2.7 BAGLEY, SIEBERT, AND MCDONALD CREEKS (CENTRAL STRAIT INDEPENDENT DRAINAGES)

Figure 2.7-1 displays the Central Strait independent drainages.

2.7.1 Bagley Creek (WRIA #18.0183)

Bagley Creek is a medium-sized independent drainage to salt water, entering the Strait of Juan de Fuca approximately two miles west of Green Point. It is the westernmost watershed of East WRIA 18. The Bagley Creek drainage has approximately 9.5 miles of streams and tributaries. It was closed to new appropriations in 1948. The predominant land use in the drainage is commercial forest or private woodlots, with pasture/grassland representing 12% and rural residential representing 5% (PSCRBT 1991).

Fish and Habitat

Bagley Creek has historically supported coho and chum salmon, steelhead, cutthroat and rainbow trout, and dolly varden. Culverts at three road crossings have been evaluated as fish passage barriers (WDFW Fish Passage Barrier Database, 1999). The 332-foot long concrete box culvert under Highway 101 is considered to be a fish passage barrier. In 1991, the PSCRBT indicated no recent sightings of adult salmon or sea-run cutthroat upstream of the Highway 101 culverts. And the WSDOT database also shows the Highway 101 culvert to be a complete barrier to fish passage. Restoration could be accomplished with construction of a fishway within the culvert, which would provide access to 11,942 m^2 of spawning habitat, and 22, 028 m^2 of rearing habitat (WDFW Fish Barrier Database). Upstream of the Highway 101 culvert, there are two additional culverts within 0.2 miles that are also considered to be fish passage barriers.

Floodplain

The lowest culvert on Bagley Creek Road (0.2 miles upstream of Highway 101) is installed too low, causing sediment deposition upstream, and limiting flows during peak flow events. This also results in bank erosion upstream, and the “need” for continued dredging of the channel upstream of the culvert. Also, the lower reaches of Bagley Creek are thought to be naturally unstable.

Channel Condition/Substrate/Riparian

Habitat north of Highway 101 appears to have high levels of fine sediment, and LWD is clumped into a series of deposits (Mike McHenry, Carl Ward) that may previously have been marginally passable, but which currently appear to be fully passable.

Specific reaches that have been identified as deficient in LWD are detailed in the Limiting Factors Analysis (Haring, 1999). Habitat south of Highway 101 (for approximately 1 mile) is less than ideal, with trampled stream banks, little riparian canopy, and direct animal access to the stream (PSCRBT 1991). Streamkeeper inventories estimate canopy cover to be 50 to 100%, but conifer cover to be only zero to 20%.

The Bagley Creek watershed is mostly composed of very shallow soils over glacial till. These conditions make Bagley Creek the most responsive creek in the county to flooding

caused by intense rainfall or low-elevation rain-on-snow events. Miscellaneous streamflow measurements published by USGS indicate that Bagley Creek had a peak flow of almost 350 cfs in a flood in 1948, an extremely high flow for a watershed of this size (peak flows of 36 cfs from 1997-1999 were noted in the LFA). The soils in the remainder of the watershed that are not till are relatively deep, highly erosive silts, deposited in shallow lakebeds as the glaciers retreated.

An unpermitted, constructed crossing of the upper creek, in association with anticipated development, resulted in large amounts of fine sediments being introduced to the system in 1992. Deposits from this event are still present throughout the system. The LFA notes that this watershed is currently at risk of permanent conversion of the forested portions of the headwaters to non-forest cover by residential development. The Streamkeepers identified two major bank erosion areas approximately 300 and 350 yards upstream of the mouth that resulted from January 1999 rains.

Stream surveys conducted from July 1997 – April 1999 estimated surface substrate composition to be 20% gravel and 35% cobble. Benthic invertebrate sampling, conducted in October, 1998, yielded a Benthic Index of Biological Integrity (BIBI) score of 42, which is interpreted as good.

Water Quality

Bagley Creek is classified as a Class AA water body. It also is listed for aesthetic beneficial use. Fish passage was blocked (as of 1993) but is now repaired (pers. comm. Joel Freudenthal, November 10, 2000). The creek is on the 303(d) list for fecal coliforms; other nonpoint issues listed by the *Dungeness River Area Watershed Management Plan* include vegetation removal, animal access, sedimentation, and highway runoff. Ecology states that there are runoff and erosion problems from the bluffs (Ecology 1998). Nitrates were elevated in 1992.

