Terrestrial Mollusk Surveys on the Olympic National Forest 2018 to 2020

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INTRODUCTION

The Forest Service (FS) adopted standards and guidelines for managing habitat of late-successional related species in the Northwest Forest Plan (USDA and USDI 1994 amended by USDA and USDI 2001). These standard and guidelines included measures to manage known sites and conduct pre-habitat disturbing surveys for rare or isolated flora and fauna species known as "Survey and Manage" species. The intent was to provide for reasonable assurance of the species' persistence.

The Survey and Manage species list includes several terrestrial mollusk species that occur on the Olympic National Forest (ONF). In addition, some mollusks on ONF are Regional Forester's Sensitive Species, identified as having population viability concerns (USDA 2019). One species, *Hemphillia burringtoni* (the Burrington or keeled jumping slug) has been petitioned for federal listing under the Endangered Species Act. The US Fish and Wildlife Service determined that listing this species as threatened or endangered may be warranted (76 Federal Register 61826-6184), noting the substantial threats identified in the petition, including the destruction, modification or curtailment of its habitat or range resulting from timber harvest.

Some forest activities are exempt from Survey and Manage standards and guidelines, as stipulated by Judge Pechman in 2006, including thinning forests less than 80 years old. Forest stands over 80 years old in the northeast part of ONF have been proposed for commercial thinning, and in 2018 mollusk surveys were initiated in these older stands. The survey results will provide information for FS environmental analysis and decisions and assure rare species persistence as intended under the Northwest Forest Plan. While not an environmental assessment report, this document explains the terrestrial mollusk surveys conducted on the Olympic National Forest 2018 to 2020.

METHODS

The survey areas were forest stands in the northeast corner of Olympic National Forest in the Snow Creek-Salmon River, Jimmycomelately Creek, Middle Dungeness River, and McDonald Creek watersheds (Figure 1). The stands selected for surveys were over 80 years old located in Adaptive Land Management (AMA) Northwest Forest Plan land designation. The age of the forest stands ranged from 80 to 160 years. They were second growth coniferous or mixed coniferous forests originated from fire, some with a history of timber harvest. Elevation ranged from 797 to 3012 feet.

Surveys were conducted following the protocol for pre-disturbance surveys in Duncan et al. (2003). Two survey visits were completed at each survey area during the fall and spring between November 2018 and June 2020. Most areas received one survey visit in the fall and one in the spring; however, some received both visits spread at least three weeks apart in Spring 2020. According to the protocol, surveys were done in appropriate weather and soil

conditions, and timing was adjusted if needed. October 2018, for example, was too dry and surveys were postponed until November. Conversely, June 2020 experienced wet conditions with surveys continuing well into the month.

The sample areas were concentrated at appropriate habitat features described in the Appendix B of Duncan et al. 2013 such as concentrations of woody debris, ferns, leaf litter and hardwoods. The surveys were focused on finding Survey and Manage (USDA and USDI 1994) or Regional Forest Service Sensitive Species (USDA 2019) known to occur on this part of the Olympic National Forest (Table 1); however, all mollusks that surveyors detected were documented. Surveyors took photos of each mollusk species detected. Although during historical surveys in the 1990s and 2000s, Forest Service surveyors identified *Hemphillia glandulosa* and *H. burringtoni* morphologically, recent studies indicate that these two species cannot be differentiated by morphological features; however, they can be differentiated by geographic range (Wilke and Ziegltrum 2003, Ranken et al. 2019). All glandulosa/ burringtoni complex slugs detected in these 2018-2020 surveys were recorded as *H. burringtoni* due to the geographic location (Ranken et al. 2019).

Surveyors collected specimens of mollusks that could not be identified or were suspected to be Survey and Manage or Sensitive. I mailed live specimens to Darci Rivers-Pancratz, FS regional office identification services. After identification, specimens were either preserved and placed at Oregon State University museum or mailed back to me to release at field collection sites.

While some surveys were accomplished by me and other Forest Service employees, many were conducted by contracted surveyors. Most of the surveys in the Fall 2019 and Spring 2020 were done by contractors of Hamer Environmental. In addition to mollusks, FS and Hamer Environmental surveyors noted all amphibians detected during the surveys, and, if possible, photographed the amphibians. We also noted incidental goshawk observations or their sign (nests, whitewash, prey remains, molted feathers), a FS Sensitive species found in coniferous forest habitat.

