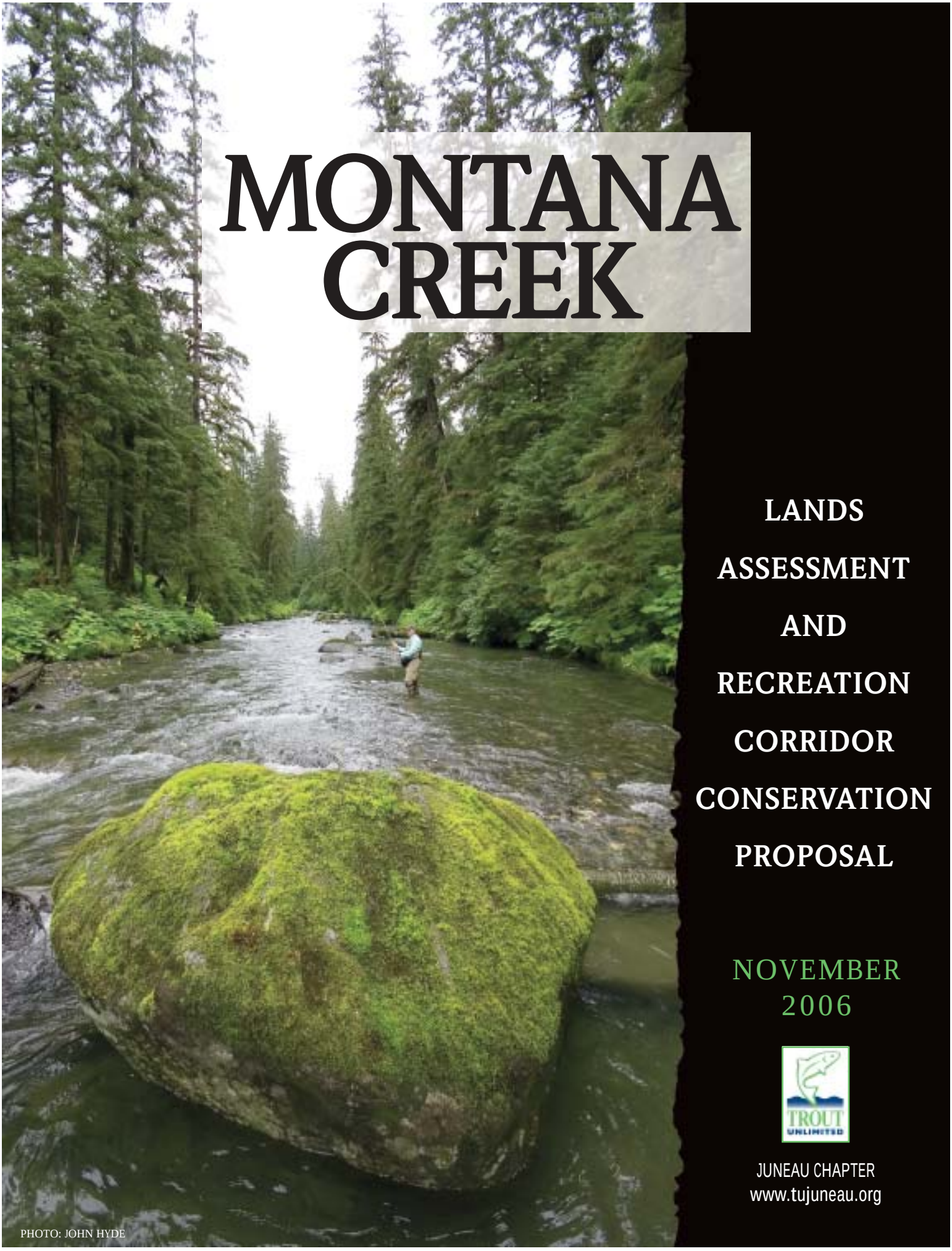

MONTANA CREEK

LANDS ASSESSMENT AND RECREATION CORRIDOR CONSERVATION PROPOSAL

NOVEMBER 2006

JUNEAU CHAPTER
www.tujuneau.org

PHOTO: JOHN HYDE

ACKNOWLEDGEMENTS

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Juneau Douglas City Museum

Skaggs Foundation

TROUT UNLIMITED

Trout Unlimited (TU), founded in 1959, is a private, non-profit organization with more than 155,000 members nationwide dedicated to conserving, protecting, and restoring North America's trout and salmon fisheries and their watersheds. The Juneau Chapter of TU, now 100 members strong, is in the process of re-building its membership in partnership with the statewide Alaska TU office, which re-opened in 2005 in Juneau.

The Juneau chapter of TU initiated this study in May 2006 to contribute as a grass-roots, community effort to the revision of the City and Borough of Juneau's Comprehensive Plan. The work is supported by the Trout Unlimited Embrace-A-Stream grant program.

Additional information about Trout Unlimited in Juneau can be found at www.tujuneau.org or by calling (907) 790-8876.

The goal of the Juneau Chapter of TU is to ensure the sustainability of the Montana Creek Watershed as a fishery, recreation area, and educational asset to our community. The watershed supports healthy salmon runs, large mammal populations, the local commercial fishing industry, and cherished fishing and hunting opportunities for Juneau residents. The Juneau Chapter seeks to promote comprehensive and durable land use designations within the watershed to maintain the fishery and recreational values of Montana Creek.

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EXECUTIVE SUMMARY

The Montana Creek watershed provides excellent fish and wildlife habitat and a variety of unique recreational and educational opportunities for Juneau. These values must be preserved and protected through informed land use planning and management decisions as urbanization of the Mendenhall Valley continues.

This document provides the City and Borough of Juneau with an overview of the value of the Montana Creek Watershed to Juneau residents and an outline of management recommendations to ensure the sustainability of fish habitat and recreational and educational opportunities.

Threats to Montana Creek include development of floodplains and wetlands, non-point source pollutants, and resource extraction activities. Watersheds such as Duck Creek have suffered from a lack of stream setbacks and prudent land use designations and zoning. To avoid repeating these mistakes, forward-looking municipal planning should recognize the existing multiple uses and values of the riparian lands in the Montana Creek Watershed.

We specifically recommend the following:

1. Establish a Stream Conservation Corridor extending 500 feet from either bank of Montana Creek.

The proposed corridor is only .78 square miles or 5.1% of the entire 15.23 square mile Montana Creek Watershed. An estimated 74% of the corridor is classified as a wetland and/or lies within the 100-year floodplain and is largely unsuitable for development. A wider corridor is needed to protect side channels and wetlands that are vital salmon, trout, and char habitat and to protect Montana Creek from contaminated runoff.

2. Protect all CBJ wetlands associated with Montana Creek.

Wetlands provide benefits such as flood attenuation, groundwater recharge, nutrient storage and contributions to surface water systems, and fish and wildlife habitat.

3. Build a trail along Montana Creek and link it to the existing trail network.

This trail will greatly increase access for hikers, anglers, and other user groups.

4. Abandon both the potential road corridor connecting Montana Creek with the Herbert/Eagle River area via Windfall Lake and planning for a heliport.

A road or a heliport within the watershed would be detrimental to recreational values and would pose serious threats to water quality and adjacent riparian habitat.

5. Educate the public on stream stewardship.

Montana Creek is an ideal location for youth education programs and represents a living laboratory for other areas of study by Juneau students as well as the University of Alaska.

6. Enforce laws and ordinances protecting fish habitat and watershed resources.

Trout Unlimited proposes partnering with the Juneau Police Department and Alaska State Troopers so that off-trail ATV use and illegal dumping may be curtailed.

INTRODUCTION

As the most important clearwater tributary to the Mendenhall River, Montana Creek offers vital salmon, trout, and char habitat as well as outstanding recreational opportunities for fishing, hiking, hunting, and wildlife viewing. The ecological and recreational value of this pristine watershed must be preserved and protected through informed land use planning and management decisions.

This document provides the City and Borough of Juneau (CBJ) with an overview of the value of the Montana Creek Watershed to Juneau residents and an outline of management recommendations to ensure the sustainability of the fish habitat and recreational opportunities. As CBJ updates the 1996 Comprehensive Plan, this community based plan can inform and guide the planning and management decisions. It is intended for use by the CBJ staff, Planning Commission, Wetlands Advisory Board, City Assembly, local citizens, resource agencies, and others involved in conservation and land management decisions within the Montana Creek Watershed.

The ecological and recreational value of this pristine watershed must be preserved and protected through informed land use planning and management decisions.

PHOTO BY RICH CULVER

WATERSHED DESCRIPTION

The watershed drains approximately 15.5 square miles (U.S. Geological Survey, 1998), originating in the mountains that divide the Juneau Ice Field to the east from the coastal forests and wetlands to the southwest. Montana Creek enters the Mendenhall River approximately one mile upstream of Glacier Highway, and Back Loop Road crosses Montana Creek approximately 1.5 miles upstream of its confluence with the Mendenhall River (See Map 1). For purposes of discussion, the portions of Montana Creek upstream and downstream of Back Loop Road will be referred to as "upper" and "lower" Montana Creek in this report.

