Watershed Resource Action Plan

Chena River Watershed

Focal Resources / Conservation Targets

1	Alpine Tundra - Upper Chena
2	Boreal Forests - Upper Chena
3	Boreal Forests - Lower Chena
4	Tributaries - Upper Chena
5	Tributaries - Lower Chena
6	Sloughs and Wetlands - Upper Chena
7	Sloughs and Wetlands - Lower Chena
8	Mainstem River & Major Forks - Upper Chena
9	Mainstem River & Major Forks - Lower Chena
10	Confluence with Tanana
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Project Information

Project Area Description

The Chena River is a tributary of the Tanana River and originates in a mountainous area about 90 miles east of the city of Fairbanks in interior Alaska. The river flows southwest from its headwaters to its confluence with the Tanana River in Fairbanks. The Chena River Watershed encompasses 2,115 square miles. The watershed is characterized by highlands, tapering to a broad plain near Fairbanks. The plain is a mosaic of wetlands with braided sloughs. Urban developments such as Fort Wainwright, the University of Alaska, North Pole, and several unincorporated suburbs are interspersed throughout the watershed. Fairbanks, Alaska's second largest city, lies at the northern edge of the broad Tanana River Valley on the banks of the Chena River.

Planning Team

Jewelz Barker, co-sponsor	Tanana Valley Watershed Association (TVWA)
Jimmy Fox, co-sponsor	U.S. Fish and Wildlife Service
Irene Holak	TVWA Staff
Greg Low, Facilitator	Applied Conservation
Aaron Martin	U.S. Fish and Wildlife Service
Audra Brase	Alaska Department of Fish and Game
Bob Henszey	U.S. Fish and Wildlife Service
Chandra McGee	Alaska Department of Conservation
Christy Everett	TVWA Board of Directors
David Wigglesworth	U.S. Fish and Wildlife Service
Gale Vick	Tanana Chiefs Conference
Jackson Fox	City of Fairbanks
James Savereide	Alaska Department of Fish and Game
Jeff Falke	University of Alaska Fairbanks
Jeff Adams	U.S. Fish and Wildlife Service
Laura Jacobs	U.S. Fish and Wildlife Service
Melissa Riordan	U.S. Army of Corp. of Engineers
Roger Harding	U.S. Fish and Wildlife Service

Planning Process

The project team produced a Conservation Action Plan (CAP) following the internationally-recognized Nature Conservancy CAP planning model. The CAP methodology has been deployed successfully by hundreds of teams working to conserve species, ecosystems, landscapes, watersheds and seascapes across the globe. From a political boundary perspective, CAP has been applied by projects with a global, multi/national, country-based, state, province, municipality, village or community focus. CAP is a relatively simple, straightforward, and proven approach for planning, implementing, and measuring success for conservation actions. The process included three, 2.5-day CAP workshops with the planning team to determine focal conservation resources in the Chena River Watershed (focusing on ecosystem-level resources), assess the current and projected future health of the resources, identify critical threats, and develop conservation strategies to enhance health and abate threats. The workshops were held in November, 2014, February 2015 and April 2015. The CAP was facilitated and assisted by Greg Low of Applied Conservation.

Chena River Watershed

Focal Targets, Descriptions and Nested Targets	
1	Alpine Tundra - Upper Chena
Type	Terrestrial - Alpine Tundra
Description	Alpine tundra climate is cold, windy, and icy/snowy, and characterized by rocky, rough to gentle terrain. Alpine tundra has a low-growing season temperatures with very short frost-free period. Alpine biome is generally treeless, and dominated by scrubfields/ shrubs (e.g. willows, birch), herbs, bryophytes, and lichens. Few stunted trees are at the lower elevations (e.g. black spruce, aspen). Dwarf scrubs and herb meadows dominate mid-elevation, while alpines grasses and herbfields reside in the higher elevations. At the highest parts of the alpine zones are few vascular plants (i.e. cushion- or mat-formers), mosses, liverworts, and amble lichen populations. Wildlife species diversity (e.g. caribou, hoary marmot, and peregrine falcon) and density are low in the alpine tundra because of limiting factors of exposure to wind, solar radiation, soil temperature, and the distribution of snow and its meltwater. (Ecosystems of British Columbia 1991)
Nested	Caribou
Nested	Moose
Nested	Rock Ptarmigan
2	Boreal Forests - Upper Chena
Type	Terrestrial - Conifer Forest
Description	Boreal forests, also known as taiga, form an extensive vegetation zone between the coastal forests to the northern limit of forests, extending in a broad circumpolar belt across the northern hemisphere. They are the most extensive vegetation formation in North America. Forests predominate, but there are also extensive mosaics of shrubs and herbaceous plant communities. The forests on well drained uplands, flood plains, and stream terraces consists of pure and mixed stands of white spruce, paper birch, quaking aspen, and balsam poplar. On lowlands, north-facing hillslopes, toeslopes, and stream terraces with permafrost, stunted forests of black spruce and occasional paper birch and tamarack occur. Where fire has burned the forest, shrubs and herbaceous plants occur before the forest eventually return. (White et al. 1991; U.S. Department of Agriculture et al. 1992; Johnson et al. 1995; Wikipdeia 2015)
Nested	Marten
Nested	Moose
Nested	Little Brown Bat?
3	Boreal Forests - Lower Chena
Nested	Marten
Nested	Moose
Nested	Little Brown Bat?
4	Tributaries - Upper Chena
Type	Freswater - River/Stream

Description	Tributaries are defined as all perennial streams and their adjacent riparian forest, not including the mainstem and major forks (defined separately). Tributary streams in the Chena River basin originate from hill slopes, where they are relatively high gradient, with coarse substrates and forced pool-riffle sequences. Often when tributaries flow onto the floodplain of the mainstem or major forks they transition to having lower gradients, slower velocity, with fine substrates and pool or run habitats. Many tributaries meet sloughs or off-channel habitats prior to meeting the mainstem or major fork. The surrounding riparian area is a complex mosaic of black and white spruce, with groves of aspen and birch trees mixed with small meadows. Common shrubs and ground cover plants include willow, alder, mosses, lichens, and grasses.
Nested	Rearing Juvenile Salmon/Fish Assemblage
Nested	Rearing Juvenile Grayling/Fish Assemblage
Nested	Moose
Nested	Olive-Sided Flycatcher
5	Tributaries - Lower Chena
Nested	Rearing Juvenile Salmon/Fish Assemblage
Nested	Rearing Juvenile Grayling/Fish Assemblage
Nested	Moose
Nested	Olive-Sided Flycatcher
6	Sloughs and Wetlands - Upper Chena
Type	Freshwater Wetlands
Description	Wetlands are the transitional areas between terrestrial and aquatic environments where the water table is usually at or near the land surface. These areas are saturated by water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation, typically adapted for life in saturated soil conditions. Wetlands are also commonly referred to as swamps, marshes, and bogs. (U.S. Army Corps of Engineers n.d.; Environmental Proteciton Agency & U.S. Army Corps of Engineers 2014). Sloughs are sluggish channels of water connected to the main stem or side channel of a stream that flow slowly through low, swampy ground. Most sloughs are old streambed channels that contain water most of the year and only carry stream current under high water conditions. However, some sloughs may only have a season connection to the main stem or side channel. (Alaska Legal Resource Center n.d.)
Nested	Rearing Juvenile Fish Assemblage (e.g. Salmon)
Nested	Rusty Blackbird
Nested	Olive-Sided Flycatcher
Nested	Moose
7	Sloughs and Wetlands - Lower Chena
Nested	Rearing Juvenile Fish Assemblage (e.g. Salmon)
Nested	Rusty Blackbird
Nested	Olive-Sided Flycatcher
Nested	Moose
8	Mainstem River & Major Forks - Upper Chena