RESULTS AND DISCUSSION

We surveyed a total of 131 stands (3596 acres) (Appendix A). Following the survey protocol, the search time totaled 360 hours. Surveys revealed a diversity of molluscan fauna. A total of 20 species was recorded (Table 2). Surveyors of Hamer Environmental found *Zacoleus Leonardi,* the Ryan Lake Snail (Figure 2) in the Jimmycomelately Creek and McDonald Creek watersheds. This is north of its previously described range (Burke 2013). All other mollusk species detected were expected in this geographic area.

We detected nine amphibian species (Table 3). One, the Van Dyke's salamander, *Plethodon vandykei*, is a Regional Forester's Sensitive species. The western red-backed salamander (*Plethodon vehiculum*) and the Ensatina (*Ensatina eschscholtzii*) were the most commonly

observed amphibian species. One surveyor found goshawk sign, an apparent uninhabited nest, at a site in the Jimmycomelately watershed (stand 24010032).

Of the 20 mollusk species confirmed, one was a Survey and Manage and Sensitive Species, *Hemphillia burringtoni*, the Burrington or keeled jumping-slug (Figure 3). We found this species throughout the four watersheds sampled, in 85 out of 131 stands (65%) surveyed. We detected a total of 249 individuals, or, in other words, 69% of the search time (249 individuals in 360 hours) revealed *H. burringtoni* individuals.

We found *Hemphillia burringtoni* slugs in forest stands ranging in age from 80 to 140 years, and many of the stands had a history of harvest. Forty-one out of the 85 forest stands with *H. Burringtoni* detections had been commercially thinned or salvage harvested. The timber harvest occurred in 1967 to 2010, or about 10 to 52 years prior to the surveys.

Hemphillia burringtoni habitat includes low to mid elevation moist coniferous forests with microhabitat features such as decaying woody debris, leaf litter and low vegetation (Duncan et al. 2003, Wainwright and Duncan 2005). Our surveys provide evidence that this species is found in second growth forests including those with a history of disturbance from harvest. However, we do not know if populations persisted in refugia containing microhabitat features or if they immigrated from surrounding suitable habitat after the disturbed forests recovered.

The Forest Service conducted historic mollusk surveys in the Snow Creek area in the 1990s and 2000s. We found *H. burringtoni* in four forest stands where this species also had been found during the historic surveys. One of these stands (23030196) was commercially thinned in 2010, so this site had *H. burringtoni* presence recorded after and before harvest. However, we do not know if the species persisted through the thinning.

Additional surveys shortly after commercial thinning would provide information about whether *H. burringtoni* and other mollusk species can persist or recover after thinning. In general, more mollusk surveys in forest stands of varying ages and management histories would be valuable to better characterize suitable habitats and adaptability of *H. burringtoni* and other terrestrial mollusks.