Meltwater from McGinnis Creek contributes to the pristine headwaters of Montana Creek.
PHOTO BY M. ELFERS

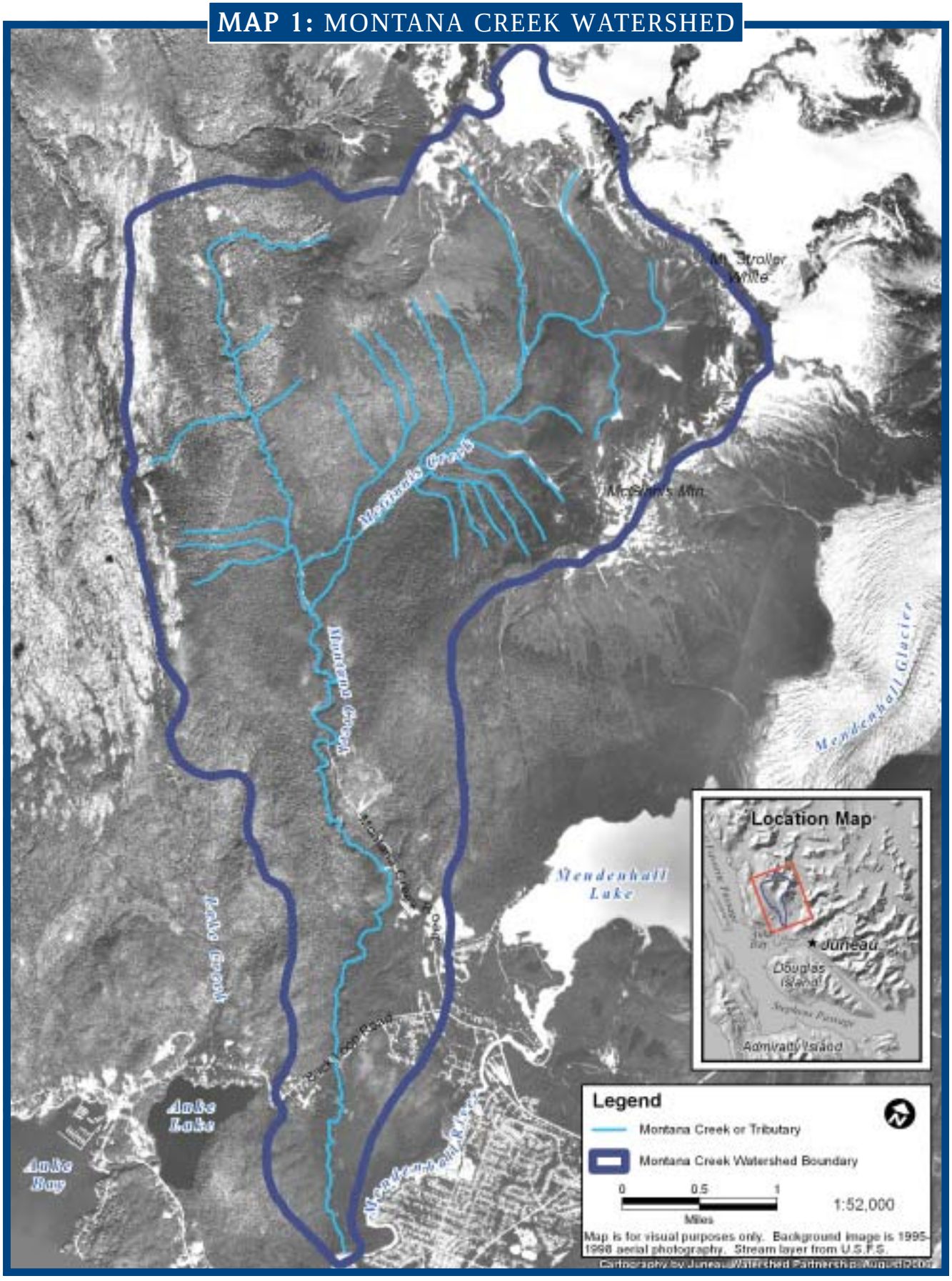
McGinnis Creek drains meltwater from Mounts McGinnis and Stroller White, and is the primary tributary to Montana Creek. Both creeks begin as high gradient streams in the headwaters, transitioning to lower gradient as they flow out of the mountains. The gradient of lower Montana Creek is low at 0.35% slope at Back Loop Road, and decreases to 0.09% near its confluence with the Mendenhall River (Adamus Resource Assessment, 1987).

The U.S. Geological Survey (USGS) maintains a stream gage on Montana Creek (station i.d. 15052800), located just upstream of Back Loop Road. Periodic stream flow data for Montana Creek has been recorded since 1965. For the period of record, mean monthly discharge ranges from 43 to 172 cubic feet per second (cfs). A peak flow of 3,850 cfs was recorded on October 20, 1998, and the minimum discharge of 3.4 cfs was recorded on February 8, 1972 (USGS, 1965-2006). According to National Weather Service information, 50% of the 15 feet or greater flood events on Montana Creek have occurred since 1995.

Some instantaneous discharge measurements have been taken in conjunction with USGS water quality studies on upper Montana Creek (station i.d. 15052780, upstream of the McGinnis Creek confluence) and McGinnis Creek (station i.d. 15052790) in 1985-1986. Discharge measurements were taken within one hour or less of each other during the study period. McGinnis Creek contributed more than half of the total flow measured at both locations for about 75% of the data readings collected. Additional research would be necessary to assess the hydrology of the entire watershed, but it is likely that discharge in both streams is influenced by climatic factors which may vary seasonally and between drainages.

Some of the wetlands in Montana Creek are connected to the main channel via surface hydrology, while others may contribute to the creek via groundwater. Wetlands in the Montana Creek drainage are primarily bogs and reed-sedge wetlands. The wetlands in the northern part of the watershed appear to act as discharge areas for groundwater flowing in moraines that cross the Mendenhall Valley. In other areas, wetlands help recharge local groundwater flow. Hydrologic modeling studies conducted on the 268-acre bog located downstream of Back Loop Road between the Montana Creek main channel and the Mendenhall River indicate that the wetland

MAP 1: MONTANA CREEK WATERSHED



serves as a buffer for surface runoff, reducing peak discharge in Montana Creek by as much as 187 cfs in July (Adamus Resource Assessment, 1987). This area also comprises a significant portion of the FEMA 100 year floodplain of lower Montana Creek.

Subdivision and Gravel Pit off Montana Creek Road.
PHOTO COURTESY OF CITY AND BOROUGH OF JUNEAU

Mendenhall Valley geology consists primarily of glacial, glacio-marine, and alluvial deposits overlying a northwest-trending belt of metamorphosed volcanic and sedimentary bedrock. Surficial geology in the Montana Creek watershed ranges from exposed bedrock to soils that are several feet deep, depending on location and slope (Alcorn and Hogan, 1995; Schoephorster and Furbish, 1974). Downstream of Back Loop Road, much of the channel flows through well drained, shallow soils on steep slopes or poorly drained, deep soils containing layers of peat and sand (Schoephorster and Furbish, 1974).

Much of the canopy cover in the watershed is closed Sitka spruce-western hemlock forest (Viereck et al., 1992). There are also areas that are above treeline as well as low-lying muskegs or meadows. The forested understory includes salmonberry, blueberry, devil's club, ferns, skunk cabbage, horsetail, and other herbaceous plants. Riparian areas may be populated by alder, willow, sedges, grasses, or the dominant tree species. Open, non-forested areas primarily occur in the middle portion of the watershed, upstream and downstream of where the stream crosses Back Loop Road. These areas are dominated by sedge wetlands or muskegs, and include a variety of grass species, rushes, and herbaceous plants.

Raptors, waterfowl, and songbirds frequent most of the watershed. Small mammals such as porcupine, beaver, red squirrel, voles, weasels, and mink are likely year-round residents. Large mammals such as black and brown bear, Sitka black-tailed deer, wolves and mountain goats live in portions of the watershed for at least part of the year. River otters have been observed in the lower stream reaches.

FISH AND FISH HABITAT

Both Montana and McGinnis Creeks support wild stocks of anadromous and resident fish. McGinnis Creek is cataloged by the Alaska Department of Fish and Game (ADF&G) for coho salmon (stream number 111-50-10500-2003-3060-4019), while Montana Creek is listed for coho, pink, and chum salmon, steelhead trout, and Dolly Varden char (stream number 111-50-10500-2003) (Johnson and Weiss, 2006). Bethers et al. (1995) also include chum and pink salmon, Dolly Varden char, and cutthroat trout as being present in McGinnis Creek, and state that sockeye salmon and cutthroat trout have been observed in Montana Creek.

As a sport fishery, Montana Creek is unique because it is located close to a densely populated area, yet it remains mostly undeveloped with pristine habitat and clean water.