Type	Freswater - River/Stream
Description	The mainstem will define the Chena River to include the major forks (North, South, Middle, West, and Little Chena River). Mainstem of the Chena River are characterized as clear water runoff streams fed by the combined input of surface and subsurface water from the surrounding valley. They are permanently flowing streams with established streambeds (channels) and banks. The river forks are 4th and 5th order streams with relatively high gradient, small gravel bars, and a series of riffle-pool sequences; the mainstem is a meandering river with moderate gradient, prominent gravel bars, riffle-pool sequences, and numerous off-channel habitats. The surrounding riparian area is a complex mosaic of black and white spruce, with groves of aspen and birch trees mixed with small meadows. Common shrubs and ground cover plants include willow, alder, mosses, lichens, and grasses. (Note: Specific extent of major forks: North Fork to Monument Creek, South Fork to Beaver Creek, Middle Fork to Munson Creek, West Fork to Frozenfoot Creek, and Little Chena River to Anaconda Creek. The stream network and adjacent riparian forest upstream of these locations would fall under Chena River Tributaries.)
Nested	Adult and Juvenile Salmon
Nested	Adult and Juvenile Arctic Grayling
Nested	Moose
Nested	Osprey
9	Mainstem River & Major Forks - Lower Chena
Nested	Adult and Juvenile Salmon
Nested	Adult and Juvenile Arctic Grayling
Nested	Moose
Nested	Osprey
10	Confluence with Tanana
Description	Confluence is the junction of two or more water bodies, described by complex hydrodynamic conditions that feature: 1) stagnant flow upstream of the junction; 2) a shear layer between the merging flows; 3) converging cells on each side of the shear layer; and 4) divergent flow downstream of the junction (Rhoads & Kenworthy 1995). The main influences on these areas are the: 1) junction angle; 2) ratio of discharges between the channels (Best 1987; Boyer et al. 2006); and 3) form and composition of the channel beds (Constantinescu et al. 2011) i.e. stream mouth. Confluences provide greater habitat complexity (Benda et al. 2004) that are important for western Washington sculpin, juvenile bull, rainbow, and cutthroat trout, and Chinook, sockeye, coho, and pink salmon (Kiffney et al. 2006). Fish species richness and abundance are found to be greater at confluences than at other sites in streams of the mid-Atlantic Highlands of the eastern U.S. (Angermeier & Hitt 2008). Migrating fish like burbot use the confluence , as documentation shows at the Chena-Tanana confluence in the early 1990s (Evenson 1993).
Nested	Burbot
Nested	Bald Eagle
Nested	Moose
11	
12	

ID	Target Name	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Projected Future Rating w Strategies
9	Mainstem River & Major Forks - Lower Chena	Landscape Context	Connectivity to tributaries and within mainstem	Number, extent, & type of barriers	Many widespread or complete manmade or natural blockages, Where culverts exist % of red barriers based on ADFG fish passage inventory	Some widespread or complete manmade or natural blockages, Where culverts exist % of red barriers based on ADFG fish passage inventory	Few widespread or complete manmade or natural blockages, Where culverts exist % of green barriers based on ADFG fish passage inventory	No widespread or complete manmade or natural blockages,	Good	Good	
9	Mainstem River & Major Forks - Lower Chena	Landscape Context	Hydrologic regime	Natural fluctuations of surface and ground water - amount, frequency, timing, duration	Water levels, flows or fluctuations are too high or too low, not related to the precipitation, and unlikely to maintain nested targets in many habitats within the target area and downstream	Water levels, flows or fluctuations in relationship to precipitation and ground water are likely to maintain nested targets in some habitats within the target and downstream	Water levels, flows or fluctuations in relationship to precipitation and ground water are likely to maintain nested targets in most habitats within the target area and downstream	Water levels, flows or fluctuations in relationship to precipitation and ground water are likely to maintain nested targets in almost all habitats within the target area and downstream	Good	Good	
9	Mainstem River & Major Forks - Lower Chena	Landscape Context	Substrate and banks (in channel habitat?)	Amount, type, size, availability of, & distribution, including woody debris	Low diversity of and abundance of suitable substrates and woody material in most habitats	Moderate diversity of and abundance of suitable substrates and woody material in most habitats	Diversity and abundance of suitable substrates and woody debrus material in most habitat	High diversity and abundance of suitable substrates and woody debrus material in most habitat	Good -	Fair	Good -

ID	Target Name	Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Projected Future Rating w Strategies
9	Mainstem River & Major Forks - Lower Chena	Condition	Characteristic native communities	Presence of characteristic native communities within habitats	Few habitats have the characteristic native communities to accom-modate most nested targets in abundance	Some habitats have the characteristic native communities to accom-modate most nested targets in abundance	Most habitats have the characteristic native communities to accom-modate most nested targets in abundance	Almost all habitats have the characteristic native communities to accom-modate almost all nested targets in abundance	Good -	Fair	Good -
9	Mainstem River & Major Forks - Lower Chena	Condition	Species composition	Presence/absence, extent of invasive species	High abundance of invasive/non-native species in most habitats	Moderate abundance of invasive/non-native species in most habitats	Low presence of existing invasive/non-native species in most habitats with NO new invasive species	Mimimal to no abundance of invasive/non-native species in most habitats	Good -	Fair -	Good -
9	Mainstem River & Major Forks - Lower Chena	Condition	Water quality	Sediment, temperature, DO, toxins, or litter/trash/residues	High % (TBD) not meeting most ADEC's standards	Moderate habitats meet most ADEC's standards	Most habitats are meeting most ADEC's standards	Majority to all habitats meet most ADEC's standards	Fair	Fair -	Good -
9	Mainstem River & Major Forks - Lower Chena	Size	Extent of area	Riparian area and river length	Severe, mostly gone	Moderate to substantial loss	Minimal loss	Mother Nature	Fair	Fair -	Good -

Summary of Health & Needs

○ Yes ◉ No

#	Conservation Target	Current Rating	Projected Future Rating With No Action	Projected Future Rating With Strategies	Strategic Action Required
5	Tributaries - Lower Chena	51	34		Abate High threats; improve any currently Poor or Fair- attributes
3	Boreal Forests - Lower Chena	53	37		Abate High threats; improve any currently Poor or Fair- attributes
7	Sloughs and Wetlands - Lower Chena	40	31		Abate High threats; improve any currently Poor or Fair- attributes
4	Tributaries - Upper Chena	80	54		Abate any High threats
6	Sloughs and Wetlands - Upper Chena	74	51		Abate any High threats
2	Boreal Forests - Upper Chena	80	57		Abate any High threats
9	Mainstem River & Major Forks - Lower Chena	60	43		Abate any High threats
10	Confluence with Tanana	80	67		Abate any High threats; consider addressing Medium threats or improving Fair attributes if low hanging fruit
1	Alpine Tundra - Upper Chena	89	79		Abate any High threats; consider addressing Medium threats or improving Fair attributes if low hanging fruit
8	Mainstem River & Major Forks - Upper Chena	82	73		Consider addressing Medium threats if low hanging fruit

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Summary of Threats — Chena River Watershed

