East, Willamette Meridian.

FEATURES:

Wetland and Aquatic Elements:	Rank:
1. Low elevation sphagnum bog	BC
2. Low elevation freshwater wetland	BC
3. Forested wetland community	C

DESCRIPTION:

Physical: Sauk Bench is located in an old oxbow on a bench above the Sauk River. It occurs at about 340 feet elevation at the base of a steep river cut slope. A narrow, apparently natural levee is located between the southern end of the twenty seven acre wetland and a twenty-five foot vertical bank that drops to the river's edge. The river is eroding this bank and is expected to wash away the levee and cause the wetland to drain in the near future.

There is a large permanently flooded area of the wetland which consists of shallow open water flanked by emergent vegetation. Adjacent to the emergent vegetation are seasonally flooded flats which are supersaturated when not flooded. The sphagnum bog is elevated above the water level and appears to be wet to saturated year round. The forested wetland appears to be wet to supersaturated year round. The wetland is fed by springs, surface sheet flow and precipitation. There is no channeled inflow or outflow.

The wetland water level appears to fluctuate substantially and may have been altered by humans in the past. Areas of shallow open water have emergent dead shrubs and seasonally flooded flats appear to be newly colonized by rooted wetland plants.

The wetland soils are muck with areas of fibrous, heath and sphagnum peat. The forested wetland and lagg areas have large woody debris and fallen trees which provide a substrate elevated above the wetland soils. The wetland soils in the western two-thirds of the system are mapped as Mukilteo muck. The upland portion of the bench is mapped Greenwater sandy loam and the levee is mapped as Pilchuck loamy sand.

Biological: Permanently flooded areas are vegetated principally by Typha latifolia, Carex cusickii, Nuphar polysepalum, Dulichium arundinaceum, Potentilla palustris and Menyanthes trifoliata. Spiraea douglasii, Ledum groenlandicum and Carex rostrata dominate seasonally flooded areas that have some Sphagnum spp. The sphagnum bog has small Thuja plicata and Tsuga heterophylla and is dominated by Ledum groenlandicum, Vaccinium oxycoccos and Sphagnum spp. Islands of forested wetlands and the lagg are dominated by Thuja plicata and Lysichitum americanum. The lagg also has high percent cover of Glyceria

cf. elata, Athyrium filix-femina, Rhamnus purshiana, Alnus rubra, Lonicera involucrata, Gaultheria shallon, Tsuga heterophylla and Rubus ursinus. Alnus rubra, Athyrium filix-femina and Acer circinatum are additional dominant species on the islands, and Rubus spectabilis and Maianthemum dilatatum have high percent cover.

CONDITION:

Sauk Bench wetland appears to be recovering well from past disturbance. There are old ditches through the wetland which currently are not functional in draining it. No exotic plant species were observed. The uplands were logged in the past and flagging suggests that logging may be planned in the area for a second time. Old railroad or road grades are visible through the uplands but don't appear to reach the wetland edge.

This wetland is not expected to exist much longer. The Sauk River is actively eroding the area of bench between it and the wetland. Once it reaches the wetland, the wetland, which is about twenty-five feet higher than the river, is expected to drain.

GLOSSARY

Cf. - compare. Cf. is used to indicate that the plant identification is in question and is used before the genus or species name in question. The name given is the species most similar to the collection.

Cover - amount, or percent, of an area over which a plant species extends.

Dominant - a plant species which covers at least 20 percent of an area.

Element - see Natural Heritage Element.

Element Occurrence Rank - the evaluation of the quality, condition, viability and defensibility of a Natural Heritage element at a given location.

Exotic - a non-native species.

Fibrous Peat - peat composed of the remains of herbaceous plants, mostly sedges. It contains little, if any Sphagnum spp.

Frequency - the number of individuals of a plant species which occur in a given area.

Freshwater - water with less than 0.5 parts per thousand marine derived salt.

Heath Peat - peat composed of the remains of shrubby plants.

Impounded - backed-up or accumulated behind an obstruction. An impounded wetland is one in which there is no outflow or water has backed-up or accumulated behind an obstruction such as a beaver dam.

Lagg - the mineral-rich drainage area surrounding a sphagnum bog.

Mid-montane - lands in western Washington located between 1,800 and 4,000 feet elevation.