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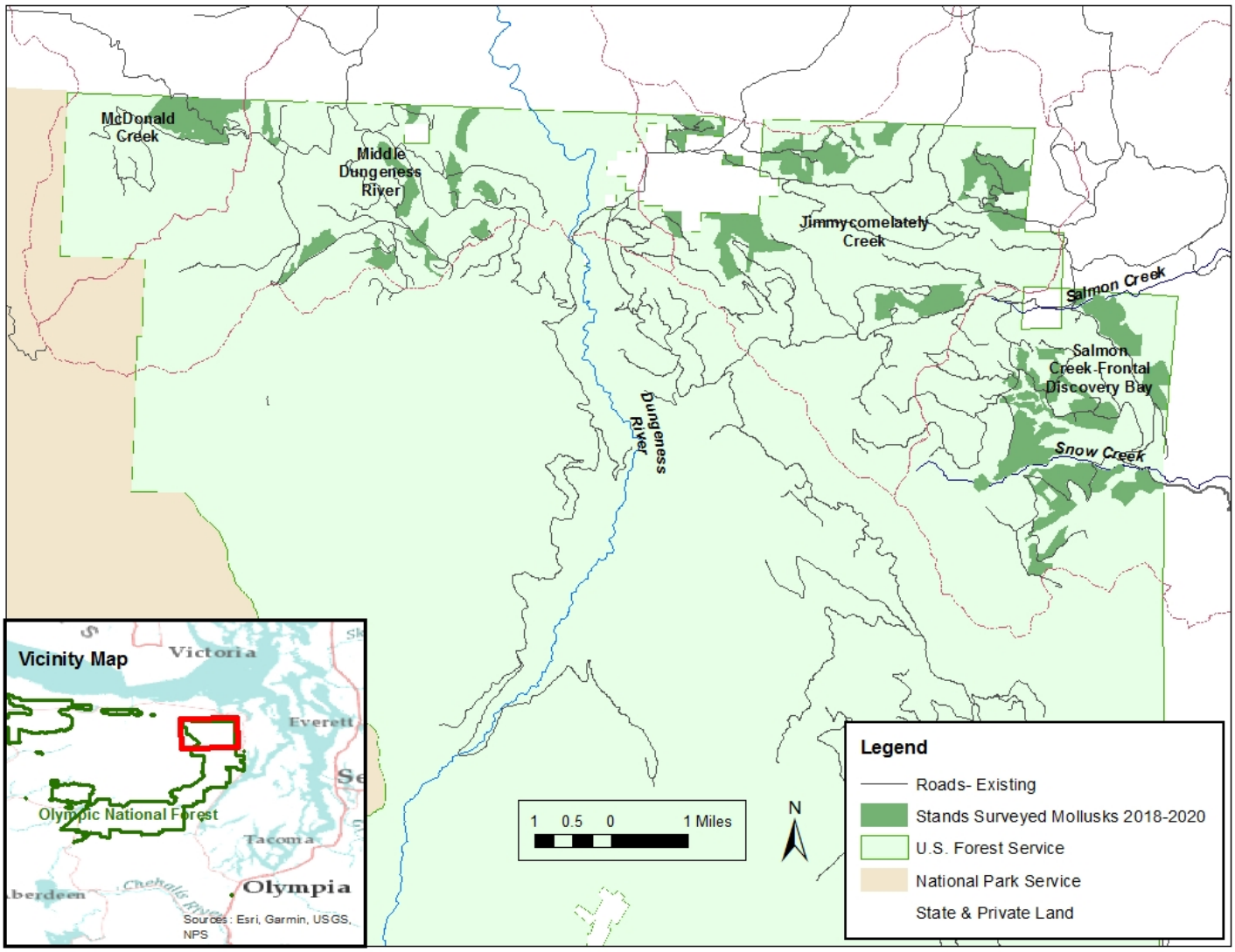

Figure 1. Map showing locations of mollusk survey areas, Olympic National Forest, 2018-2020.

Table 1. Sensitive and Survey & Manage mollusk species known or suspected to occur on the northeast Olympic National Forest (North Hood Canal Ranger District).

Species	**S&M Category**	**R6 FS Sensitive**	**Notes**
Puget Oregonian snail *Cryptomastix devia*	A	Yes	One record south end of HC District
Blue-grey tail-dropper slug *Prophysaon coeruleum*	A	Yes	The species has not been found on ONF but is suspected to occur.
Burrington jumping slug *Hemphillia burringtoni*	E	Yes	Locally common. Pre-disturbance surveys not required; manage known sites.
Evening fieldslug *Derosceras hesperium*	B	No	Now known as *D. levae* but has not been removed from list.
Broadwhorl tightcoil *Pristiloma johnsoni*	No	Yes	Documented in Clallam County but not documented on ONF.

Survey & Manage Categories:
A –Rare; pre-disturbance surveys are practical. Manage All Known Sites.
B – Rare; pre-disturbance surveys not practical. Manage All Known Sites.
C – Uncommon; pre-disturbance surveys are practical. Manage High-priority sites.
D – Uncommon; pre-disturbance surveys not practical or not necessary. Manage High-priority sites.
E – Rare, Status undetermined. Do not require pre-disturbance surveys. Manage All Known Sites.
F – Uncommon or Concern for Persistence Unknown, Status Undetermined.

Figure 2. *Zacoleus Leonardi* (Ryan Lake Slug) photo.

Figure 3. *Hemphillia burringtoni* (the Burrington Jumping Slug) photo.

Table 2. Mollusk species detected during surveys in the Snow Creek- Salmon River, Middle Dungeness River, Jimmycomelately (JCL) and McDonald Creek watersheds, Olympic National Forest, 2018 to 2020.