Threats Across Targets	Alpine Tundra - Upper Chena	Boreal Forests - Upper Chena	Boreal Forests - Lower Chena	Tributaries - Upper Chena	Tributaries - Lower Chena	Sloughs and Wetlands - Upper Chena	Sloughs and Wetlands - Lower Chena	Mainstem River & Major Forks - Upper Chena	Mainstem River & Major Forks - Lower Chena	Confluence with Tanana	Overall Threat Rank
	1	2	3	4	5	6	7	8	9	10	
Residential / commercial development		Low	Very High	Medium	High	High	High		High	Low	Very High
Incompatible road design / maintenance	Medium	Medium	High	Medium	Medium	High	High	Medium	High	Low	High
Filling in sloughs or wetlands						High	Very High				High
Removal of native vegetation from riparian zone				Medium	High		High		High	Low	High
Invasive terrestrial species/pests/pathogens		Medium	Low		Medium		High	Low	High	Low	High
Warmer climate with more frequent weather extremes	High	High	Low								High
Hardening stream banks with rip rap, channelization, et				Low	Medium	Medium	Medium	Low	High	Medium	Medium
Fire suppression	Medium	High		Medium		Low					Medium
Invasive aquatic species/pests/pathogens					Low		High		Medium	Medium	Medium
Incompatible motorized vehicle use off-roads/ATV/bulld	High	Low		Medium		Low		Low			Medium
Culverts that impede fish passage				Low	Medium	High					Medium
Construction of ditches, dikes, drainage, dredging					High	Medium				Low	Medium
Incompatible mining (excluding roads)	Low	Low		High		Low		Low			Medium
Stormwater						Low		Low	High		Medium
Incompatible boating				Medium				Medium	Medium	Low	Medium
Dumping of trash, debris, etc.		Low		Low		Low	Medium		Medium	Low	Medium
Incompatible timber management practices		Medium		Low		Low					Low
Industrial discharge									Medium		Low

Alpine Tundra - Upper Chena

Key Attributes & Future Threats

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Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Fire regime	Habitat connectivity	Hydrologic regime	Characteristic native community	Vegetation composition & structure - mosaic	Extent of area			**Threat to Target Rank**
	Stress Rank>	-	-	-	High	-	Medium			
Warmer climate with more frequent weather extremes	Contribution				High		High			High
	Threat Rank				**High**		**Medium**			
Incompatible mining (excluding roads)	Contribution				Low		Medium			Low
	Threat Rank				**Low**		**Low**			
Incompatible road design / maintenance	Contribution				Medium		Low			Medium
	Threat Rank				**Medium**		**Low**			
Incompatible motorized vehicle use off-roads/ATV/bulldozers (e.g. pioneering, etc.)	Contribution				High					High
	Threat Rank				**High**					
Dumping of trash, debris, etc.	Contribution					Low				-
	Threat Rank					-				
Fire suppression	Contribution	Medium			Medium					Medium
	Threat Rank	-			**Medium**					
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Boreal Forests - Upper Chena	Key Attributes & Future Threats
	Place cursor over cells with red triangles in top corner for hint

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Fire regime	Habitat connectivity	Hydrologic regime	Characteristic native community	Vegetation composition & structure - mosaic	Extent of area			**Threat to Target Rank**
	Stress Rank>	High	Medium	Medium	Medium	Medium	Medium			
Warmer climate with more frequent weather extremes	Contribution	High		Medium	Medium	High				High
	Threat Rank	**High**		**Low**	**Low**	**Medium**				
Invasive terrestrial species/pests/pathogens	Contribution				High	High				Medium
	Threat Rank				**Medium**	**Medium**				
Incompatible road design / maintenance	Contribution		High	Medium		High	Low			Medium
	Threat Rank		**Medium**	**Low**		**Medium**	**Low**			
Residential / commercial development	Contribution		Medium	Low						Low
	Threat Rank		**Low**	**Low**						
Incompatible timber management practices	Contribution	Medium	Medium		Low	Medium	Low			Medium
	Threat Rank	**Medium**	**Low**		**Low**	**Low**	**Low**			
Incompatible mining (excluding roads)	Contribution		Medium	Low	Low	Medium	Low			Low
	Threat Rank		**Low**	**Low**	**Low**	**Low**	**Low**			
Incompatible motorized vehicle use off-roads/ATV/bulldozers (e.g. pioneering, etc.)	Contribution		Low	Low	Low	Low	Low			Low
	Threat Rank		**Low**	**Low**	**Low**	**Low**	**Low**			
Fire suppression	Contribution	High	High		Low	Medium	Low			High
	Threat Rank	**High**	**Medium**		**Low**	**Low**	**Low**			
Dumping of trash, debris, etc.	Contribution				Low		Low			Low
	Threat Rank				**Low**		**Low**			
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Boreal Forests - Lower Chena

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Fire regime	Habitat connectivity	Hydrologic regime	Characteristic native community	Vegetation composition & structure - mosaic	Extent of area			**Threat to Target Rank**
	Stress Rank>	Medium	High	High	Medium	Medium	High			
Warmer climate with more frequent weather extremes	Contribution	Medium	Low			Low				Low
	Threat Rank	**Low**	**Low**			**Low**				
Invasive terrestrial species/pests/pathogens	Contribution				Medium	Medium				Low
	Threat Rank				**Low**	**Low**				
Incompatible road design / maintenance	Contribution		High	High	Medium	High	Medium			High
	Threat Rank		**High**	**High**	**Low**	**Medium**	**Medium**			
Residential / commercial development	Contribution		High	High	Medium	Medium	High			Very High
	Threat Rank		**High**	**High**	**Low**	**Low**	**High**			
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
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	Threat Rank									
	Contribution									-
	Threat Rank									

Tributaries - Upper Chena

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Landscape Context	Connectivity to tributaries and within mainstem	Number, extent, & type of barriers	Many widespread or	Some widespread or	Few widespread or	No widespread or	Good	Good -	Medium	
Landscape Context	Hydrologic regime	Natural fluctuations of	Water levels, flows or	Water levels, flows or	Water levels, flows or	Water levels, flows or	Good	Good -	Medium	
Landscape Context	Substrate and banks	Amount, type, size, availability of, &	Low diversity of and	Moderate diversity of	Diversity and abundance of	High diversity and	Good	Fair	High	
Condition	Characteristic native communities	Presence of characteristic	Few habitats have the	Some habitats have the	Most habitats have the	Almost all habitats have the	Good	Good -	Medium	
Condition	Species composition	Presence/absence , extent of invasive	High abundance of	Moderate abundance of	Low presence of existing	Mimimal to no	Good	Good -	Medium	
Condition	Water quality	Sediment, temperature, DO,	High % (TBD) not meeting	Moderate habitats meet	Most habitats are meeting	Majority to all habitats meet	Good	Fair	High	
Size	Extent of area	Riparian area and river length	Severe, mostly gone	Moderate to substantial	Minimal loss	Mother Nature	Good	Good -	Medium	
Overall Target Health Score (0 = Poor - 100 = Very Good)							80	54		

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Connectivity to tributaries and within mainstem	Hydrologic regime	Substrate and banks	Characteristic native communities	Species composition	Water quality	Extent of area		**Threat to Target Rank**
	Stress Rank>	Medium	Medium	High	Medium	Medium	High	Medium		
Removal of native vegetation from riparian zone	Contribution		Medium	Medium			Medium			Medium
	Threat Rank		**Low**	**Medium**			**Medium**			
Incompatible road design / maintenance	Contribution	Medium	Medium	Medium			Low	Low		Medium
	Threat Rank	**Low**	**Low**	**Medium**			**Low**	**Low**		
Hardening stream banks with rip rap, channelization, etc.	Contribution		Low	Low	Low		Low	Low		Low
	Threat Rank		**Low**	**Low**	**Low**		**Low**	**Low**		
Incompatible mining (excluding roads)	Contribution		High	High	High	High	High	Medium		High
	Threat Rank		**Medium**	**High**	**Medium**	**Medium**	**High**	**Low**		
Residential / commercial development	Contribution		Low	Low	Low	Low	Medium	Low		Medium
	Threat Rank		**Low**	**Low**	**Low**	**Low**	**Medium**	**Low**		
Dumping of trash, debris, etc.	Contribution						Low	Low		Low
	Threat Rank						**Low**	**Low**		
Culverts that impede fish passage	Contribution					Low				Low
	Threat Rank					**Low**				
Fire suppression	Contribution		Medium	Medium			Low			Medium
	Threat Rank		**Low**	**Medium**			**Low**			
Incompatible timber management practices	Contribution						Low	Low		Low
	Threat Rank						**Low**	**Low**		
Incompatible boating	Contribution			Medium		Low	Medium			Medium
	Threat Rank			**Medium**		**Low**	**Medium**			
Incompatible motorized vehicle use off-roads/ATV/bulldozers (e.g. pioneering, etc.)	Contribution		Medium	Medium			Medium			Medium
	Threat Rank		**Low**	**Medium**			**Medium**			
	Contribution									-
	Threat Rank									