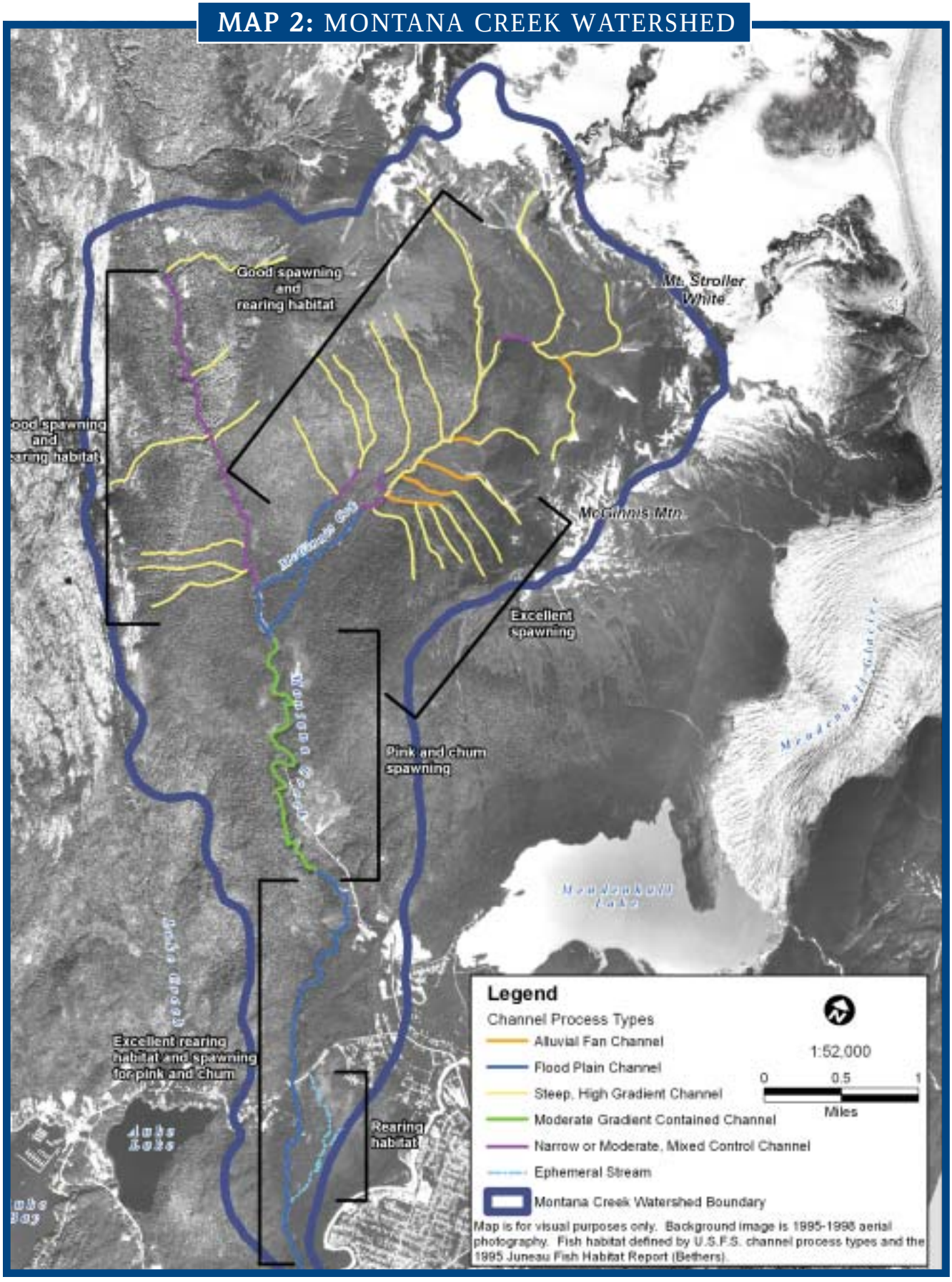
This fishery is supported by excellent spawning and rearing habitat throughout both Montana and McGinnis Creeks. The absence of fish barriers opens up rearing and spawning habitat along most of the creek (See Map 2). Much of the spawning habitat is located in the mid to upper stream reaches, while rearing habitat is primarily found in the lower gradient sections of the stream. Excellent seasonal rearing habitat is also found in side channels flowing through wetland areas in the lower watershed (Bethers et al., 1995).

As a sport fishery, Montana Creek is unique because it is located close to a densely populated area yet it remains mostly undeveloped with pristine habitat and clean water.

Bright coho salmon from Montana Creek.
PHOTO BY RICH CULVER

The coho salmon fishery is extremely productive in Montana Creek due to the rare combination of both abundant spawning and abundant rearing habitats. Coho salmon require gravel streambeds with specific gradients for spawning so that water flow aerates the eggs. Upon hatching, the coho fry rear in freshwater systems for one year before going out to saltwater. They need side channels and areas of slow moving water to provide protection from predators and high water conditions in their first year. Additionally, these slow areas often produce high populations of macroinvertebrates that coho fry rely on for food (O'Clair et al., 1992).

MAP 2: MONTANA CREEK WATERSHED



Evidence of the valuable habitat for coho salmon in Montana Creek is seen in the ADF&G's salmon counts over the past twenty years. Based on foot survey counts averaging 1,300 coho annually between 1989 and 1998, biologists estimate that 7,000 coho salmon return each year to Montana Creek (Schwan, 1999). ADF&G also reports that their biological escapement goal, or the required number of salmon returns to a stream for a sustainable run, has been met or exceeded twenty two times since 1981 (Clark, 2005).

The abundant populations of chum and pink salmon create excellent foraging conditions for Dolly Varden char. The salmon lay their eggs in the gravel beds in mid-summer and the Dolly Varden follow the spawning salmon and eat the stray eggs (O'Clair et al., 1992). When the eggs hatch in the spring, the Dolly Varden supplement their diet with salmon fry that are going out to saltwater. According to a mark and recapture study conducted in 1983, the habitat in the Montana Creek system supported 19,000 Dolly Varden (Bethers et al., 1995).

Montana Creek plays a crucial role for populations of Dolly Varden and cutthroat trout along the entire Juneau road system during several life history stages. ADF&G studies have shown that Dolly Varden and cutthroat trout that spend the winter in Auke Lake move freely into and out of Montana Creek (Jones and Seifert 1997; Jones and Harding 1998). This further emphasizes the important role Montana Creek plays to the healthy populations of Dolly Varden and cutthroat in the Juneau area.

…the habitat in the Montana Creek system supported 19,000 Dolly Varden.

BETHERS ET AL., 1995

Dolly Varden caught in Montana Creek.
PHOTO BY JOHN HYDE

…biologists estimate that 7,000 coho salmon return each year to Montana Creek.

SCHWAN, 1999

The water quality in Montana Creek affects fish and fish habitat significantly. The little data that is available indicates good water quality with a minimum of contamination. Studies show that dissolved oxygen has consistently exceeded the Alaska Department of Environmental Conservation water quality standards, and levels of pollutants such as lead, iron, suspended sediment, and diesel range organics have been low (Hood et al., 2003; Hood and Byers, 2004; USGS water quality data, 1985-1986). A small tributary stream located near the Hank Harmon Rifle Range exhibited higher iron concentrations than elsewhere in Montana Creek, and suspended sediment concentrations were generally higher at sampling sites located where the creek is accessible by road (Hood et al., 2003). The introduction of excess sediment from roads may clog interstitial spaces in salmon spawning beds.

RECREATIONAL USE AND OPPORTUNITIES

In 2006, the Juneau Economic Overview found "quality of life" and "abundance of outdoor recreation opportunities" as the top two reasons why people choose to live in Juneau (McDowell Group, 2006). The Montana Creek watershed is used by residents and tourists for hiking, snowshoeing, skiing, hunting, fishing, shooting, horseback riding, archery, wildlife viewing and photography, camping, recreational gold panning, berry picking, ATV riding and snowmobiling (Adamus Resource Assessment, 1987; Bethers et al., 1995). The close proximity to highly populated areas and good access make Montana Creek a popular destination.

In 2006, the Juneau Economic Overview found "quality of life" and "abundance of outdoor recreation opportunities" as the top two reasons why people choose to live in Juneau

MCDOWELL GROUP, 2006

The primary focus of the sport fishery is on coho salmon and Dolly Varden char, however, pink salmon, chum salmon, and cutthroat trout also inhabit the stream (Bethers et al., 1995). Additionally, adult king salmon have been observed spawning in certain reaches of the creek as recently as July 2006. The Division of Sport Fish's Statewide Harvest Survey (Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson, 2006) shows a range of annual angler user days over the last decade from 1,570-3,993, with several hundred coho harvested each year (see Appendix A).

Existing recreational facilities, including the Community Gardens, Juneau Gun Club, Archery Range and the Hank Harmon Rifle Range (pictured here) would be maintained under the proposed stream corridor.

PHOTO BY MARK KAELKE

Currently there are several trails along portions of Montana Creek. In the lower reach, ADF&G and CBJ built a trail in 1989 connecting the Mendenhall River to the rifle range. This trail facilitates access to the creek, however it is not maintained. A second section of trail in the upper reaches begins along a Department of Transportation right of way and extends upstream to a U.S. Forest Service trail that connects to Windfall Lake.

Local fisherman, seasonal visitors, and the public depend on these trails for access to the excellent fishing grounds. The protection and improvement of these trails will benefit TU members as well as all residents of Juneau seeking outdoor recreation.

DEVELOPMENT, ZONING, AND LAND USE DESIGNATION

In the past eighty years, the increase in Juneau's population and the development of the Mendenhall Valley have critically impacted streams and watersheds. Watersheds such as Duck Creek have suffered from a lack of stream setbacks and prudent land use designations and zoning. With the population boom spanning the 1960s-1980s, infrastructure and residential development sprawled throughout the valley.

Land use adjacent to Mendenhall Valley streams has changed over time from homestead agriculture to higher density residential and commercial development.
FARM IN THE LOWER DUCK CREEK WATERSHED, CIRCA 1910 (WINTER AND POND COLLECTION)

In 1987, approximately 36% of the Duck Creek Watershed was categorized as impervious surface, including streets, driveways, and rooftops (Koski and Lorenz, 1999). The stormwater runoff and pollution that resulted contributed to reduced water quality, loss of floodplain function, and the degradation of salmon and bird habitat. In 2003, Duck Creek was rated the lowest for quality of aquatic habitat of all streams studied in Southeast Alaska (Rinella, et al., 2003). As a result, significant amounts of money (at least $1 million according to one estimate), time and effort have been invested in the restoration of the Duck Creek watershed and its stream corridor by the CBJ and state and federal agencies over the past ten years (Koski and Lorenz, 1999).