Scientific Name	Common Name	Watershed*	Notes
Ancotrema sportella	Beaded lancetooth snail	All	One specimen ID confirmed by Rivers-Pankratz.
Ariolimax columbianus	Pacific banana slug	All	
Arion sp.	Arion slugs	Snow-Salmon, JCL	Non-native mostly black Arions.
Columella edentula	Toothless column snail	Snow-Salmon 23030114	ID not confirmed by RO services, but is distinctive.
Cryptomastix germana	Pygmy Oregonian snail	All	ID confirmed Rivers-Pankratz in the field.
Euconulus fulvus	Brown hive	JCL 24020007	1 specimen ID by Burke. Preserved.
Haplotrema vancouverense	Robust lancetooth	All	
Hemphellia burringtoni	Burrington jumping slug	All	ID confirmed Rivers-Pankratz. Released. 1 preserved, 1 released.
Hemphillia dromedarius	Dromedary jumping slug	All	One ID confirmed Rivers-Pankratz. Released.
Monadenia fidelis	Pacific sideband snail	Snow-Salmon, JCL, Dungeness	2 specimens preserved for genetics study; others released
Pristiloma arcticum	Northern tightcoil	Snow, JCL, Dungeness	One specimen ID by Burke.
Pristiloma lansingi	Denticulate tightcoil	Snow, JCL, Dungeness.	8 specimens ID *P. lansingi* by Burke.
Pristiloma sp.	Tightcoil	All	Not confirmed to species. But not the sensitive species *P. johnsoni*.
Prophysoan andersoni	Reticulate trail-dropper	All	ID confirmed by Burke. Released.
Prophysoan foliolatum	Yellow-bordered Tail-dropper	JCL 24020003	ID by Rivers- Pankratz, Released.
Punctum randolphi	(a tiny land snail)	Snow-Salmon, Dungeness	ID by Rivers-Pankratz
Striatura pugetensis	Northwest Striate	McDonald Cr. 26030124, 26030154	2 specimens ID by Burke. Preserved.
Vertigo columbiana	Columbia Vertigo	McDonald Cr. 26030120	1 ID by Burke. Preserved.
Vertigo sp.	Vertigo	JCL, Dungeness	Not identified to species. But not Survey and Manage sp.
Vespericola sp./ columbianus	Vespericola land snail	All	*Vespericola* found commonly. ID to species by Rivers-Pancratz
Zacoleus Leonardi	Ryan Lake Slug	Snow-Salmon 23030114. JCL 24020018b, 240200064b. McDonald 26030136b	One specimen ID by Burke. Preserved.

* For rarely observed species, the stand number is also included.
ID = Identification. ID experts = Darci Rivers-Pancratz, Thomas Burke.

Table 3. Amphibian species detected during mollusk surveys, Snow Creek-Salmon River, Jimmycomelately Creek, Middle Dungeness River, and McDonald Creek watersheds, Olympic National Forest, 2018-2020.

Scientific Name	Common Name	Number of sites	Watershed and Stand
Ambystoma gracile	Northwestern salamander	7	Snow-Salmon 23020016, 24010114; Dungeness 25040044, 25040235, 26030136a; McDonald 26030154a, b
Anaxyrus boreas	Western toad	9	Snow-Salmon 24010141, 24010060; Jimmycomelately 24020002, 24020009, 24020134; Dungeness 2601020, 26030024; McDonald 26030154a, b
Ascaphus truei	Tailed frog	8	Snow-Salmon 23030051, 24010032, 24010097, 23030050, 23030196; Dungeness 26010061, 26010132; McDonald 26030154a
Ensatina eschscholtzii	Ensatina	53	Commonly found in all watersheds
Plethodon vandykei	Vandyke's salamander	2	Snow 24010114; Jimmycomelately 24020244.
Plethodon vehiculum	W. red-backed salamander	70	Commonly found in all watersheds
Pseudacris regilla	Pacific treefrog	4	Snow-Salmon 24010141; Jimmycomelately 24020201, 240200201, 24020244
Rana aurora	Red-legged frog	1	Jimmycomelately 24020134
Taricha granulosa	Rough-skinned newt	2	Jimmycomelately 24020014a, 24020179

Appendix A. Forest stands surveyed for mollusks, Olympic National Forest, 2018-2020.