Tributaries - Lower Chena

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Landscape Context	Connectivity to mainstem river and within tributaries	Number, extent, & type of barriers	Many widespread or	Some widespread or	Few widespread or	No widespread or	Fair	Fair -	High	
Landscape Context	Hydrologic regime	Natural fluctuations of	Water levels, flows or	Water levels, flows or	Water levels, flows or	Water levels, flows or	Fair	Fair -	High	
Landscape Context	Substrate and banks	Amount, type, size, availability of, &	Low diversity of and	Moderate diversity of	Diversity and abundance of	High diversity and	Fair	Fair	Medium	
Condition	Characteristic native communities	Presence of characteristic	Few habitats have the	Some habitats have the	Most habitats have the	Almost all habitats have the	Good	Good -	Medium	
Condition	Species composition	Presence/absence , extent of invasive	High abundance of	Moderate abundance of	Low presence of existing	Mimimal to no	Good	Good -	Medium	
Condition	Water quality	Sediment, temperature, DO,	High % (TBD) not meeting	Moderate habitats meet	Most habitats are meeting	Majority to all habitats meet	Fair	Fair -	High	
Size	Extent of area	Riparian area and river length	Severe, mostly gone	Moderate to substantial	Minimal loss	Mother Nature	Fair	Fair -	High	
Overall Target Health Score (0 = Poor - 100 = Very Good)							51	34		

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Connectivity to mainstem river and within tributaries	Hydrologic regime	Substrate and banks	Characteristic native communities	Species composition	Water quality	Extent of area		**Threat to Target Rank**
	Stress Rank>	High	High	Medium	Medium	Medium	High	High		
Invasive terrestrial species/pests/pathogens	Contribution				High	High				Medium
	Threat Rank				**Medium**	**Medium**				
Invasive aquatic species/pests/pathogens	Contribution				Low	Low				Low
	Threat Rank				**Low**	**Low**				
Hardening stream banks with rip rap, channelization, etc.	Contribution		Medium	High			Medium	Medium		Medium
	Threat Rank		**Medium**	**Medium**			**Medium**	**Medium**		
Removal of native vegetation from riparian zone	Contribution		Medium	High	High	High	High	High		High
	Threat Rank		**Medium**	**Medium**	**Medium**	**Medium**	**High**	**High**		
Residential / commercial development	Contribution		Very High	High		Medium	High	Medium		High
	Threat Rank		**High**	**Medium**		**Low**	**High**	**Medium**		
Construction of ditches, dikes, drainage, dredging	Contribution	Medium	High	High	Medium	Medium	High	Medium		High
	Threat Rank	**Medium**	**High**	**Medium**	**Low**	**Low**	**High**	**Medium**		
Incompatible road design / maintenance	Contribution	Medium				High	Medium			Medium
	Threat Rank	**Medium**				**Medium**	**Medium**			
Culverts that impede fish passage	Contribution	Medium						Medium		Medium
	Threat Rank	**Medium**						**Medium**		
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Sloughs and Wetlands - Upper Chena

Key Attributes & Future Threats

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Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Landscape Context	Connectivity to mainstem river and tributaries	Number, extent, & type of barriers	Many widespread or	Some widespread or	Few widespread or	No widespread or	Fair	Fair -	High	
Landscape Context	Hydrologic regime	Natural fluctuations of	Water levels, flows or	Water levels, flows or	Water levels, flows or	Water levels, flows or	Good	Good -	Medium	
Landscape Context	Substrate and banks	Amount, type, size, availability of, &	Low diversity of and	Moderate diversity of	Diversity and abundance of	High diversity and	Good	Good -	Medium	
Condition	Characteristic native communities	Presence of characteristic	Few habitats have the	Some habitats have the	Most habitats have the	Almost all habitats have the	Good	Good -	Medium	
Condition	Species composition	Presence/absence , extent of invasive	High abundance of	Moderate abundance of	Low presence of existing	Mimimal to no	Good	Good -	Medium	
Condition	Water quality	Temperature, DO, toxins, or	High % (TBD) not meeting	Moderate habitats meet	Most habitats are meeting	Majority to all habitats meet	Good	Good -	Medium	
Size	Extent of area	Acres of habitat types	Severe, mostly gone	Moderate to substantial	Minimal loss	Mother Nature	Good	Fair	High	
Overall Target Health Score (0 = Poor - 100 = Very Good)							74	51		

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Connectivity to mainstem river and tributaries	Hydrologic regime	Substrate and banks	Characteristic native communities	Species composition	Water quality	Extent of area		**Threat to Target Rank**
	Stress Rank>	High	Medium	Medium	Medium	Medium	Medium	High		
Incompatible road design / maintenance	Contribution	High	Low	Low			Low	Low		High
	Threat Rank	**High**	**Low**	**Low**			**Low**	**Low**		
Construction of ditches, dikes, drainage, dredging	Contribution	Low	Medium	Low			Low	Medium		Medium
	Threat Rank	**Low**	**Low**	**Low**			**Low**	**Medium**		
Culverts that impede fish passage	Contribution	High				Medium				High
	Threat Rank	**High**				**Low**				
Filling in sloughs or wetlands	Contribution	Low	Medium			Medium	High	High		High
	Threat Rank	**Low**	**Low**			**Low**	**Medium**	**High**		
Incompatible mining (excluding roads)	Contribution	Low	Low				Medium			Low
	Threat Rank	**Low**	**Low**				**Low**			
Residential / commercial development	Contribution	Low	Medium				Medium	High		High
	Threat Rank	**Low**	**Low**				**Low**	**High**		
Hardening stream banks with rip rap, channelization, etc.	Contribution			Low		Low	Low	Medium		Medium
	Threat Rank			**Low**		**Low**	**Low**	**Medium**		
Dumping of trash, debris, etc.	Contribution						Low			Low
	Threat Rank						**Low**			
Stormwater	Contribution		Low				Medium			Low
	Threat Rank		**Low**				**Low**			
Fire suppression	Contribution						Low			Low
	Threat Rank						**Low**			
Incompatible timber management practices	Contribution						Low			Low
	Threat Rank						**Low**			
Incompatible motorized vehicle use off-roads/ATV/bulldozers (e.g. pioneering, etc.)	Contribution			Low	-	Low	Low			Low
	Threat Rank			**Low**	-	**Low**	**Low**			

Sloughs and Wetlands - Lower Chena

Key Attributes & Future Threats

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Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Landscape Context	Connectivity to mainstem river and tributaries	Number, extent, & type of barriers	Many widespread or	Some widespread or	Few widespread or	No widespread or	Fair	Fair -	High	
Landscape Context	Hydrologic regime	Natural fluctuations of	Water levels, flows or	Water levels, flows or	Water levels, flows or	Water levels, flows or	Fair	Fair -	High	
Landscape Context	Substrate and banks	Amount, type, size, availability of, &	Low diversity of and	Moderate diversity of	Diversity and abundance of	High diversity and	Fair	Fair	Medium	
Condition	Characteristic native communities	Presence of characteristic	Few habitats have the	Some habitats have the	Most habitats have the	Almost all habitats have the	Fair	Fair	Medium	
Condition	Species composition	Presence/absence , extent of invasive	High abundance of	Moderate abundance of	Low presence of existing	Mimimal to no	Fair	Fair -	High	
Condition	Water quality	Temperature, DO, toxins, or	High % (TBD) not meeting	Moderate habitats meet	Most habitats are meeting	Majority to all habitats meet	Fair	Fair	Medium	
Size	Extent of area	Acres of habitat types	Severe, mostly gone	Moderate to substantial	Minimal loss	Mother Nature	Fair	Fair	Medium	
Overall Target Health Score (0 = Poor - 100 = Very Good)							40	31		