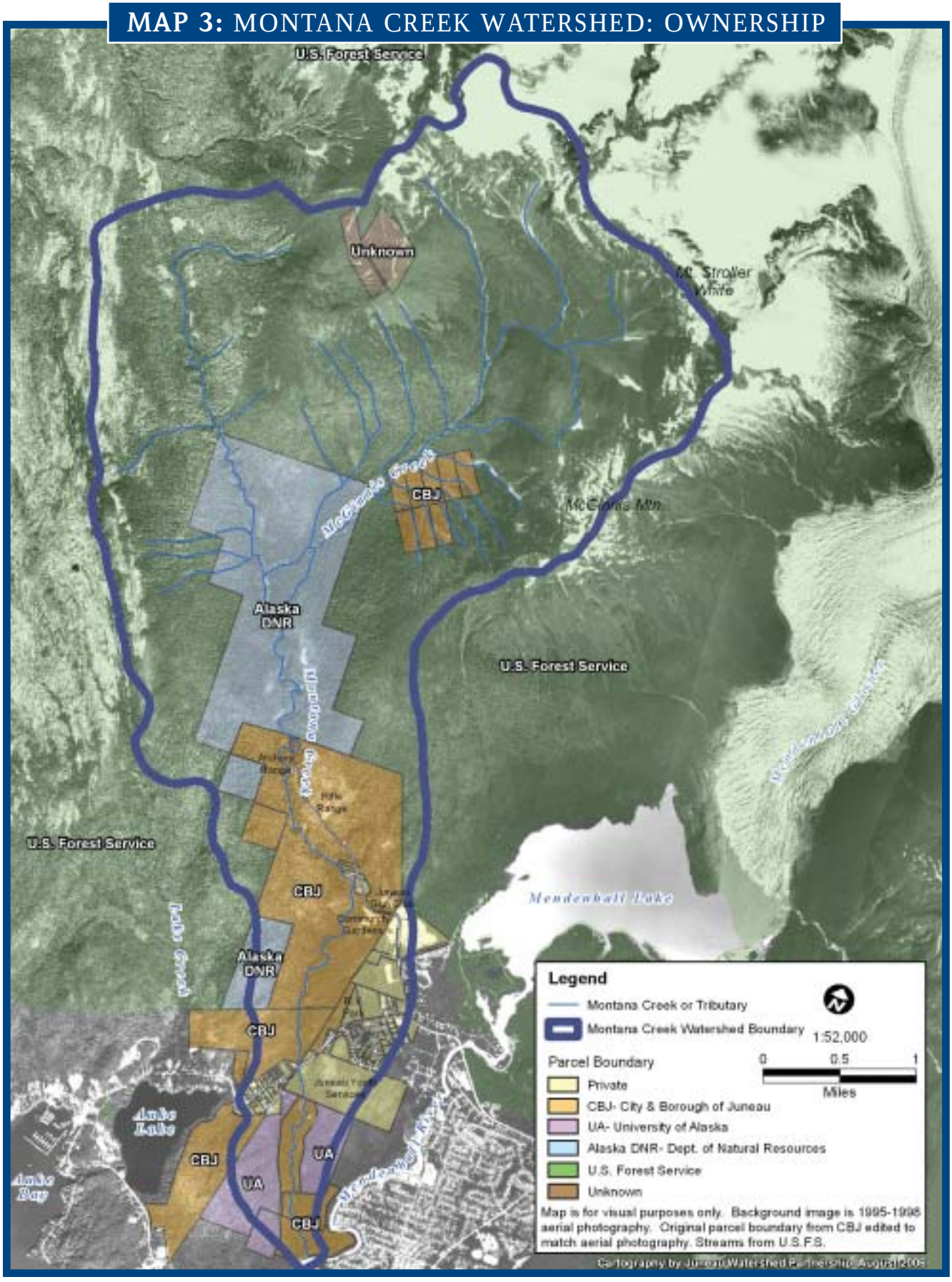
To avoid repeating the mistakes that occurred in the Duck Creek Watershed, forward-looking municipal planning should recognize the existing multiple uses and values of the riparian lands in the Montana Creek Watershed. With increasing pressure for affordable housing and other development, a comprehensive plan that recognizes habitat, education and recreation assets within the watershed is crucial.

An analysis of the land use designations and zoning in the Montana Creek Watershed reveals a lack of cohesion in planning as well as a trend towards increased residential housing density. Current land ownership consists of federal, state, CBJ and private lands (See Map 3). The U.S. Forest Service owns the land in the headwaters of the watershed, the Alaska Department of Natural Resources manages a large portion of land in the central watershed, and CBJ owns large parcels in the mid to lower reaches of the watershed. Private land ownership is mostly concentrated in the downstream reaches east of the creek.

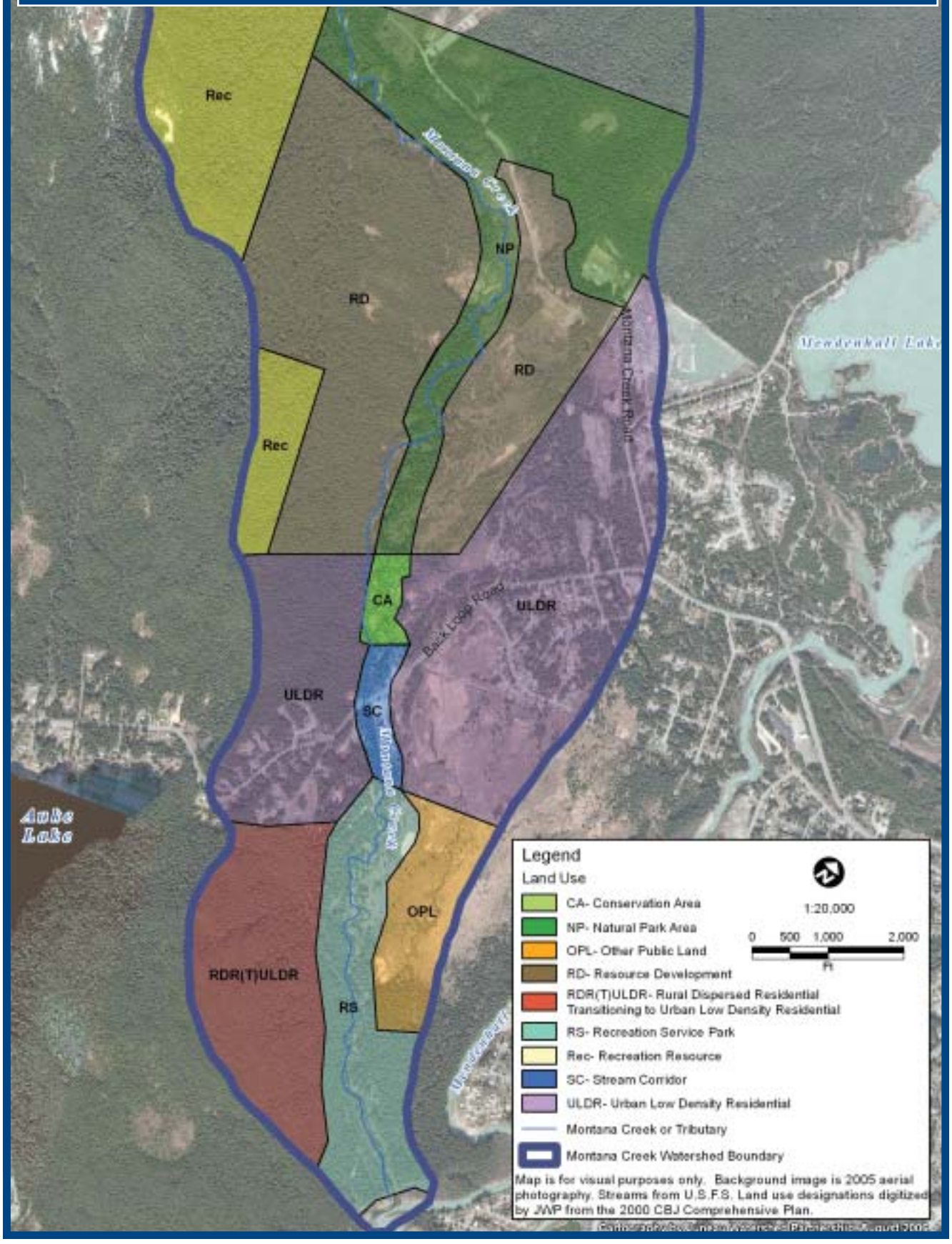
Land Use Designations (LUDs) guide land use decisions throughout the CBJ and private lands in the watershed. There are currently four separate LUDs along the Montana Creek stream corridor (See Map 4). The 1997 Parks and Recreation Comprehensive Plan describes each area as follows:

- Conservation Area (CA) -An area of high environmental value with recreation as a secondary objective.
- Recreation Service Park (RS) - A more highly developed park for more programmed recreation.
- Natural Park Area (NP) -A less structured park area for outdoor pursuits.
- Stream Corridor (SC) - Open space in recognition of anadromous stream corridors

MAP 3: MONTANA CREEK WATERSHED: OWNERSHIP



MAP 4: MONTANA CREEK WATERSHED: 2000 CBJ LAND USE DESIGNATION



Additionally, much of the land surrounding the current stream corridor is designated RD (Resource Development) or ULDR (Urban Low Density Residential). A unified and complimentary set of land use designations is needed for the corridor. Additionally, a wider corridor is needed to buffer the creek from potentially harmful effects of development on the surrounding land.

There is a pattern of higher density development moving towards the Montana Creek area. A brief survey of zoning changes since 1965 in this area reinforces the complexity of land use in the watershed (See Table 1). The original zoning along Montana Creek was Agricultural and Forest Land in 1965. In 1969, development pressures in the valley opened portions of the lower watershed for development of single-family and duplex residences with a density of one unit per acre. Between 1987 and 2006, significant changes in zoning become apparent (See Map 5). Most of the land in the upper Montana Creek Watershed is zoned for Rural Reserve. This type of zoning is defined as public lands managed for conservation and development of natural resources, and for future community growth (CBJ, 1987). The Rural Reserve designation allows for such land uses as residential development, resource extraction activities, and development of recreational facilities (CBJ Land Use Ordinance 49.25.200, and Table 49.25.300). The remaining land is primarily residential zoning for building densities of one to five units per acre. However, it is interesting to note that the amount of available D1 designation (Single Family and Duplex one unit per acre area) has decreased since 1987 and has been converted to D3 and D5, or three to five units per acre (CBJ, 1987 and 2005). Much of this density shift has occurred through site-specific re-zoning requests.