CELLKEY Num	YRORIG	HTHYR	HSVYR	ELEV	WATERSHED	Acres	Num HEBU*
23020001	1938	1969	1981	1995	SNOW CREEK/SALMON RIVER	51.3	3
23020002	1928	1969	0	1690	SNOW CREEK/SALMON RIVER	30.2	3
23020003	1880	0	1979	1558	SNOW CREEK/SALMON RIVER	9.8	1
23020003	1880	0	1979	1558	SNOW CREEK/SALMON RIVER	3.7	1
23020003	1880	0	1979	1558	SNOW CREEK/SALMON RIVER	46.1	0
23020003	1880	0	1979	1558	SNOW CREEK/SALMON RIVER	8.7	0
23020003	1880	0	1979	1558	SNOW CREEK/SALMON RIVER	4.6	0
23020005	1928	1971	0	1283	SNOW CREEK/SALMON RIVER	22.5	0
23020006	1928	1971	0	1371	SNOW CREEK/SALMON RIVER	21.0	0
23020007	1880	1969	0	1391	SNOW CREEK/SALMON RIVER	50.1	1
23020013	1880	1967	0	1145	SNOW CREEK/SALMON RIVER	9.7	0
23020015	1935	1967	1979	1171	SNOW CREEK/SALMON RIVER	21.7	5
23020016	1880	1967	0	1073	SNOW CREEK/SALMON RIVER	15.0	1
23020023	1935	0	0	2162	SNOW CREEK/SALMON RIVER	36.2	3
23020069	1935	0	0	2329	SNOW CREEK/SALMON RIVER	9.4	0
23020074	1935	0	0	2277	SNOW CREEK/SALMON RIVER	4.8	0
23020085	1935	0	0	2241	SNOW CREEK/SALMON RIVER	16.0	0
23020114	1880	0	0	1923	SNOW CREEK/SALMON RIVER	7.8	0
23030045	1929	0	1989	1929	SNOW CREEK/SALMON RIVER	15.4	2
23030045	1929	0	1989	1929	SNOW CREEK/SALMON RIVER	16.0	1
23030045	1929	0	1989	1929	SNOW CREEK/SALMON RIVER	6.6	1
23030045	1929	0	1989	1929	SNOW CREEK/SALMON RIVER	7.8	1
23030049	1880	0	0	1791	SNOW CREEK/SALMON RIVER	7.6	0
23030050	1928	1983	1986	1696	SNOW CREEK/SALMON RIVER	20.2	6
23030051	1930	1973	1980	1526	SNOW CREEK/SALMON RIVER	29.7	11
23030055	1928	1983	1989	1709	SNOW CREEK/SALMON RIVER	32.4	6
23030073	1929	0	0	1555	SNOW CREEK/SALMON RIVER	40.8	3
23030075	1920	0	0	2293	SNOW CREEK/SALMON RIVER	22.3	1
23030085	1929	1980	0	1831	SNOW CREEK/SALMON RIVER	80.9	5
23030100	1930	1973	0	1470	SNOW CREEK/SALMON RIVER	4.9	0
23030114	1930	0	0	2014	SNOW CREEK/SALMON RIVER	76.8	8
23030141	1880	1986	0	2021	SNOW CREEK/SALMON RIVER	90.0	6
23030142	1927	0	0	1709	SNOW CREEK/SALMON RIVER	20.2	2
23030142	1927	0	0	1709	SNOW CREEK/SALMON RIVER	23.5	1
23030178	1928	1979	0	1549	SNOW CREEK/SALMON RIVER	13.5	3
23030196	1929	2010	1989	1929	SNOW CREEK/SALMON RIVER	51.6	7