Muck - peat decomposed to such a degree that plant parts can not be distinguished.

Native - occurring in Washington prior to European influence.

Natural Heritage Element - a basic unit of Washington's biologic and geologic environment identified as a needed component of a system of natural areas and defined in the Natural Heritage Plan. Elements can be plant or animal species, wetland types, aquatic communities, terrestrial plant communities or geologic features.

Natural Heritage Information System - the body of information relating to natural heritage resources stored in the data system of the Natural Heritage Program.

Peat - the remains of plants which have accumulated in water or in wet places.

Pristine - having never been disturbed or altered by humans from the native condition.

Sphagnum Bog - a wetland with a well developed Sphagnum moss or peat layer and resultant distinctive flora.

Sphagnum Peat - peat composed primarily of Sphagnum spp.

Woody Peat - peat composed of particles of partially decomposed wood.

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APPENDIX A

PLANT SPECIES SCIENTIFIC AND COMMON NAMES

<u>Scientific Name</u>	<u>Common Name</u>
Abies amabilis	Pacific silver fir
Abies lasiocarpa	subalpine fir
Acer circinatum	vine maple
Agrostis sp.	bentgrass
Agrostis cf. aequivalvis	Alaska bentgrass
Agrostis cf. scabra	winter bentgrass
Agrostis cf. thurberiana	Thurber bentgrass
Alnus rubra	red alder
Amelanchier alnifolia	western serviceberry
Angelica arguta	Lyall's angelica
Angelica genuflexa	kneeling angelica
Anthoxanthum odoratum	sweet vernalgrass
Arnica cf. latifolia var. latifolia	mountain arnica
Aster sp.	aster
Aster cf. alpinus	boreal aster
Aster foliaceus	leafy aster
Aster integrifolius	thick-stemmed aster
Aster modestus	few-flowered aster
Aster cf. occidentalis var. occidentalis	western mountain aster
Athyrium filix-femina	lady-fern
Blechnum spicant	deer-fern
Calamagrostis canadensis	bluejoint reedgrass
Caltha biflora	white marshmarigold
Carex sp.	sedge
Carex buxbaumii	Buxbaum's sedge
Carex canescens	gray sedge
Carex cusickii	Cusick's sedge
Carex illota	sheep sedge
Carex interior complex	inland sedge
Carex laeviculmis	smooth-stem sedge
Carex lanuginosa	woolly sedge
Carex lasiocarpa	slender sedge
Carex lenticularis	lenticulate sedge
Carex leptalea	bristle-stalked sedge
Carex limosa	mud sedge
Carex luzulina	woodrush sedge
Carex nigricans	black alpine sedge

Carex paupercula	poor sedge
Carex pluriflora	several-flowered sedge
Carex rostrata	beaked sedge
Carex sitchensis	Sitka sedge
Carex spectabilis	showy sedge
Carex stylosa	long-styled sedge
Carex cf. vesicaria	inflated sedge
Cassiope mertensiana	Mertens' mountain heather
Castilleja parviflora var. albida	small flowered paintbrush
Cicuta douglasii	Douglas' water-hemlock
Cornus canadensis	bunchberry
Cornus stolonifera	red-osier dogwood
Danthonia intermedia	timber danthonia
Deschampsia atropurpurea	mountain hairgrass
Deschampsia caespitosa	tufted hairgrass
Drosera rotundifolia	sundew
Dulichium arundinaceum	dulichium
Eleocharis pauciflora	few-flowered spike-rush
Epilobium sp.	willow-herb
Epilobium cf. alpinum var. alpinum	alpine willow-herb
Epilobium cf. glaberrimum	smooth willow-herb
Epilobium glandulosum	common willow-herb
Equisetum sp.	horsetail
Equisetum arvense	field horsetail
Equisetum fluviatile	water horsetail
Eriophorum chamissonis	Chamisso's cotton-grass
Eriophorum polystachion	many-spiked cotton-grass
Galium sp.	bedstraw
Gaultheria shallon	salaal
Glyceria elata	tall mannagrass
Hieracium gracile	slender hawkweed
Hippuris montana	mountain mare's-tail
Hippuris cf. vulgaris	common mare's-tail
Hordeum brachyantherum	meadow barley
Hypericum anagalloides	bog St. John's-wort
Juncus sp.	rush
Juncus articulatus	jointed rush
Juncus balticus	Baltic rush
Juncus drummondii var. subtriflorus	Drummond's rush
Juncus effusus	soft rush
Juncus ensifolius	dagger-leaf rush
Juncus cf. filiformis	thread rush
Juncus supiniformis	spreading rush
Kalmia sp.	laurel