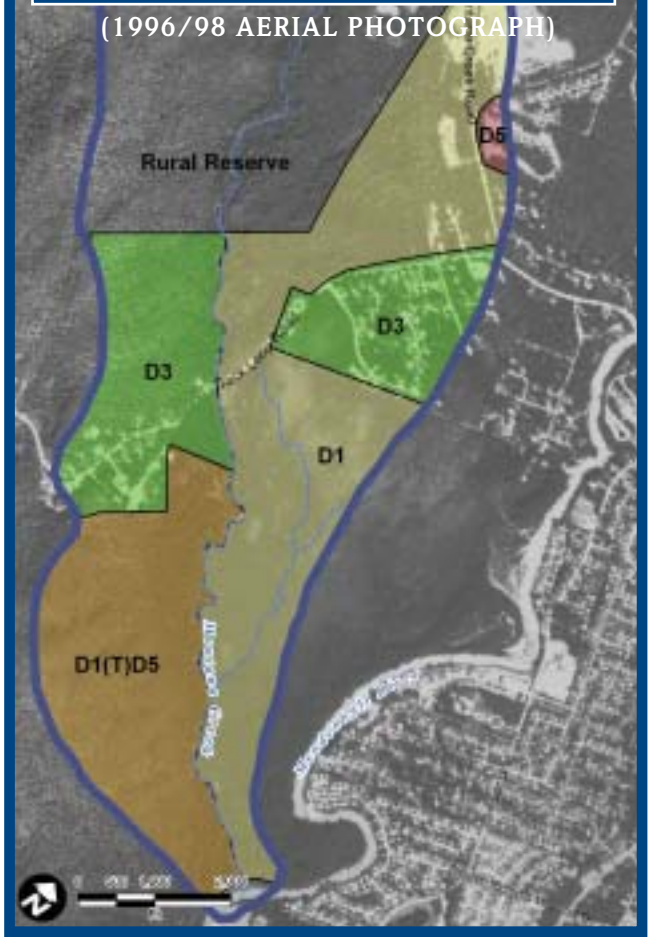
As seen in the recent zoning changes to higher densities there is pressure to develop in the Montana Creek Watershed. Without forward-looking planning and a thorough understanding of the value of the watershed to the community, conflicts may arise between residential, resource development, and recreational uses.

TABLE 1.
CHANGES IN CBJ ZONING IN THE MONTANA CREEK WATERSHED (CBJ 1965, 1969, 1987, AND 2005).

Year	Area	Zone	Description
1965	Entire creek corridor	AF	Agricultural and forest land
1969	Lower watershed, including west side of Mendenhall River	R40	Residential reserve, with 40,000 square foot minimum lot size.
1987	East side of lower and upper creek	D-1	Single-family and duplex residential development at one dwelling unit/acre.
	West side of lower creek	D-1(T) D-5	Transition from single-family and duplex residential development at one dwelling unit/acre to an allowable five units/acre after sewer and water are provided.
	West side of creek at Back Loop Rd. and upstream to U.S. Forest Service boundary	D-3	Single-family and duplex residential development at three dwelling units/acre.
	Creek corridor upstream of U.S. Forest Service boundary	RR	Rural reserve - public lands managed for conservation and development of natural resources, and for future community growth.
2005	East side of lower creek	D-1	Single-family and duplex residential development at one dwelling unit/acre.
	West side of lower creek	D-1(T) D-5	Transition from single-family and duplex residential development at one dwelling unit/acre to an allowable five units/acre after sewer and water are provided.
	West side of creek adjacent to Back Loop Rd.	D-3	Single-family and duplex residential development at three dwelling units/acre.

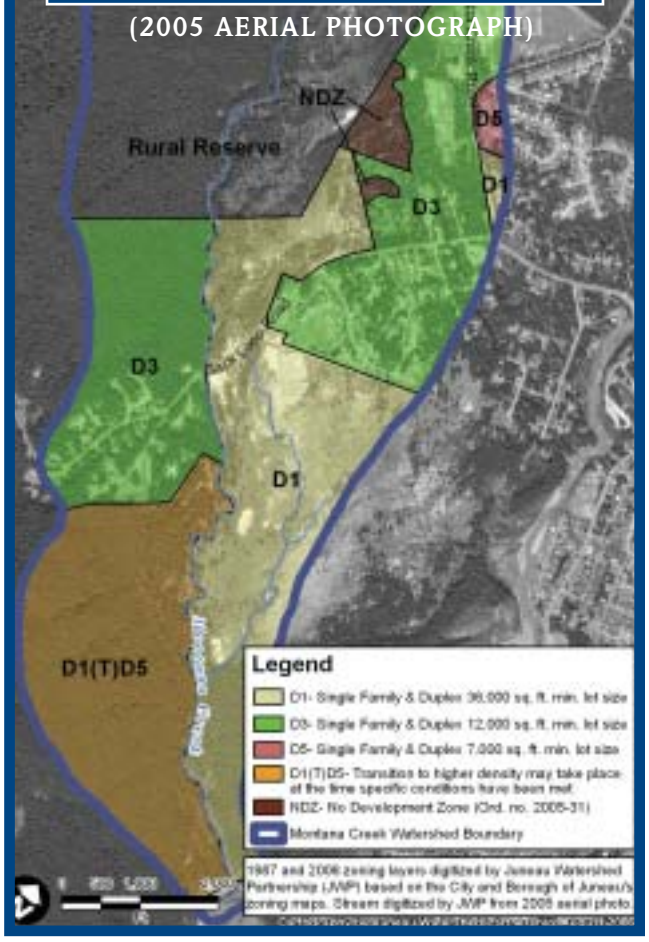
MAP 5A: MONTANA CREEK WATERSHED: 1987 ZONING

(1996/98 AERIAL PHOTOGRAPH)



MAP 5B: MONTANA CREEK WATERSHED: 2006 ZONING

(2005 AERIAL PHOTOGRAPH)



Recent zoning changes in the watershed are trending toward higher densities.

EXISTING HABITAT PROTECTION

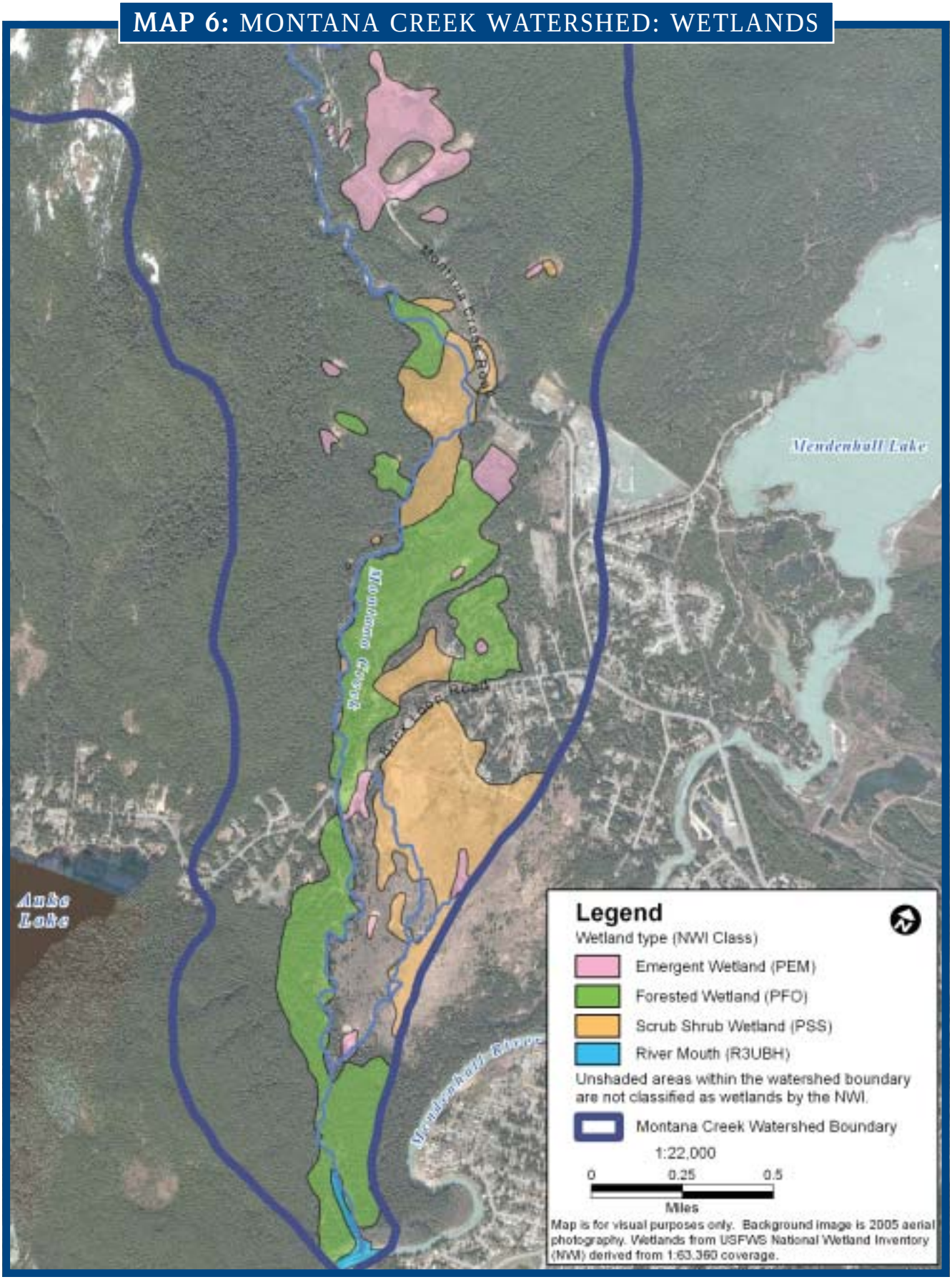
The Juneau Coastal Management Program (1986) currently includes a 50 foot setback for development adjacent to anadromous streams or lakes, and states that the setback area should be vegetated or revegetated to "maximize shade on the stream." This requirement for riparian vegetation is reinforced in Section 49.70.950 of the local Land Use Ordinances. In addition, there is a no disturbance zone established within 25 feet of anadromous water bodies (CBJ Land Use Ordinance 49.70.310). Despite these regulations, structures and facilities exist within the 50 foot setback along Montana Creek. These include an unpaved road, retaining walls, and houses that straddle the stream itself in the reach downstream of the rifle range.