CELLKEY Num	YRORIG	HTHYR	HSVYR	ELEV	WATERSHED	Acres	Num HEBU*
23030201	1929	2010	1989	1929	SNOW CREEK/SALMON RIVER	7.3	4
23030202	1880	2010	0	1791	SNOW CREEK/SALMON RIVER	23.5	2
23030202	1929	2010	1989	1929	SNOW CREEK/SALMON RIVER	2.8	0
24010004	1890	0	0	1060	JIMMY-COME-LATELY CREEK	6.2	0
24010005	1890	0	0	797	JIMMY-COME-LATELY CREEK	20.1	0
24010012	1880	0	0	1191	JIMMY-COME-LATELY CREEK	72.4	2
24010012	1880	0	0	1191	JIMMY-COME-LATELY CREEK	10.8	1
24010014	1880	0	0	896	JIMMY-COME-LATELY CREEK	3.1	1
24010016	1890	0	0	863	JIMMY-COME-LATELY CREEK	16.8	1
24010016	1890	0	0	863	JIMMY-COME-LATELY CREEK	13.2	0
24010016	1890	0	0	863	JIMMY-COME-LATELY CREEK	7.2	0
24010032	1885	0	0	1079	JIMMY-COME-LATELY CREEK	53.3	1
24010055	1880	0	0	1946	SNOW CREEK/SALMON RIVER	24.8	2
24010060	1932	0	0	1115	SNOW CREEK/SALMON RIVER	58.3	0
24010072	1930	1984	1989	1975	SNOW CREEK/SALMON RIVER	19.7	4
24010073	1935	1984	1989	2067	SNOW CREEK/SALMON RIVER	20.5	1
24010074	1925	1981	1989	1841	SNOW CREEK/SALMON RIVER	28.4	2
24010080	1927	1999	0	1076	SNOW CREEK/SALMON RIVER	20.1	0
24010097	1930	1980	0	1713	SNOW CREEK/SALMON RIVER	30.2	3
24010102	1890	0	0	1394	JIMMY-COME-LATELY CREEK	113.0	0
24010107	1880	1973	0	2028	SNOW CREEK/SALMON RIVER	4.2	1
24010114	1880	0	0	2070	SNOW CREEK/SALMON RIVER	77.0	9
24010116	1880	0	0	1906	SNOW CREEK/SALMON RIVER	8.9	6
24010121	1890	0	0	1453	JIMMY-COME-LATELY CREEK	4.1	0
24010127	1917	0	0	1047	SNOW CREEK/SALMON RIVER	8.4	1
24010134	1937	0	0	1115	SNOW CREEK/SALMON RIVER	47.8	0
24010135	1940	1977	0	1109	SNOW CREEK/SALMON RIVER	6.3	0
24010138	1925	0	0	958	SNOW CREEK/SALMON RIVER	6.7	2
24010138	1925	0	0	958	SNOW CREEK/SALMON RIVER	2.3	0
24010138	1925	0	0	958	SNOW CREEK/SALMON RIVER	10.6	0
24010138	1925	0	0	958	SNOW CREEK/SALMON RIVER	8.5	0
24010141	1925	0	0	876	SNOW CREEK/SALMON RIVER	108.2	8
24010150	1927	1967	0	984	SNOW CREEK/SALMON RIVER	17.6	0
24020001	1880	1974	0	1870	JIMMY-COME-LATELY CREEK	10.6	0
24020002	1880	0	0	1503	JIMMY-COME-LATELY CREEK	9.7	0
24020003	1880	1970	0	1490	JIMMY-COME-LATELY CREEK	11.2	0
24020007	1880	0	0	1788	JIMMY-COME-LATELY CREEK	33.6	0
24020009	1920	0	0	1348	JIMMY-COME-LATELY CREEK	19.9	3