Bagley Creek is listed on the Clean Water Act Section 303(d) list of impaired waterbodies, due to elevated fecal coliform counts (Ecology 1998). Although fecal coliform is not known to directly affect salmonids, it is often an indicator of water quality impacts in the watershed that can adversely affect salmonids. These other impacts include direct animal access to the channel (which affects riparian condition and bank stability), high fine sediment levels in the substrate from stormwater and agricultural runoff, and high nutrient levels in the stream which may cause excessive plant growth and reduce dissolved oxygen levels.

Water temperature data collected by Streamkeepers indicate a high temperature of 13.2^{o}C, a low of 4.5^{o}C, and an average of 8.6^{o}C; dissolved oxygen samples indicate a high of 13.7 mg/L, a low of 7.7 mg/L, and an average of 11.6 mg/L.

Water Quantity

Quarterly flow measurements collected by Streamkeepers for July 1997 – April 1999 indicate a high flow of 36 cfs (1/24/98), a low flow of 1.7 cfs (7/26/97), and a mean flow of 7.4 cfs. Instream flow recommendations have been made for Bagley Creek, based on toe width measurements made at Highway 101. These recommendations are included as part of Section 3.3.2. Figure 2.7-2 presents the overall hydrograph for Bagley Creek.

Figure 2.7-1. Central Straits Area Map. SEE SEPARATE FILE.

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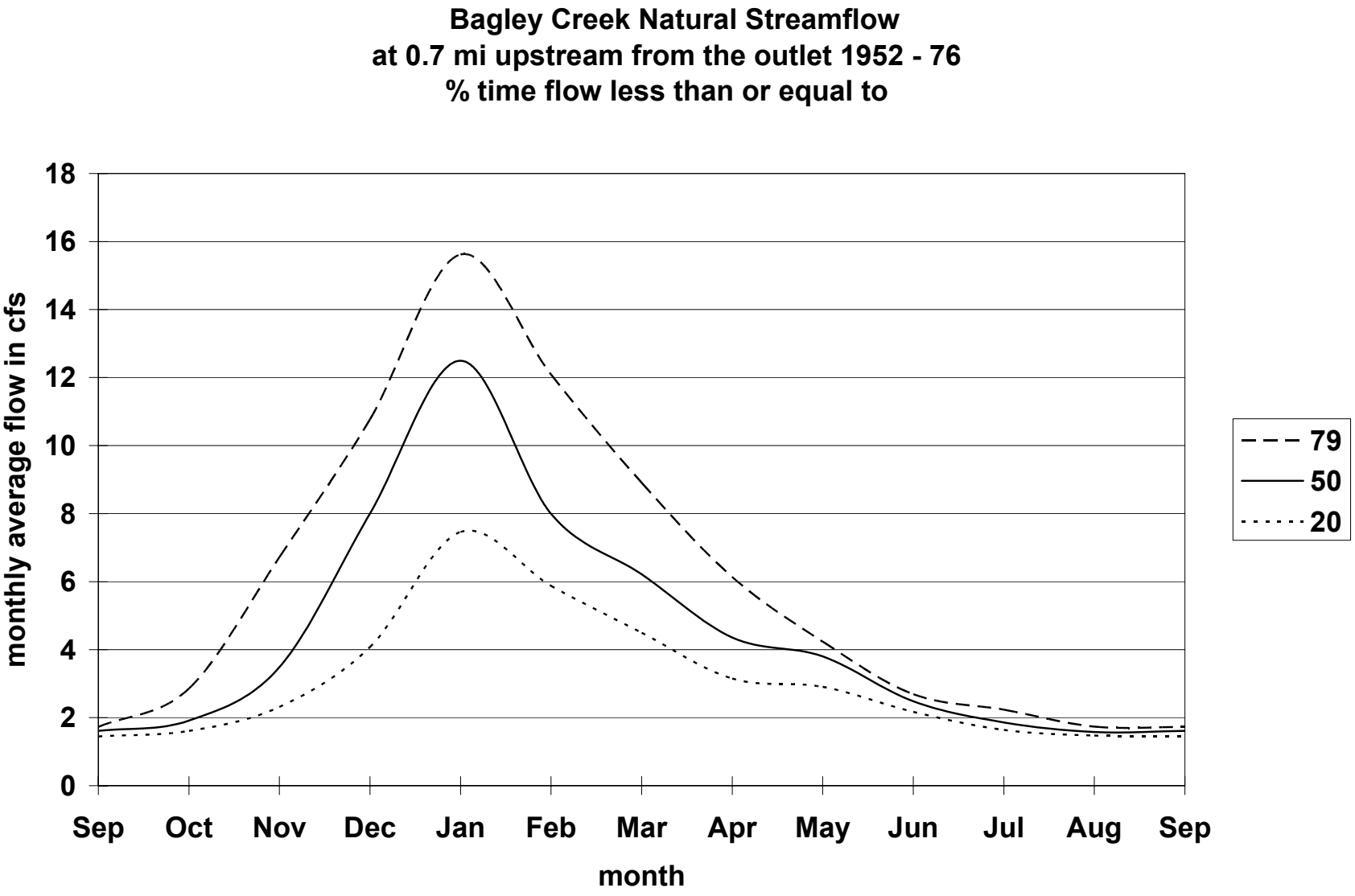