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Connectivity to mainstem river and tributaries	Hydrologic regime	Substrate and banks	Characteristic native communities	Species composition	Water quality	Extent of area		**Threat to Target Rank**
	Stress Rank>	High	High	Medium	Medium	High	Medium	Medium		
Removal of native vegetation from riparian zone	Contribution		High			High				High
	Threat Rank		**High**			**High**				
Invasive terrestrial species/pests/pathogens	Contribution					High				High
	Threat Rank					**High**				
Incompatible road design / maintenance	Contribution	High	High			Medium				High
	Threat Rank	**High**	**High**			**Medium**				
Residential / commercial development	Contribution		High							High
	Threat Rank		**High**							
Hardening stream banks with rip rap, channelization, etc.	Contribution		Medium		High	Medium				Medium
	Threat Rank		**Medium**		**Medium**	**Medium**				
Warmer climate with more frequent weather extremes	Contribution									-
	Threat Rank									
Invasive aquatic species/pests/pathogens	Contribution					High				High
	Threat Rank					**High**				
Dumping of trash, debris, etc.	Contribution						Very High			Medium
	Threat Rank						**Medium**			
Filling in sloughs or wetlands	Contribution	Very High	Very High	Very High	Very High	Medium	Very High	Very High		Very High
	Threat Rank	**High**	**High**	**Medium**	**Medium**	**Medium**	**Medium**	**Medium**		
Stormwater	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Mainstem River & Major Forks - Upper Chena	Key Attributes & Future Threats
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Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Connectivity to tributaries and within mainstem	Hydrologic regime	Substrate and banks (in channel habitat?)	Characteristic native communities	Species composition	Water quality	Extent of area		**Threat to Target Rank**
	Stress Rank>	Medium	-	Medium	-	Medium	Low	-		
Invasive terrestrial species/pests/pathogens	Contribution					Medium				Low
	Threat Rank					**Low**				
Incompatible road design / maintenance	Contribution	High				Medium				Medium
	Threat Rank	**Medium**				**Low**				
Incompatible mining (excluding roads)	Contribution						Medium			Low
	Threat Rank						**Low**			
Incompatible motorized vehicle use off-roads/ATV/bulldozers (e.g. pioneering, etc.)	Contribution			Low		Medium	Medium			Low
	Threat Rank			**Low**		**Low**	**Low**			
Incompatible boating	Contribution			High	Medium		Medium			Medium
	Threat Rank			**Medium**	**-**		**Low**			
Hardening stream banks with rip rap, channelization, etc.	Contribution	Medium								Low
	Threat Rank	**Low**								
Dumping of trash, debris, etc.	Contribution									-
	Threat Rank									
Stormwater	Contribution					Low				Low
	Threat Rank					**Low**				
Construction of ditches, dikes, drainage, dredging	Contribution									-
	Threat Rank									
Fire suppression	Contribution									-
	Threat Rank									
Incompatible timber management practices	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Mainstem River & Major Forks - Lower Chena

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Landscape Context	Connectivity to tributaries and within mainstem	Number, extent, & type of barriers	Many widespread or	Some widespread or	Few widespread or	No widespread or	Good	Good	-	
Landscape Context	Hydrologic regime	Natural fluctuations of	Water levels, flows or	Water levels, flows or	Water levels, flows or	Water levels, flows or	Good	Good	-	
Landscape Context	Substrate and banks (in channel habitat?)	Amount, type, size, availability of, &	Low diversity of and	Moderate diversity of	Diversity and abundance of	High diversity and	Good -	Fair	Medium	
Condition	Characteristic native communities	Presence of characteristic	Few habitats have the	Some habitats have	Most habitats have the	Almost all habitats have	Good -	Fair	Medium	
Condition	Species composition	Presence/absence , extent of invasive	High abundance of	Moderate abundance of	Low presence of existing	Mimimal to no	Good -	Fair -	High	
Condition	Water quality	Sediment, temperature, DO,	High % (TBD) not meeting	Moderate habitats meet	Most habitats are meeting	Majority to all habitats meet	Fair	Fair -	High	
Size	Extent of area	Riparian area and river length	Severe, mostly gone	Moderate to substantial	Minimal loss	Mother Nature	Fair	Fair -	High	
Overall Target Health Score (0 = Poor - 100 = Very Good)							60	43		

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Connectivity to tributaries and within mainstem	Hydrologic regime	Substrate and banks (in channel habitat?)	Characteristic native communities	Species composition	Water quality	Extent of area		**Threat to Target Rank**
	Stress Rank>	-	-	Medium	Medium	High	High	High		
Removal of native vegetation from riparian zone	Contribution						High	High		High
	Threat Rank						**High**	**High**		
Residential / commercial development	Contribution						High			High
	Threat Rank						**High**			
Incompatible boating	Contribution						Medium			Medium
	Threat Rank						**Medium**			
Hardening stream banks with rip rap, channelization, etc.	Contribution						Medium	High		High
	Threat Rank						**Medium**	**High**		
Dumping of trash, debris, etc.	Contribution						Medium			Medium
	Threat Rank						**Medium**			
Incompatible road design / maintenance	Contribution						High			High
	Threat Rank						**High**			
Stormwater	Contribution						High			High
	Threat Rank						**High**			
Industrial discharge	Contribution						Medium			Medium
	Threat Rank						**Medium**			
Invasive aquatic species/pests/pathogens	Contribution					Medium				Medium
	Threat Rank					**Medium**				
Invasive terrestrial species/pests/pathogens	Contribution					High				High
	Threat Rank					**High**				
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Confluence with Tanana

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Landscape Context	Delta dynamics	Natural channel complexity	Confined | Unnatural	Some channels are	Unrestricted channel(s)	Some channels are	Good	Good	-	
Landscape Context	In channel habitat	Amount, type, size, availability of,	Low diversity of and	Moderate diversity of	Diversity and abundance of	High diversity and	Good	Good	-	
Condition	Characersitic native community	Presence of characteristic	Few habitats have the	Some habitats have	Most habitats have the	Almost all habitats have	Good	Good -	Medium	
Condition	Species composition	Presence/absence , extent of invasive	High abundance of	Moderate abundance of	Low presence of existing	Mimimal to no	Good	Good -	Medium	
Condition	Water quality	Temperature, DO, toxins, or	High TBD% not meeting	Moderate habitats meet	Most habitats are meeting	Majority to all habitats meet	Good	Good -	Medium	
Size	Extent includes floodplain/riparian and river area	Acres	Severe loss	Moderate to substantial	Minimal loss	Mother Nature	Good	Good -	Medium	
Overall Target Health Score (0 = Poor - 100 = Very Good)							80	67		

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**	Delta dynamics	In channel habitat	Characersitic native community	Species composition	Water quality	Extent includes floodplain/ripari an and river area			**Threat to Target Rank**
	Stress Rank>	-	-	Medium	Medium	Medium	Medium			
Incompatible boating	Contribution					Medium				Low
	Threat Rank					**Low**				
Removal of native vegetation from riparian zone	Contribution			Medium	Medium	Medium	Medium			Low
	Threat Rank			**Low**	**Low**	**Low**	**Low**			
Invasive terrestrial species/pests/pathogens	Contribution			Low	Medium					Low
	Threat Rank			**Low**	**Low**					
Residential / commercial development	Contribution			Medium	Low	Medium	Medium			Low
	Threat Rank			**Low**	**Low**	**Low**	**Low**			
Hardening stream banks with rip rap, channelization, etc.	Contribution			Medium	Medium	High				Medium
	Threat Rank			**Low**	**Low**	**Medium**				
Invasive aquatic species/pests/pathogens	Contribution				High					Medium
	Threat Rank				**Medium**					
Dumping of trash, debris, etc.	Contribution					Medium				Low
	Threat Rank					**Low**				
Incompatible road design / maintenance	Contribution			Medium			Low			Low
	Threat Rank			**Low**			**Low**			
Construction of ditches, dikes, drainage, dredging	Contribution			Medium		Low	Low			Low
	Threat Rank			**Low**		**Low**	**Low**			
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Overall Target Health Score (0 = Poor - 100 = Very Good)										