There are several large wetland areas in the Montana Creek Watershed (See Map 6). Most of the designated wetlands in the Montana Creek area are Category A, or high-value wetlands. CBJ adopted the following administrative policies in relation to Category A wetlands to include:

- Seek acquisition of Category A wetlands.
- Retain ownership and manage Category A wetlands for environmental protection.
- "Generally" keep Category A wetlands in their natural condition. However, Category A wetlands may be developed if "there is no net loss of individual functional values" within a given wetland unit (Juneau Wetlands Management Plan, 1997).

Even with this administrative policy, development has occurred on Class A wetlands near Montana Creek.

MAP 6: MONTANA CREEK WATERSHED: WETLANDS



THREATS TO MONTANA CREEK WATERSHED

The Montana Creek watershed provides excellent fish and wildlife habitat, and a variety of recreational and educational opportunities. Maintaining and protecting this high value stream is critical as urbanization of the Mendenhall Valley continues. Physical alterations to the stream channel and associated floodplain have contributed to declining water and fish habitat quality in other Juneau streams, such as Duck, Jordan, Lemon, and Vanderbilt Creeks. Historically, each of these creeks supported locally or regionally significant salmon fisheries. But development of the watersheds has degraded habitat and each of the streams is listed as "impaired" by the Alaska Department of Environmental Conservation (ADEC, 2006). The potential loss of important cutthroat trout spawning and rearing areas in Peterson Creek (North Douglas), due to the development of a golf course, also reinforces the importance of protecting Montana Creek. Potential threats to Montana Creek include development of floodplains and wetlands, contribution of non-point source pollutants from recreational and land uses, and continued or renewed resource extraction activities.

Low flows in Duck Creek concentrate naturally occurring iron flocculation, thus decreasing water quality.
PHOTO BY KOSKI AND LORENZ

Seasonal dry conditions in Duck Creek due to development and loss of adjacent wetlands.
PHOTO BY M. ELFERS

RECOMMENDATIONS

1. **Establish a Stream Conservation Corridor extending 500 feet from either bank of Montana Creek.**
2. **Protect all CBJ wetlands associated with Montana Creek.**
3. **Build a trail along Montana Creek and link it to the existing trail network.**
4. **Abandon both the potential road corridor connecting Montana Creek with the Herbert/Eagle River area via Windfall Lake and planning for a heliport.**
5. **Educate the public on stream stewardship.**
6. **Enforce laws and ordinances protecting fish habitat and watershed resources.**

1. Establish a Stream Conservation Corridor with a single land use designation extending 500 feet from either bank of Montana Creek as part of the Revised Comprehensive Plan (See Map 7).

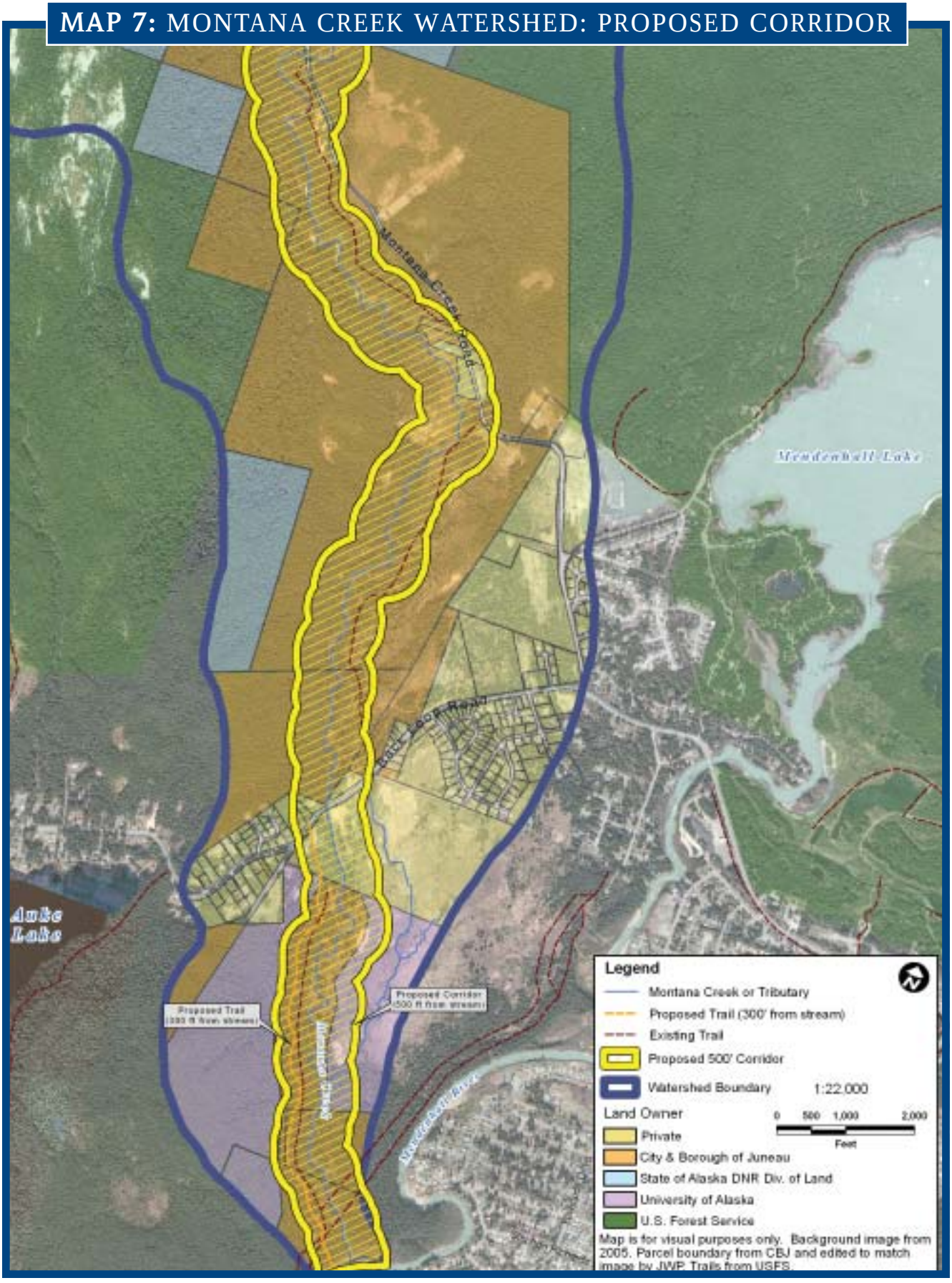
Currently there are a variety of buffer sizes and four separate LUDs along Montana Creek (See Figure 4). In order to effectively protect trout and salmon habitat unified and complimentary LUD's are needed. A wider corridor is needed to protect side channels that are vital salmon, trout, and char habitat. The proposed corridor will also protect Montana Creek from contaminated runoff resulting from urban pollution and sedimentation. Furthermore, much of the area inside the proposed corridor is unsuitable for development due to flood danger, stream channel migration, steep slopes, or designation as valuable wetlands. The proposed corridor is designed to acknowledge these conditions and more effectively protect the creek. A detailed rationale of this recommendation includes:

A) A WIDER BUFFER IS NECESSARY FOR FILTRATION As development increases around Montana Creek, a wider buffer is needed to protect the creek from pollution and urban runoff. Increased development in a watershed leads to increased impervious surfaces. Without filtration from soils and vegetation, runoff is transported more rapidly into creeks and sediment loads are increased (U.S. Environmental Protection Agency, 1993; Knighton 1998; Dunn and Leopold 1978). Studies have shown that excessive sediment increases the mortality of salmon eggs and sac fry within salmon redds. Sediment blocks the flow of oxygenated water over eggs and sac fry and effectively smothers them. (Bisson, 2003)

B) WETLANDS, TRIBUTARIES, AND SIDE CHANNELS Many side channels of Montana Creek, which often range outside the current buffers, provide excellent rearing habitat for salmon and trout. These channels may be old stream channels that now hold excess water or may drain adjoining wetlands. Protecting these critical rearing areas from development, habitat degradation, and maintaining their connectivity to Montana Creek will help ensure the health of salmon and trout populations.

C) 100-YEAR FLOOD PLAIN Much of the proposed corridor lies within the Federal Emergency Management Agency's 100-year floodplain. In several areas the 100 year flood plain stretches beyond the current buffers (See Map 8).

MAP 7: MONTANA CREEK WATERSHED: PROPOSED CORRIDOR



Furthermore, it does not take a major flood event to inundate the wetland areas surrounding Montana Creek. At the 15-foot water level, one stage below flood level, water starts to inundate the undeveloped wetlands adjacent to Back Loop Road. Water also begins flowing over the low water crossing on Montana Creek Road. Since 1966 there have been 16 occasions when Montana Creek has exceeded this level and flooded the road (USGS 1965-2006).

According to National Weather Service information, 50% of the 15 feet or greater flood events on Montana Creek have occurred since 1995.