Figure 2.7-2 Bagley Creek hydrograph. (Lieb 2004) Recent data indicate these flows are overestimated.

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Estuarine

The Bagley Creek estuary is likely similar to historic condition. A berm of sand and small gravel forms across the mouth of the creek during low flows in the summer, sealing off the creek from surface flow interaction with salt water. This effectively limits juvenile and adult salmonid migration (upstream and downstream) until flows increase enough to open a channel through the berm. Ecology (1998) reports there are community concerns of runoff and erosion problems at Bagley bluffs, although these concerns are reported to relate primarily to presence of trees and other slide material on the marine shoreline that makes beach walking difficult (Joel Freudenthal). However, these natural ecological processes are typically beneficial to fish life and marine nearshore ecology, and have unfortunately been lost on much of the WRIA 18 marine shoreline as a result of shoreline armoring.

2.7.2 Siebert Creek (WRIA #18.0173)

Siebert Creek, 12.4 miles long, drains 19.5 mi^2 of the northwest flank of Blue Mountain and is a significant independent drainage to salt water, entering the Strait of Juan de Fuca at Green Point. The Siebert Creek watershed includes 31.2 miles of mainstem stream and tributaries, much of which is well incised, with its upper watershed reaching an elevation of 3,800'. It is the westernmost stream influenced directly by Dungeness area irrigation flows and was closed to new appropriations in 1973.

Fish and Habitat

Siebert Creek historically supported coho and chum salmon, steelhead, cutthroat and rainbow trout, and Dolly Varden. The PSCRBT (1991) characterizes Siebert Creek as having ideal fish habitat throughout, except in the East Fork. With the construction of a bridge for eastbound Highway 101 in 1999, a maintained fishway provides passage through the culvert under westbound Highway 101, which would otherwise be impassable. The fishway has not always been sufficiently maintained to allow unhindered fish passage (Randy Johnson, WDFW).

Floodplain

Clallam County removed the double box culverts at the Old Olympic Highway in 1998 (prior 13-foot drop at outlet, originally constructed in 1916), and replaced them with a bridge. The former highway location is still protected by riprap and bank armoring, resulting in channel constriction, bank erosion, and channel instability downstream. Stream energy appears to have actually increased as a result of the culvert removal (Joel Freudenthal).

Channel Condition/Substrate/Riparian

A few eroding stream banks were noted in the lower section, particularly immediately downstream of Highway 101. Habitat surveys in lower Siebert Creek found a low gradient, gravel bed channel with bedrock outcrops between RM 6.4 and 8.0. Pool percentage was rated fair to poor (41% to 29%), with critically low levels of LWD (0.96 pieces/100 feet) (McHenry 1992, as referenced in McHenry et al. 1996, Bernthal and Rot 1999). The few