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**									**Threat to Target Rank**
	Stress Rank>									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
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	Threat Rank									
	Contribution									-
	Threat Rank									

Key Attributes & Future Threats

Place cursor over cells with red triangles in top corner for hint

Category	Key Attribute	Indicator	Poor	Fair	Good	Very Good	Current Rating	Projected Future Rating w No Action	Stress Ranking (calculated)	Stress Ranking (User Override)
Overall Target Health Score (0 = Poor - 100 = Very Good)										

Threats (Sources of Stress) List Sources of stress below (max of 12 per target). Enter Contribution of each source where applicable.	**Key Attribute >**									**Threat to Target Rank**
	Stress Rank>									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
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	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									
	Contribution									-
	Threat Rank									

Strategies

Instructions

Objective 1

Beginning 2020, assure no net loss of currently native vegetated riparian area in the Lower Chena River mainstem and tributaries and sloughs, and by 2025 assure that 50% of the shoreline along all reaches has "good" native riparian vegetation (see interagency report).

Targets/Key Attributes Benefited	Current Rating	Projected Future Rating With No Action	Projected Future Rating If Objective Achieved
Tributaries - Lower Chena|Extent of area	Fair	Fair -	Good -
Mainstem River & Major Forks - Lower Chena|Extent of area	Fair	Fair -	Good -
Sloughs and Wetlands - Lower Chena|Extent of area	Fair	Fair	Good -
Mainstem River & Major Forks - Lower Chena|Characteristic native communities	Good -	Fair	Good -
Sloughs and Wetlands - Lower Chena|Characteristic native communities	Fair	Fair	Good -
Tributaries - Lower Chena|Characteristic native communities	Good	Good -	Good -
Tributaries - Lower Chena|Water quality	Fair	Fair -	Fair
Sloughs and Wetlands - Upper Chena|Water quality	Good	Good -	Good -
Mainstem River & Major Forks - Lower Chena|Water quality	Fair	Fair -	Fair

Strategic Actions *Enter Key, High-Level Strategies Needed to Achieve Objective*	Feasibility	Cost Estimate
Get critical data and maps on vegetated riparian areas; determine minimum buffer width and vegetation composition needed (consider the nested targets). See interagency riparian management zone recommendations.	Very High	
Draft zoning overlay ordinance that will prevent net loss of vegetation while allowing reasonable uses by landowners. Draw upon existing waterways setback and waterways protection zoning.	Very High	

Organize and mobilize support of key constituencies (e.g., Riverfront Commission, property owners, developers, planning commission, zoning commission) to support amendment of Fairbanks North Star Burough ordinance	Medium	
Education - "Habitat Happy". Show landowners and other key constituencies the benefits of riparian vegetation, and that funding is available for restoration.	Very High	
Secure support of planning director, mayor and planning commission chairman	Medium	
Secure adoption of ordinance by burough assembly	Low	
Prioritize the potential restoration projects within all reaches based on habitat value, current degradation, and opportunity. Develop a list of "shovel ready projects" -- list the "best bang for buck" projects and an action plan with proper design for each. Remember the fish in the design.	Very High	
Get $$$ - e.g., NFWF, AKSSF, USFS, others; compensatory mitigiation as funding source and mitigation banking opportunities	High	
Get the job done: Contractors hired by private landowners or agency owners.	High	$ 50,000
Overall Feasibility & Overall Cost	**Medium**	**$ 50,000**

Return on Investment	**Very High**

Objective 2

Restore important fish habitat by reducing hardened banks in the lower Chena sloughs, tributaties and mainstem. By 2025, assure that 50% of the banks and substrate within each reach provide “good” diversity and abundance of suitable substrates/shelter in most rearing habitat for fish -- through large woody debris, native vegetated banks or bioengineered banks. Assure no additional hardening on public land and private land as of 2020.

Targets/Key Attributes Benefited	**Current Rating**	**Projected Future Rating With No Action**	**Projected Future Rating If Objective Achieved**
Tributaries - Lower Chena|Substrate and banks	Fair	Fair	Good
Mainstem River & Major Forks - Lower Chena|Substrate and banks (in channel habitat?)	Good -	Fair	Good -

Sloughs and Wetlands - Lower Chena|Substrate and banks	Fair	Fair	Good

Strategic Actions ***Enter Key, High-Level Strategies Needed to Achieve Objective***	**Feasibility**	**Cost Estimate**
Prioritize the potential projects within all reaches based on habitat value, current degradation, and opportunity. Develop a list of "shovel ready projects" -- list the "best bang for buck" projects and an action plan with proper design for each. Remember the fish in designing for cover.	Very High	
Get $$$ - ADFG, USFWS, landowners (e.g., DOD, NFWF, AKSSF, USFWS (salmon hotspot); compensatory mitigiation as funding source	High	
Research current management plan for dam operation, and work with ACOE to allow more woody debris below Moose Creek dam.	High	
Secure borough ordinance that prohibits future hardening.	Low	
Education on the Power of Roots - show landowners benefits of intact vegetation and education to show boaters and other key constituencies the benefits of woody debris.	High	
Build constituency to support both DOD and borough action.	Medium	
Build "Fort Fish."	Medium	
Get the job done: Contractors hired by landowners (or DOD).	Very High	$ 50,000
Overall Feasibility & Overall Cost	**Medium**	**$ 50,000**

Return on Investment	**High**

Objective 3

By 2025, improve connectivity for fish passge in the Chena tributaries and sloughs: (1) all exisiting culverts will be “green” (based on ADFG inventory of barriers); (2) no new barriers will be erected after 2020; (3) remove other targeted barriers to reconnect passage

Targets/Key Attributes Benefited	Current Rating	Projected Future Rating With No Action	Projected Future Rating If Objective Achieved
Tributaries - Lower Chena|Connectivity to mainstem river and within tributaries	Fair	Fair -	Good -
Sloughs and Wetlands - Lower Chena|Connectivity to mainstem river and tributaries	Fair	Fair -	Good -
Tributaries - Upper Chena|Connectivity to tributaries and within mainstem	Good	Fair	Good
Sloughs and Wetlands - Upper Chena|Connectivity to mainstem river and tributaries	Fair	Fair -	Good -
Tributaries - Lower Chena|Hydrologic regime	Fair	Fair -	Fair
Sloughs and Wetlands - Upper Chena|Hydrologic regime	Good	Good -	Good
Sloughs and Wetlands - Lower Chena|Hydrologic regime	Fair	Fair -	Fair

Strategic Actions ***Enter Key, High-Level Strategies Needed to Achieve Objective***	Feasibility	Cost Estimate
Develop a list of "shovel ready projects" -- list the "best bang for buck" barriers and an action plan with proper design for each barrier to DOT	Very High	
Get $$$ - matchng funds as incentive for DOT; explore Exxon-Valdez settlement, NFWF, AKSSF, USFWS (salmon hotspot); compensatory mitigiation as funding source	High	
Get borough to pass ordinance that requires fish passage for all new culverts (see Mat-Su model)	Low	
Build constituency to support both DOT and borough action (see Mat-Su and others)	Medium	
Identify other significant barriers that have yet been catalogued, and add them to the shovel-ready list	Very High	
Get the job done	Very High	
Maintain the green status	High	$ 50,000
Overall Feasibility & Overall Cost	**Medium**	**$ 50,000**

Return on Investment	**Very High**

Objective 4

By 2020, the Lower Chena river, tributaries and sloughs will meet DEC water quality standards* (* restoration plan in place - e.g., Noyes Slough). Key sources are roads, development, stormwater.