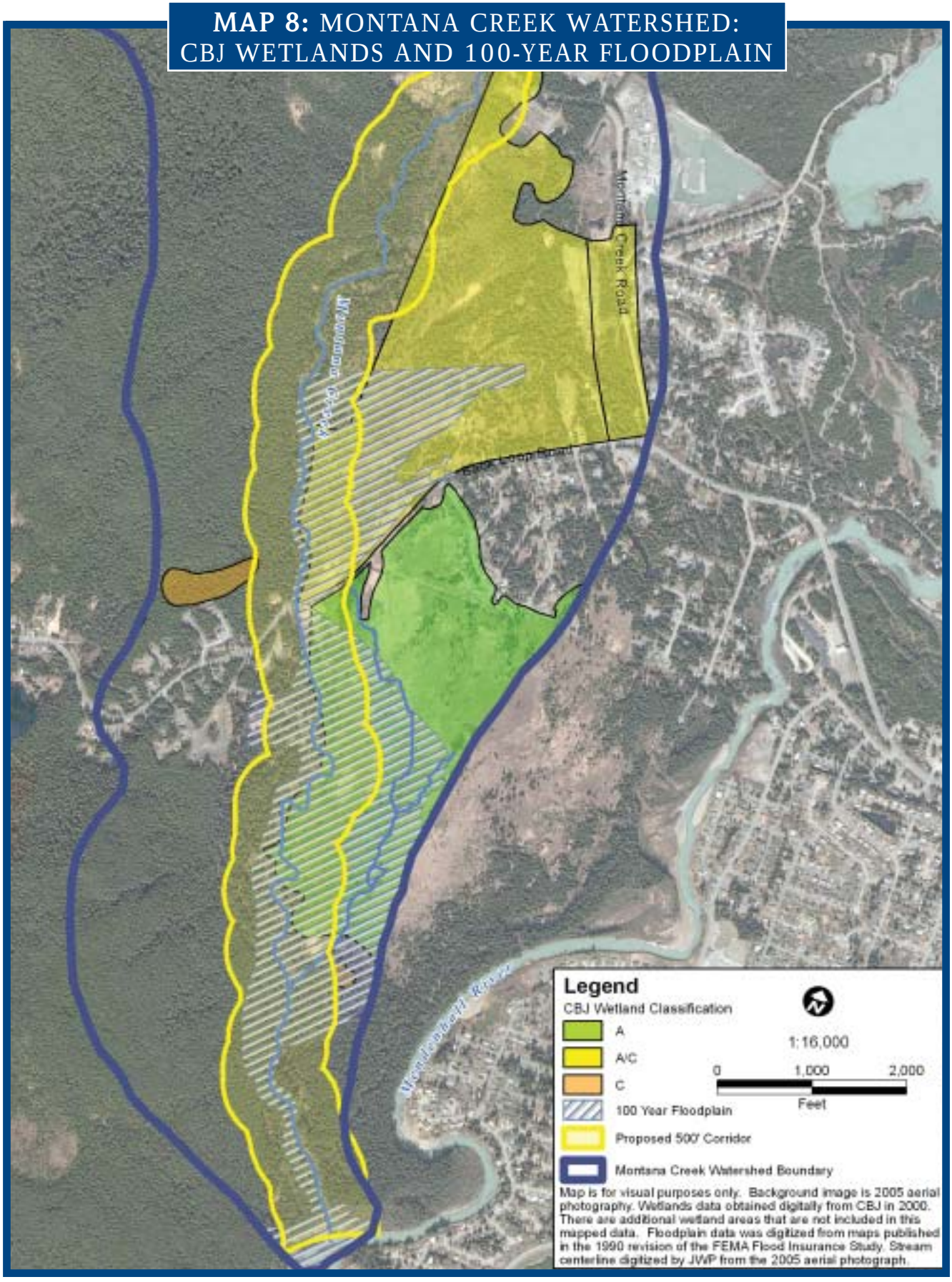
There have been several recent incidents where damaging flood levels have occurred. In October of 1998 Juneau received over 6 inches of rain and Montana Creek exceeded its 50-year flood level. There was also a high water event in September of 1996 when the creek exceeded its 10-year flood level (USGS 1965-2006).

D) CHANNEL MIGRATION ZONE A 500-foot corridor is needed on Montana Creek to allow for flooding due to natural stream migration. During a high water event in 1962, on a stretch near the Community Garden, Montana Creek's main channel jumped over 500 feet to the east. It later moved back to its original course. It is not known how many times this has occurred. In 1999, both the main channel and the old flood channel were carrying water. (Carstenson, 1999). This stream channel behavior can also be seen near the houses at the low water crossing on Montana Creek Road near the rifle range. Large culverts and extensive road work were implemented to accommodate increased stream flow as Montana Creek's main channel moves to the east.

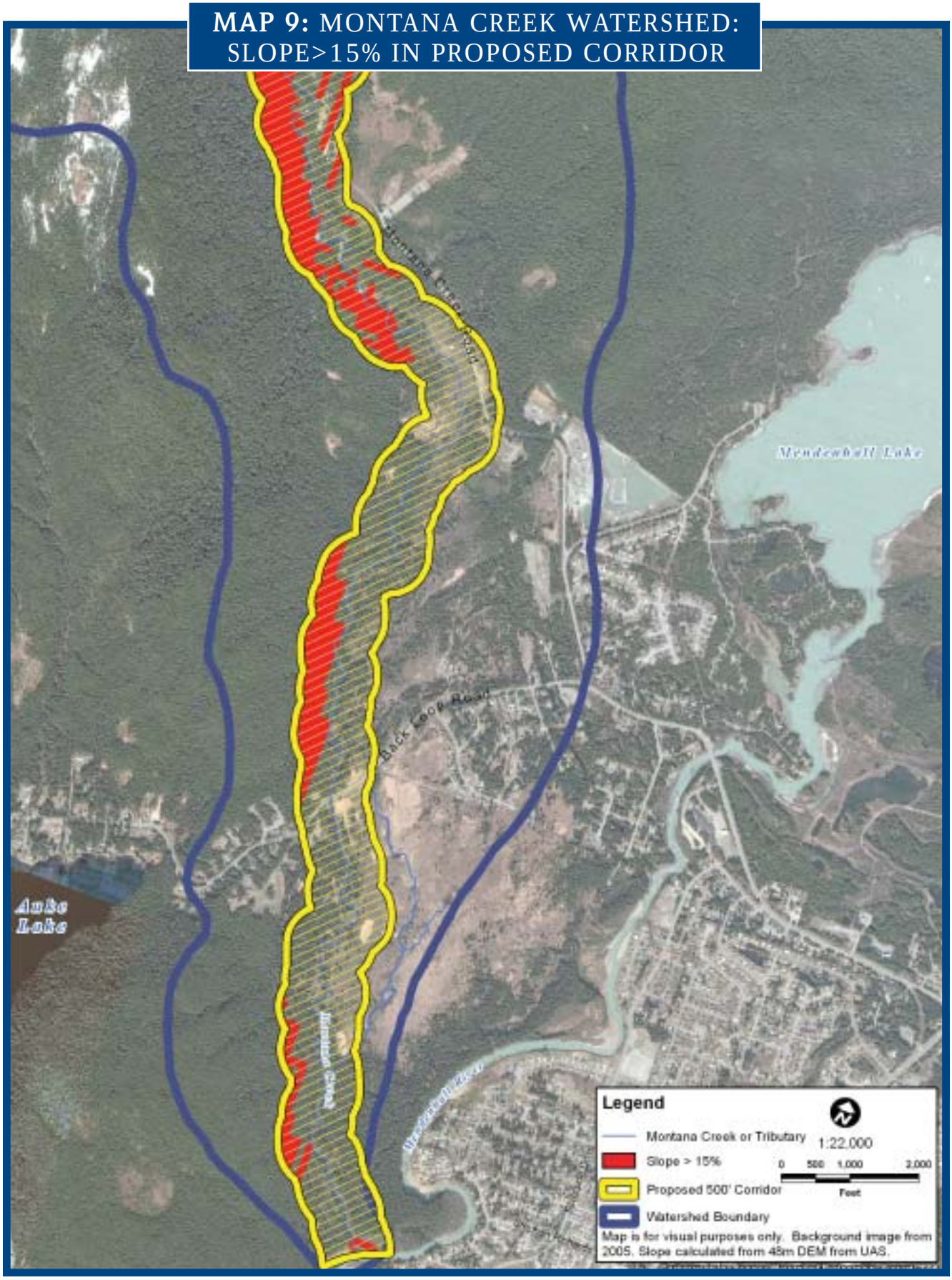
E) STEEP SLOPES Within the proposed corridor, an estimated 21.5% of the land is on slopes greater than 15%. Most of this land is either in the upper Canyon Stretch or on the steep hillside to the west of Montana Creek (See Map 9). These large

Migration of Montana Creek stream channel.
PHOTO COURTESY OF THE CITY AND BOROUGH OF JUNEAU

MAP 8: MONTANA CREEK WATERSHED: CBJ WETLANDS AND 100-YEAR FLOODPLAIN



MAP 9: MONTANA CREEK WATERSHED: SLOPE>15% IN PROPOSED CORRIDOR



areas of land cannot be developed under CBJ ordinance. Street construction on grades greater than 15% is restricted. In addition, despite the current shortage of affordable housing, the costs of developing housing on slopes 18% or greater make such land unsuitable for affordable housing on CBJ-owned property (CDD, Montana, 2006).

F) A UNIQUE AND VALUABLE AREA The proposed corridor is only .78 square miles or 5.1% of the entire 15.23 square mile Montana Creek Watershed. An estimated 74% of the corridor is classified as a wetland (combined CBJ & National Wetlands Inventory) and/or lies within the 100-year floodplain (See Figure 8). Such high value stream and wetland complexes are unique and increasingly rare in Juneau. Additionally, the existing recreational resources such as the Community Garden, Archery Range, Hank Harmon Rifle Range and Juneau Gun Club are valuable destinations for the public and are complementary to the goals of this proposal.