LWD pieces were generally in good condition (level of decay). Excessive fine sediments (avg. 22.7% <0.85 mm) occurred in the reach below RM 3.4 (the only area sampled) (Bernthal and Rot 1999). Juvenile fish populations in Siebert Creek exhibited low overall densities (0.22 fish/m^2), which reflected the degraded habitat and channel conditions. Riffle-dependent species, including steelhead and cutthroat comprised 82% of the fish observed, while coho salmon, which require pool habitat for rearing, accounted for only 18% of the total (McHenry 1992, as referenced in McHenry et al 1996). Macroinvertebrate sampling found relatively high levels of EPT taxa (>50%) at all sampling sites (RM 0.1, 0.8, 1.0, 1.5, 2.5, 2.6, 3.5, and 3.9)(Bernthal and Rot 1999). The headwaters of Siebert Creek are located in the foothills of ONP, are generally in excellent condition, and are not prone to rain-on-snow flooding. Previous landslide concerns on East Fork Siebert Cr. (PSCRBT 1991) have been mostly corrected through NRCS (Joel Freudenthal). Emery Creek, a seasonal tributary to Siebert Creek entering the right bank at RM 3.4, is not known to directly support anadromous salmonids (natural barrier just upstream of its mouth), but does impact habitat downstream in Siebert Creek. It has been extensively straightened and channelized in the past. The substrate in this tributary is impacted by fine sedimentation of the gravels from periodic slumps of clay from adjacent hill slopes. An old County landfill may also be contributing pollutants to the creek (PSCRBT 1991). Much of the stream flows through a wooded ravine that is well vegetated and undisturbed.

Water Quality

Siebert Creek is classified as a Class AA water body. Nonpoint issues listed by the *Dungeness River Area Watershed Management Plan* include a major source of sedimentation from a logging road on the East Fork, some vegetation removal, and an old landfill leachate and sedimentation at Emery Creek. Primary land uses are commercial timber, Olympic National Park (the uppermost ~20% of the watershed), and private woodlots. Wilson (1988, as referenced in PSCRBT 1991) reported low levels of bacterial contamination; recent testing indicates few fecal coliform concerns (Joel Freudenthal). Temperature monitoring during August 1993 found fair conditions at RM 0.1, 1.6, and 3.1, with good conditions at RM 9.4 (Bernthal and Rot 1999).

Water Quantity

Annual flows from 16 years of gaging (1953-1969) averaged 17 cfs, with a peak instantaneous flow of 1,620 cfs recorded in November 1955 (DQ Plan 1994). Instream flow recommendations have been made for Siebert Creek, based on toe width measurements made at Old Olympic Highway. These recommendations are included as part of Section 3.3.2. Figure 2.7-3 presents the overall hydrograph for Siebert Creek.

Estuarine

The Siebert Creek estuary is likely similar to historic condition. Steep, confined topography in the lower watershed and high wave energy at the mouth probably combine to prevent any significantly large estuary from developing (Randy Johnson). A berm of sand/small gravel forms across the mouth of the creek during low flows in the summer, sealing off the creek from flow interaction with salt water. This effectively limits juvenile and adult salmonid migration (upstream and downstream) until flows increase enough to open a channel through the berm.