Targets/Key Attributes Benefited	Current Rating	Projected Future Rating With No Action	Projected Future Rating If Objective Achieved
Tributaries - Lower Chena|Water quality	Fair	Fair -	Good -
Mainstem River & Major Forks - Lower Chena|Water quality	Fair	Fair -	Good -
Sloughs and Wetlands - Lower Chena|Water quality	Fair	Fair	Good -

Strategic Actions ***Enter Key, High-Level Strategies Needed to Achieve Objective***	Feasibility	Cost Estimate
Strategies for riparian vegetation will serve important component of water quality improvement		
Multiagency Green Infrastructure Group (GIG) addresses impervious surfaces associated with existing development, which also helps minimize amount going into storm drains		
Major municipal permiting requirements also address stormwater runoff, to a substantial degree	Medium	
Assess loading of runoff (sediment and other pollutants) from state highways, burough and city roads, and private lanes. What are the major sources?	High	
Explore with DOT and road agencies the use of vacuum sweepers (not pushers and brooms), catch basins, sediment filters and other options. Find out what they measures will apply, what testing is needed, what is required to do it at suffucient scale, and what we can do to help make it happen. (SWAC)	Medium	
Improve exsiting education and training regarding Alaska Stormwater Pollution Prevention Plan: landowners, businesses, construction companies, road commissioners, municipal employees -- the BMPs are the bible. (CESCL and AGC)	High	
Develop and put into place an ongoing assessment/monitoring of water quality condition in our target water bodies.	Medium	$ 50,000
Overall Feasibility & Overall Cost	**Medium**	**$ 50,000**

Return on Investment	**High**

Objective 5

By 2025, future roads and residential development in the Upper and Lower Chena watershed boreal forests will minimize forest fragmentation and habitat loss, avoid adverse downstream impacts on water quality and flows, and avoid key fire prone areas (e.g. black spruce).

Targets/Key Attributes Benefited	Current Rating	Projected Future Rating With No Action	Projected Future Rating If Objective Achieved
Boreal Forests - Upper Chena|Habitat connectivity	Good	Good -	Good -
Boreal Forests - Lower Chena|Habitat connectivity	Fair	Fair -	Fair -
Boreal Forests - Lower Chena|Hydrologic regime	Fair	Fair -	Fair
Boreal Forests - Lower Chena|Extent of area	Fair	Fair -	Fair
Tributaries - Lower Chena|Water quality	Fair	Fair -	Fair

Strategic Actions ***Enter Key, High-Level Strategies Needed to Achieve Objective***	Feasibility	Cost Estimate
Enter strategic action here		$ 50,000
Overall Feasibility & Overall Cost		**$ 50,000**

Return on Investment	-

Objective 6

By 2020, assure no net loss of sloughs and wetlands in the upper and lower Chena - primarily occurring from filling and residential/commerical development.

Targets/Key Attributes Benefited	Current Rating	Projected Future Rating With No Action	Projected Future Rating If Objective Achieved
Sloughs and Wetlands - Upper Chena|Extent of area	Good	Fair	Good
Sloughs and Wetlands - Lower Chena|Extent of area	Fair	Fair	Fair

Strategic Actions *Enter Key, High-Level Strategies Needed to Achieve Objective*	Feasibility	Cost Estimate
		$ 50,000
Overall Feasibility & Overall Cost		**$ 50,000**

Return on Investment	-

Objective 7

By 2020, implement a program to control invasive species (terrestrial and aquatic) in the Chena River Watershed: (1) eradicate high priority invaders e.g. - elodea; (2) contain any established invasives to their existing areas - e.g. bird vetch; and (3) prevent the establishment of any new harmful invasives.

Targets/Key Attributes Benefited	Current Rating	Projected Future Rating With No Action	Projected Future Rating If Objective Achieved
Boreal Forests - Upper Chena|Vegetation composition & structure - mosaic	Good	Good -	Good
Boreal Forests - Lower Chena|Vegetation composition & structure - mosaic	Good	Good -	Good
Tributaries - Upper Chena|Species composition	Good	Good -	Good
Tributaries - Lower Chena|Species composition	Good	Good -	Good
Sloughs and Wetlands - Upper Chena|Species composition	Good	Good -	Good
Sloughs and Wetlands - Lower Chena|Species composition	Fair	Fair -	Fair
Mainstem River & Major Forks - Upper Chena|Species composition	Good	Good -	Good

Mainstem River & Major Forks - Lower Chena|Species composition	Good -	Fair	Good -
Confluence with Tanana|Species composition	Good	Good -	Good

Strategic Actions ***Enter Key, High-Level Strategies Needed to Achieve Objective***	**Feasibility**	**Cost Estimate**
		$ 50,000
Overall Feasibility & Overall Cost		**$ 50,000**

Return on Investment	-

Objective 8

By 2025, the Lower Chena tributaries and sloughs will mostly mimic natural water levels, flows and fluctuations, thus likely to support juvenile salmon and grayling in most habitats.

Targets/Key Attributes Benefited	**Current Rating**	**Projected Future Rating With No Action**	**Projected Future Rating If Objective Achieved**
Sloughs and Wetlands - Lower Chena|Hydrologic regime	Fair	Fair -	Good -
Tributaries - Lower Chena|Hydrologic regime	Fair	Fair -	Good -

Strategic Actions ***Enter Key, High-Level Strategies Needed to Achieve Objective***	**Feasibility**	**Cost Estimate**
		$ 50,000
Overall Feasibility & Overall Cost		**$ 50,000**

Return on Investment	-

Return on Investment

Explanation		ROI	Overall
Objective 3	By 2025, improve connectivity for fish passge in the Chena tributaries and sloughs: (1) all exisiting culverts will be “green” (based on ADFG inventory of barriers); (2) no new barriers will be erected after 2020; (3) remove other targeted barriers to reconnect passage	**100**	**Very High**
Objective 1	Beginning 2020, assure no net loss of currently native vegetated riparian area in the Lower Chena River mainstem and tributaries and sloughs, and by 2025 assure that 50% of the shoreline along all reaches has "good" native riparian vegetation (see interagency report).	**66**	**Very High**
Objective 4	By 2020, the Lower Chena river, tributaries and sloughs will meet DEC water quality standards* (* restoration plan in place - e.g., Noyes Slough). Key sources are roads, development, stormwater.	**47**	**High**
Objective 2	Restore important fish habitat by reducing hardened banks in the lower Chena sloughs, tributaties and mainstem. By 2025, assure that 50% of the banks and substrate within each reach provide “good” diversity and abundance of suitable substrates/shelter in most rearing habitat for fish -- through large woody debris, native vegetated banks or bioengineered banks. Assure no additional hardening on public land and private land as of 2020.	**44**	**High**

Threat_Table
Construction of ditches, dikes, drainage, dredging
Culverts that impede fish passage
Dumping of trash, debris, etc.
Filling in sloughs or wetlands
Fire suppression
Hardening stream banks with rip rap, channelization, etc.
Impervious surfaces
Inadequate road maintenance
Inadequate wastewater treatment – septic systems, sewage systems
Incompatible boating
Incompatible dam operation for flows
Incompatible mining (excluding roads)
Incompatible motorized vehicle use off-roads/ATV/bulldozers (e.g. pioneering, etc.)
Incompatible oil/gas/energy development
Incompatible road design / maintenance
Incompatible timber management practices
Industrial discharge
Invasive aquatic species/pests/pathogens
Invasive terrestrial species/pests/pathogens
Oil or hazardous material spill
Removal of native vegetation from riparian zone
Removal of woody debris at Moose Creek dam
Residential / commercial development
Stormwater
Warmer climate with more frequent weather extremes