Kalmia cf. microphylla	alpine laurel
Kalmia occidentalis	western bog laurel
Ledum groenlandicum	Labrador-tea
Leptarrhena pyrolifolia	leatherleaf saxifrage
Lonicera involucreta	black twin-berry
Luetkea pectinata	partridgefoot
Luzula hitchcockii	smooth woodrush
Luzula cf. parviflora	smallflowered woodrush
Lycopodium selago	fir clubmoss
Lycopodium sitchense	Alaska clubmoss
Lycopus uniflorus	northern bugleweed
Lysichitum americanum	skunk cabbage
Maianthemum dilatatum	beadruby
Menyanthes trifoliata	buckbean
Menziesia ferruginea	fool's huckleberry
Mitella pentandra	alpine mitrewort
Nuphar polysepalum	Indian pond lily
Oenanthe sarmentosa	Pacific water-parsley
Oplopanax horridum	devil's club
Osmorhiza purpurea	purple sweet-root
Parnassia fimbriata var. fimbriata	fringed grass-of-Parnassus
Pedicularis groenlandica	pink elephants
Phalaris arundinacea	reed canarygrass
Phleum alpinum	alpine timothy
Phyllodoce empetriformis	red mountain-heather
Physocarpus capitatus	Pacific ninebark
Picea sitchensis	Sitka spruce
Pinus monticola	western white pine
Platanthera dilatata	white bog-orchid
Platanthera saccata	slender bog-orchid
Polygonum bistortoides	American bistort
Potentilla sp.	cinquefoil
Potentilla flabellifolia	fan-leaf cinquefoil
Potentilla palustris	purple cinquefoil
Prunella vulgaris	self-heal
Pseudotsuga menziesii	Douglas fir
Pteridium aquilinum	bracken
Puccinellia pauciflora	weak alkaligrass
Pyrus fusca	western crabapple
Rhamnus purshiana	casara
Rubus pedatus	fiveleaved bramble
Rubus spectabilis	salmonberry
Rubus ursinus	Pacific blackberry
Salix spp.	willow

Salix cf. commutata	undergreen willow
Salix sitchensis	Sitka willow
Sanguisorba sp.	burnet
Saxifraga ferruginea var. macounii	rusty saxifrage
Saxifraga punctata	dotted saxifrage
Scirpus cf. acutus	hardstem bulrush
Scirpus cf. cyperinus	wool-grass
Scirpus microcarpus	small-fruit bulrush
Scutellaria lateriflora	mad-dog skullcap
Senecio triangularis	arrowleaf groundsel
Sparganium sp.	bur-reed
Sparganium angustifolium	narrowleaf bur-reed
Sparganium cf. minimum	small bur-reed
Sphagnum spp.	sphagnum
Spiraea densiflora var. densiflora	subalpine spirea
Spiraea douglasii	spirea
Spiranthes romanzoffiana	ladies-tresses
Stachys sp.	hedge-nettle
Stellaria longipes var. longipes	longstalk starwort
Thuja plicata	western red cedar
Tiarella trifoliata cf. var. unifoliata	coolwort foamflower
Tofieldia glutinosa	sticky tofieldia
Trientalis arctica	northern starflower
Trisetum cf. cernuum	nodding trisetum
Tsuga heterophylla	western hemlock
Tsuga mertensiana	mountain hemlock
Typha latifolia	cat-tail
Vaccinium sp.	huckleberry
Vaccinium cf. deliciosum	blue-leafed huckleberry
Vaccinium ovalifolium	early blueberry
Vaccinium oxycoccos	wild cranberry
Vaccinium parvifolium	red bilberry
Valeriana sitchensis	mountain heliotrope
Veratrum californicum	California false hellebore
Veronica wormskjoldii	American alpine speedwell
Viburnum edule	moosewood viburnum
Viola sp.	violet
Viola palustris	marsh violet