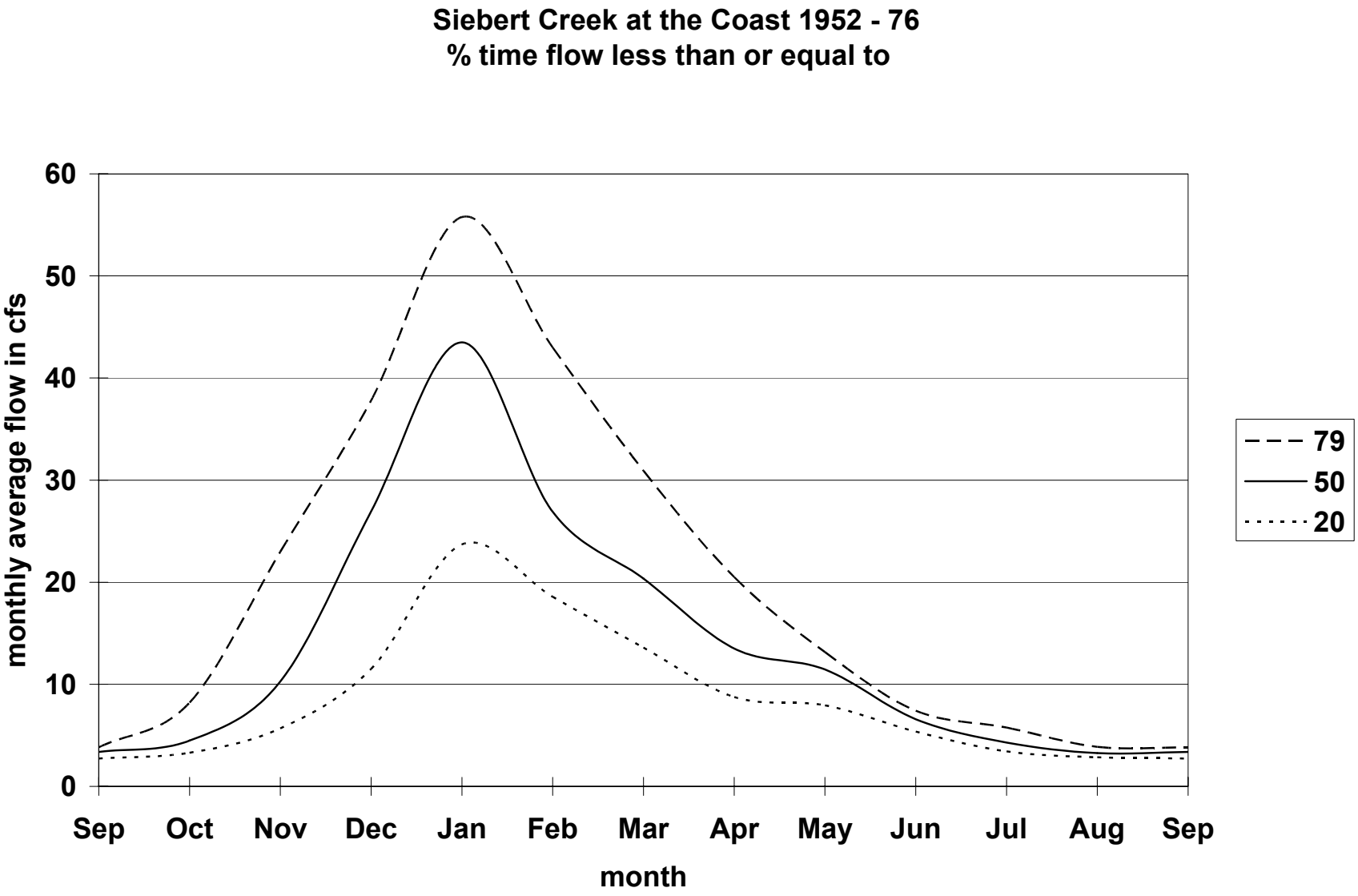

Figure 2.7-3 Siebert Creek Hydrograph. Recent data indicate these flows are overestimated.

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2.7.3 McDonald Creek (WRIA #18.0160)

McDonald Creek is a significant independent drainage to salt water, entering the Strait of Juan de Fuca between the western end of Dungeness Spit and Green Point. It is 13.6 miles in length, draining ~23.0 mi^2 of the northeast flank of Blue Mountain. With its headwaters originating at ~4,700 feet, McDonald Creek flows through a deeply incised coastal upland and marine bluff to the Strait of Juan de Fuca. Significant erosion and storm damage has been reported associated with winter storms. It was closed to new appropriations in 1946. Primary land uses in McDonald Creek are commercial timber (83%) and private woodlots (9%) (PSCRBT 1991).

Fish and Habitat

McDonald Creek has historically supported coho and chum salmon, steelhead, cutthroat and rainbow trout, and Dolly Varden. An irrigation screen bypass dam is located immediately upstream of Highway 101. Adult salmon have been observed to jump over the dam at high flows. A fishway was installed to provide adult passage at all flow conditions. There is concern that the current fishway may not provide effective upstream passage for all anadromous salmonid species, or for juvenile salmonids.

Floodplain

This creek is impacted by timber harvest on Forest Service lands in the upper watershed that occurred in the 1980s-early 1990s. Portions of the stream channels in the upper watershed are incised in steep ravines within former glacial lakebeds. Timber harvest in several locations resulted in damage to the ravine walls and subsequent sediment inputs into the upper watershed. There is also sediment and bank erosion from the rechannelization attempt next to the Solmar subdivision (done without Hydraulic Project Approval). Other large areas of commercial and state forest lands were harvested in the early 1990s and are now in a state of recovery of hydrologic maturity. Large portions of the upper watershed have also been permanently converted to non-forest cover by residential development on Lost Mountain in the eastern side, and off Blue Mountain Road on the western side of the upper subbasin.