The proposed corridor is only .78 square miles or 5.1% of the entire 15.23 square mile Montana Creek Watershed.

G) DEVELOPMENT IN THIS CORRIDOR IS EXPENSIVE Development and resource extraction in the proposed corridor would be detrimental to potential homeowners, the CBJ, and Montana Creek. Allowing construction in the 100-year flood plain will cost taxpayers money in the future. Juneau taxpayers continue to pay for habitat restoration on Duck and Jordan Creek, reclamation of former gravel pits, and road and driveway maintenance on Montana Creek Road.

Trout Unlimited will work with private landowners, such as Juneau Youth Services and the University of Alaska, to find complimentary land use strategies for their property. Multiple win-win opportunities such as access easements, conservation acquisitions, and conservation easements exist to maintain the watershed character while providing incentives to adjacent landowners. Additionally, TU acknowledges that a future school site has been identified near the Community Garden, and is interested in helping guide its planning.

For a review of corridor and buffer width prescriptions please see Appendix B.

2. Protect all CBJ wetlands associated with Montana Creek.

CBJ should cease granting permits for development on Class A wetlands associated with Montana Creek. According to the CBJ's Land Use Code and Wetlands Management Plan Category A wetlands "may only be developed if there is no net loss of individual functional values in a wetland unit. One environmental function cannot be substituted for another."

Wetlands in the Montana Creek watershed provide benefits such as flood attenuation, groundwater recharge, nutrient storage and contributions to surface water systems, and fish and wildlife habitat (Adamus Resource Assessment, 1987). Some protection of wetlands is provided through the CBJ Wetland Management Plan (1997); however development in wetland areas still occurs. Acquiring high value wetlands with protective easements will maintain both wetland and stream functions.

3. Build and maintain a trail along Montana Creek and link it to the existing trail network.

In the CBJ West Mendenhall Valley Greenbelt Plan a proposed trail parallels Montana Creek to the west. The trail connects the existing paved bike path along

the Mendenhall River to Back Loop Road. It then continues on the east side of the creek to Montana Creek Road near the Community Garden (See Figure 7).

We propose the construction and maintenance of a gravel trail for non-motorized use, similar to the recently improved Herbert River Trail. To avoid conflicts with private property owners and wildlife habitat along the stream banks, it would be sited a minimum of 300 feet from Montana Creek and a minimum of 100 feet from the outer boundary of the corridor.

Currently this stretch of Montana Creek is very difficult to access due to a lack of connectivity between existing trails and their unmaintained condition. This trail will greatly increase access for hikers, anglers, and other user groups. It will fulfill the CBJ Greenbelt Master Plan goal of connecting neighborhoods with trails and will offer an ideal connection to a trail circumnavigating Auke Lake.

4. Abandon the potential road corridor connecting Montana Creek with the Herbert/Eagle River area via Windfall Lake and discontinue all planning for a remote heliport site in the Montana Creek watershed.

Constructing either a road along this corridor or a heliport within the watershed would be detrimental to the recreational values enjoyed by current users and would pose serious threats to water quality, fish and function of adjacent riparian habitat.

Recent collaborative flight routing and noise reduction efforts have been effective in reducing helicopter impacts. We believe that these strategies are preferable to incurring the massive expenditures and impacts of a remote heliport. A major road would undermine the integrity of the watershed and is not needed.

5. Educate the public on stream stewardship.

The Chapter is very interested in partnering with CBJ Parks and Recreation to promote educational opportunities that a pristine Montana Creek riparian area offers. Trout Unlimited has several programs designed to educate and involve youth with fishing and cold water conservation that the Juneau Chapter plans to make available to local students. A healthy Montana Creek will be an ideal location for these programs and will represent a living laboratory for other areas of study by Juneau students as well as the University of Alaska.

6. Enforce laws and ordinances protecting fish habitat and watershed resources.

Illegal off-road vehicle use in the upper watershed has damaged wetlands adjacent to Montana Creek as well as portions of the McGinnis Creek headwaters. While ATVs are allowed on the road right-of-way in upper Montana Creek, off-road vehicle recreation is subject to local ordinances governing riparian disturbance as well as state regulations that protect anadromous fish habitat (AS 41.18.870). Enforcement is difficult and often does not occur. Trout Unlimited proposes partnering with the Juneau Police Department and Alaska State Troopers so that off-trail ATV use and illegal dumping may be curtailed. In addition, the Juneau Chapter of TU will explore options for obtaining and placing increased and improved regulatory and interpretative signage along the stream corridor.

Damage from off road vehicles adjacent to Montana Creek.
PHOTO BY MARK KAELKE

CONCLUSION

With the update of the Juneau Comprehensive Plan, the public and municipal decision makers have the opportunity to proactively preserve and protect the most valuable clear water stream in the Mendenhall Valley. Thoughtful and intelligent protection of resources in the Montana Creek Watershed produces *ecological* and *economical* benefits.

A 500 foot no-development / recreational corridor adjacent to Montana Creek promotes the sustainability of the high quality fish habitat and recreational opportunities. The establishment of an adequate riparian buffer will protect the stream from the detrimental impacts of unplanned development that Juneau has seen in Duck and Jordan Creek. The lack of buffers along these streams continues to cost the city money for rehabilitation.

Similarly, the restriction of development in Class A wetlands maintains the filtration of sediment and contaminants in runoff. These wetlands prevent fine sediment from degrading the vital spawning and rearing habitat that supports Montana Creek's thriving fish populations.

Many of us live here because we love the beauty and accessibility of the Alaskan outdoors. To us, Montana Creek is unique because of the abundant fishing opportunities that are so close to our homes. We need to protect this resource for our enjoyment and for the benefit of future generations.

PHOTO BY MARK KAELKE

APPENDIX A: MONTANA CREEK ANGLER EFFORT AND CATCH RATES

Year	ANGLER EFFORT (angler days)	COHO SALMON Harvest	COHO SALMON Catch	PINK SALMON Harvest	PINK SALMON Catch	CHUM SALMON Harvest	CHUM SALMON Catch	CUTTHROAT TROUT Harvest	CUTTHROAT TROUT Catch	DOLLY VARDEN Harvest	DOLLY VARDEN Catch
1992	608	97	308	27	27	15	15	27	101	74	410
1993	770	134	525	0	0	0	26	0	45	28	697
1994	735	208	344	0	256	0	241	0	197	9	1381
1995	2045	255	652	0	106	69	231	34	143	104	1076
1996	2241	353	1010	20	386	33	563	0	158	473	7362
1997	2448	218	303	0	1227	205	777	0	71	591	5479
1998	2221	274	684	0	605	0	206	67	741	349	7056
1999	2069	230	680	0	439	14	213	58	408	429	1841
2000	2763	324	497	0	154	26	530	9	151	534	2683
2001	3993	301	641	133	2121	39	1115	96	741	508	8722
2002	3015	658	1905	73	1652	0	277	37	1022	174	7676
2003	2229	361	734	0	954	11	199	47	127	302	2913
2004	1570	90	194	0	307	0	47	0	65	40	1895
2005	1782	264	686	0	235	0	191	20	91	165	1228

Source: Unpublished data from Alaska Department of Fish and Game, Sport Fish Division Research and Technical Services database.

PHOTO BY JOHN HYDE

PHOTO BY RICH CULVER

APPENDIX B: ADDITIONAL REFERENCES FOR RIPARIAN BUFFERS

In a comprehensive review of riparian literature, Scheuler and Holland state that the typical minimum base width recommended to provide adequate stream protection is 100ft, noting that buffers may be expanded beyond the 100ft minimum to incorporate the following conditions:

- The full extent of the 100-year floodplain.
- Steep slopes greater than 25%.
- Adjacent delineated wetlands or critical habitats.
- Higher order or quality streams.

Scheuler, T.R. and H.K. Holland, eds. The Practice of Watershed Protection. Center for Watershed Protection: Elliott City, Maryland. 2000.

The City of Everett, Washington conducted a review of riparian literature and, as applied to the riparian function requirements of their community, came up with the following buffer width recommendations:

- Sediment Retention and Filtration: 100 ft.–300 ft.
- Bank Stability: 100 ft.–125 ft.
- Small Woody Debris: 250 ft.
- Shade/Water Temperature: 35 ft.–250 ft.
- Water Quality: 13 ft.–600 ft.
- Wildlife Habitat: 30 ft.–1000ft.

Everett, Use of Best Available Science in the City of Everett Buffer Regulations: Non Shoreline Streams. Prepared for the City of Everett by The Watershed Company, Kirkland, Washington. 2003.

From a review of over 140 books and articles performed to establish a legally defensible basis for determining buffer width, extent, and vegetation, the author concludes that the following general prescription provides the greatest level of protection for stream corridors, including good control of sediment and other contaminants, maintenance of quality aquatic habitat, and some minimal terrestrial habitat:

- Base width: 100 ft. plus 2 ft. per 1% of slope.
- Extend to the edge of the floodplain.
- Include adjacent wetlands. The buffer width is extended by the width of the wetlands, which guarantees that the entire wetland and an additional buffer are protected.
- Existing impervious surfaces in the riparian zone do not count toward buffer width.
- Slopes over 25% do not count toward the buffer width.
- The buffer applies to all perennial and intermittent streams.

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HOW YOU CAN GET INVOLVED WITH TROUT UNLIMITED

Trout Unlimited is increasing its efforts in Alaska, with the opening of the State Office in Juneau in 2005 and the re-building of the Juneau Chapter. But, we need help from our members and other concerned citizens to ensure success in our local and regional efforts. To find out more about our work in Alaska and to get involved please see www.tujuneau.org or call us at 907/790-8876.