CELLKEY Num	YRORIG	HTHYR	HSVYR	ELEV	WATERSHED	Acres	Num HEBU*
24020014	1900	0	1980	1568	JIMMY-COME-LATELY CREEK	88.9	1
24020014	1900	0	1980	1568	JIMMY-COME-LATELY CREEK	22.1	0
24020016	1900	0	0	1699	JIMMY-COME-LATELY CREEK	35.5	1
24020018	1900	0	0	1362	JIMMY-COME-LATELY CREEK	12.3	0
24020018	1900	0	0	1362	JIMMY-COME-LATELY CREEK	5.1	0
24020022	1920	0	0	1207	JIMMY-COME-LATELY CREEK	35.4	3
24020024	1902	0	0	1463	JIMMY-COME-LATELY CREEK	40.5	1
24020027	1900	0	1980	1385	JIMMY-COME-LATELY CREEK	25.3	0
24020029	1900	0	1979	1831	JIMMY-COME-LATELY CREEK	17.5	1
24020052	1920	0	0	2041	JIMMY-COME-LATELY CREEK	41.1	3
24020062	1900	0	0	3012	JIMMY-COME-LATELY CREEK	8.8	2
24020064	1880	0	0	2192	JIMMY-COME-LATELY CREEK	40.1	3
24020067	1900	0	0	2454	JIMMY-COME-LATELY CREEK	37.7	7
24020118	1920	0	1981	2323	JIMMY-COME-LATELY CREEK	67.5	6
24020134	1880	0	0	1831	JIMMY-COME-LATELY CREEK	18.2	1
24020135	1880	0	0	1480	JIMMY-COME-LATELY CREEK	9.3	0
24020139	1920	0	0	2182	JIMMY-COME-LATELY CREEK	11.8	0
24020141	1880	0	0	2178	JIMMY-COME-LATELY CREEK	103.0	7
24020164	1750	0	0	2464	JIMMY-COME-LATELY CREEK	19.3	1
24020179	1880	0	0	1959	JIMMY-COME-LATELY CREEK	35.4	0
24020180	1880	0	0	2051	JIMMY-COME-LATELY CREEK	134.6	5
24020201	1900	0	1980	1814	JIMMY-COME-LATELY CREEK	7.0	1
24020204	1900	0	1980	1870	JIMMY-COME-LATELY CREEK	12.6	2
24020244	1875	0	0	1873	JIMMY-COME-LATELY CREEK	15.3	0
25040016	1880	1987	0	1673	DUNGENESS RIVER	34.9	5
25040020	1900	1988	0	1604	DUNGENESS RIVER	50.6	3
25040039	1920	1987	0	2041	DUNGENESS RIVER	27.3	1
25040044	1865	1976	0	1870	DUNGENESS RIVER	33.2	0
25040193	1880	1988	0	1467	DUNGENESS RIVER	24.8	2
25040235	1860	1990	0	1332	DUNGENESS RIVER	26.0	10
26010033	1920	0	0	1772	DUNGENESS RIVER	44.2	2
26010044	1920	1990	0	2530	DUNGENESS RIVER	53.1	7
26010048	1860	0	1989	1804	DUNGENESS RIVER	32.9	2
26010049	1860	1976	1980	1965	DUNGENESS RIVER	22.0	0
26010058	1860	0	1988	2175	DUNGENESS RIVER	18.8	3
26010061	1930	0	0	2520	DUNGENESS RIVER	15.5	3
26010106	1920	0	0	1736	DUNGENESS RIVER	6.3	1
26010110	1920	0	0	2257	DUNGENESS RIVER	21.6	3

CELLKEY Num	YRORIG	HTHYR	HSVYR	ELEV	WATERSHED	Acres	Num HEBU*
26010122	1920	0	0	2782	DUNGENESS RIVER	11.1	0
26010132	1860	1977	1984	1906	DUNGENESS RIVER	23.5	0
26010134	1910	0	0	2520	DUNGENESS RIVER	26.2	1
26010140	1920	0	0	2986	DUNGENESS RIVER	14.9	0
26010145	1920	0	0	2503	DUNGENESS RIVER	6.5	1
26010203	1880	0	0	2149	DUNGENESS RIVER	8.5	1
26010232	1913	0	0	2234	DUNGENESS RIVER	27.5	1
26030020	1937	0	0	2001	MCDONALD CREEK	63.9	3
26030024	1920	0	0	1975	MCDONALD CREEK	69.5	4
26030025	1930	0	0	1949	MCDONALD CREEK	45.9	3
26030039	1928	0	0	2251	MCDONALD CREEK	1.0	1
26030039	1928	0	0	2251	MCDONALD CREEK	22.3	0
26030118	1900	0	0	2208	MCDONALD CREEK	5.4	2
26030136	1910	0	0	2231	MCDONALD CREEK	29.3	2
26030136	1910	0	0	2231	MCDONALD CREEK	27.8	1
26030149	1900	1980	0	2090	MCDONALD CREEK	7.3	0
26030154	1910	2008	0	2231	MCDONALD CREEK	1.6	1
26030154	1928	2008	0	2251	MCDONALD CREEK	30.6	3
26030154	1937	2008	0	2001	MCDONALD CREEK	42.3	2
					Total	3596.2	249

YRORIG = Stand year of origin, HTHYR = year thinned, HSVRY = Year salvaged, according to Forest Service records. “0” means no record of thinning or salvage.
Num HEBU = Number of Hemphillia burringtoni observed. If they were found during both survey visits, the higher number was used.