Channel Condition/Substrate/Riparian

Many of the upper portions of the stream are critically depleted of LWD (stream cleanout of LWD occurred in the 1950s). Channel instability between the mouth and Highway 101 is further impacted by LWD depletion (Randy Johnson). Specific reaches that have been identified as deficient in LWD are detailed in the Limiting Factors Analysis (Haring, 1999). Habitat surveys in 1992 and 1993 found pool percentage to be poor and pool frequency to be fair below RM 4.9, with a low gradient channel bed. Condition of LWD (degree of decay) was fair to good. Key piece density was poor throughout the lower 9 miles. Between RM 4.9 and 6.7, pool percentage and pool frequency were fair, with most pools formed by boulders or bedrock. Channel gradient was 2 to 4% with gravel as the dominant substrate. LWD condition was fair. Between RM 6.7 and 8.5, the channel gradient ranged between 4 to 8% with outcrops of bedrock common. Given the gradient class, pool percentage was good, with pool frequency fair; LWD condition was fair (Bernthal and Rot 1999). The stream is confined and channelized from the Agnew Ditch to Highway 101 (0.1 miles) (Joel Freudenthal).

The substrate is generally made up of large gravel/rocks or sandy sediment, neither providing good substrate for salmon production (PSCRBT 1991).

McDonald Creek is located in a deep ravine. Riparian condition is reported to be good, but increased conifer presence would be beneficial (Haring, 1999). Macroinvertebrate sampling showed RM 2.1-3.9 to be degraded with low levels of EPT taxa, and all taxa in general. Substrate was cobble dominated with high levels of fine sediment (Bernthal and Rot 1999). In the vicinity of the Solmar subdivision, riparian condition varies from fair to poor. In some cases, lawns and/or riprapped bulkheads extend to the edge of the channel (Randy Johnson).

Water Quality

McDonald Creek is classified as a Class AA water body. It also is listed for aesthetic beneficial use and irrigation conveyance. Nonpoint issues listed by the *Dungeness River Area Watershed Management Plan* include an unstable channel and bank erosion, particularly from an unpermitted rechannelization attempt at Solmar, causing erosion and sedimentation and leading to unfavorable habitat for fish. Elevated bacteria from the Agnew ditch is also noted.

Wilson (1988) indicated elevated coliform bacterial contamination. McDonald Creek serves as conveyance for portions of Agnew Ditch, where past water quality samples have indicated high bacterial levels. In August 1993, six temperature monitors were installed. Water temperature was poor at RM 2.0, 4.3, and 6.5, and fair at RM 0.1 and 8.3 (Bernthal and Rot 1999). Temperature thresholds were substantially exceeded only at RM 2.0, just downstream of a large residential development.

Water Quantity

Flows have been recorded in a range from less than 1 cfs in late summer and early fall to 25 cfs in June. Irrigation practices likely affect salmon presence, indirectly, and abundance in McDonald Creek. The section of McDonald Creek from RM 5.0 to 2.0 is used for conveyance of irrigation water by the Agnew Irrigation District. Dungeness River water is conveyed through the Agnew ditch to RM 5.0, where it is dumped into McDonald Creek. This conveyed water is subsequently removed from McDonald Creek at RM 2.0. Although there is no appreciable loss of flow, this practice may cause Dungeness River fish to home into McDonald Creek and reduce the homing ability of native McDonald Creek fish (McHenry et al. 1996).

Instream flow recommendations, based on toe width measurements made at Old Olympic Highway, have been made for McDonald Creek. These recommendations are included as part of Section 3.3.2. The limited flow data that is available for McDonald Creek was not reviewed to ascertain consistency with recommended instream flows. Figure 2.7-4 presents the overall hydrograph for McDonald Creek.

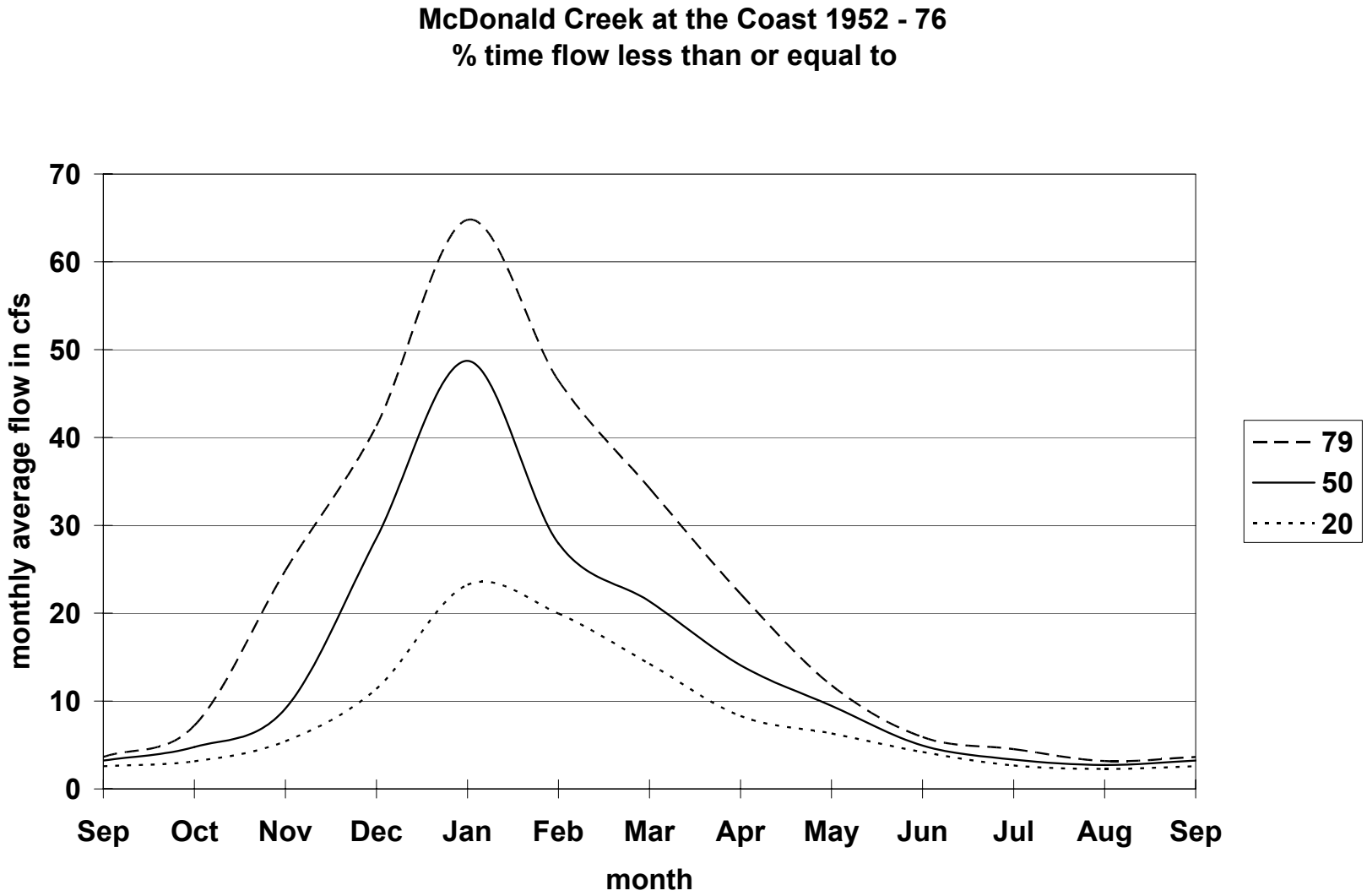

Figure 2.7-4 McDonald Creek Hydrograph. Recent data indicate these flows are overestimated.

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Estuarine

The McDonald Creek estuary is likely similar to historic condition. Steep, confined topography in the lower watershed and high wave energy at the mouth probably combine to prevent any significantly large estuary from developing (Randy Johnson). A berm of sand/small gravel forms across the mouth of the creek during low flows in the summer, sealing off the creek from direct flow interaction with salt water. This effectively limits juvenile and adult salmonid migration (upstream and downstream) until flows increase enough to open a channel through the berm.

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