Stress Rank Matrix

Current Rating of Key Attribute	-----Projected Future Rating of Key Attribute-----					
	Very Good	Good	Good -	Fair	Fair -	Poor
Very Good	-	Medium	High	Very High	Very High	Very High
Good	-	-	Medium	High	Very High	Very High
Good -	-	-	Low	Medium	High	Very High
Fair	-	-	-	Medium	High	Very High
Fair -	-	-	-	Medium	High	Very High
Poor	-	-	-	Low	Medium	High
-	-	-	-	-	-	-

Threat Rank Matrix

< Stress >	<---------- Source Contribution ---------->				
	Very High	High	Medium	Low	-
Very High	Very High	Very High	High	Medium	-
High	High	High	Medium	Low	-
Medium	Medium	Medium	Low	Low	-
Low	Low	Low	Low	-	-
-	-	-	-	-	-

Threat Rank Scores *for Threat-to-Target calcs. Based on thresholds below.*

Very High	105
High	35
Medium	7
Low	1
-	0

Threat-to-Target Thresholds

Highs = Very High	3
Mediums = High	5
Lows = Medium	7

Threat Summary Thresholds (= to or >) - in *ThreatAdd sheet*

Very High	210	*2 Very High or 6 High*
High	70	*2 High*
Medium	14	*2 Medium*
Low	1	
-	0	

Revised this to raise the bar a little

Health Ranking	Score	Weight	Delta	Color Shade Threshold - if score is	
Very Good	100	0.85		90.00	Dark Green

Good	80.03	1	*19.97*	72.03	Green
Good -	60.04	1	*19.99*	54.04	Light Green
Fair	40.04	1	*20.00*	36.04	Yellow
Fair -	20.03	1	*20.01*	18.03	Orange
Poor	0.01	2	*20.02*	0	Red

weight is used for overall target scores; minor fractions added for reporting marg

ROI Feasibility Rank & Weight (proxy for % probability of success)			**Color Shade Threshold - if score is a**	
Very High	100	0.85	90	Dark Green
High	75	1	67.5	Green
Medium	50	2	45	Yellow
Low	25	5	22.5	Orange
Very Low	1	10	0.9	Red

Cost Range

$	1,000
$	10,000
$	100,000
$	1,000,000

ROI Constant 10,000

Threat To Target Thresholds

Very High	210
High	70
Medium	14
Low	0.02
-	0

Created this to better replicate CAP workbook rollup

2x required

Benefits	*Equal to or greater than*	
Very High	119.97	3 KEAs full steps
High	79.98	2 KEAs full steps
Medium	39.99	1 KEA full step
Low	4.95	1 KEA half step (G to VG)

Feasibility	*Equal to or greater than*	see thresholds above
Very High	90%	
High	68%	
Medium	45%	
Low	23%	
Very Low	1%	

Cost

Very High	$ 1,000,000

High	$	100,000
Medium	$	10,000
Low	$	1

CAP v6 Workbook Strategy Ranking Matrix - w Very Low feasibility added
Overall Strategy Rank = f (Benefits, Feasibility and Cost)

ROIRank	Benefits	< Cost >	Feasibility: Very High	Feasibility: High	Feasibility: Medium	Feasibility: Low
Very High	-	-	-	-	-	-
High	Benefits = Very High	Very High	Very High	High	High	Medium
Medium		High	Very High	Very High	High	Medium
Low		Medium	Very High	Very High	Very High	High
Very Low		Low	Very High	Very High	Very High	Very High
	Benefits = High	Very High	High	Medium	Medium	Low
		High	High	High	Medium	Low
		Medium	Very High	High	High	Medium
		Low	Very High	Very High	High	High
	Benefits = Medium	Very High	Medium	Low	Low	Low
		High	Medium	Medium	Low	Low
		Medium	High	Medium	Medium	Low
		Low	Very High	High	Medium	Medium
	Benefits = Low	Very High	Low	Low	Low	Low
		High	Low	Low	Low	Low
		Medium	Medium	Low	Low	Low
		Low	High	Medium	Low	Low
	-	-	-	-	-	-

Status	**Threshold (less than or equal to)**	*Rating*
Poor	18.03	*5*
Fair -	36.04	*4*
Fair	54.04	*3*
Good -	72.03	*2*
Good	90.00	*1*
Very Good	100.00	*0*

Change	delta greater than or
Extreme	40
Very Severe	35
Severe	30
Very High	25
High	20
Moderate	15
Low-Moderate	10
Low	5

None	0
Negative	-1000000

Strategic Action Ranking **Note: 1 is highest need for action**

Current Health of Target	-----Projected Future Decline in Health (higher pts/%)-----					
	Extreme	Very Severe	Severe	Very High	High	Moderate
Very Good	2	2	2	2	2	6
Good	2	2	2	**5**	5	6
Good -	2	2	2	**5**	5	6
Fair	1	1	1	3	3	3
Fair -	1	1	1	3	3	3
Poor	1	1	1	1	1	3
-	-	-	-	-	-	-

StrategicActionSc	StategicAction
1	Abate Very High or High threats; improve any currently Poor attributes
2	Abate Very High or High threats
3	Abate High threats; improve any currently Poor or Fair- attributes
4	Improve currently Poor or Fair- attributes
5	Abate any High threats
6	Abate any High threats; consider addressing Medium threats or improving Fair attrib
7	Improve currently Fair- key attributes; consider improving Fair key attributes if low-h
8	Consider improving currently Fair key attributes if low-hanging fruit
9	Consider addressing Medium threats if low hanging fruit
10	No action needed

- *Newly developed*

The matrix to the left defines the Stress rank based upon the Current Rating and Projected Future Rating for a given Key Attribute. It reflects the absolute level of stress as well as what's getting worse.

From CAP workbook

The matrix to the left defines the combination Threat (Source/Stress) rank given the rankings for the Contribution of a given Source to the Stress. Note that the Stress Rank serves as a

and generally track CAP workbook

above…

90% if set @ % of Score

90

	72.03	Kenai 2-5-2 scored 63 Good
	54.04	
	36.04	
	18.03	
	0.009	

ginal delta impacts

above…	90%	if set @ % of Score
	90	
	67.5	
	45	
	22.5	
	0.9	

Breakpoints for modified numerical test

*Very High 18.1 tamp the cost curve for qualitative *2 vs *10*

High	*9.1*	*8,000*
Medium	*4.6*	*4,000*
Low	*1*	*2,000*
Very Low	*0*	*1,000*

CAP-app Modified Numerical Test vs Matrix -- NOT USED

Overall Strategy Rank = f (Benefits, Feasibility and Cost)

VL is new I CAP-app	
Very Low	-
Low	-
Low	-
Medium	-
Medium	-
Very Low	-
Low	-
Low	-
Medium	-
Very Low	-
Very Low	-
Low	-
Low	-
Very Low	-
Very Low	-
Very Low	-
Very Low	-
-	-

			<---------- Feasibility ---------->				
		-	Very High	High	Medium	Low	Very Low
Benefits = Very High	< Cost >	Very Hi	13.5	10.1	6.7	3.4	0.1
		High	27.0	20.2	13.5	6.7	0.3
		Mediun	54.0	40.5	27.0	13.5	0.5
		Low	108.0	81.0	54.0	27.0	1.1
Benefits = High	< Cost >	Very Hi	9.0	6.7	4.5	2.2	0.1
		High	18.0	13.5	9.0	4.5	0.2
		Mediun	36.0	27.0	18.0	9.0	0.4
		Low	72.0	54.0	36.0	18.0	0.7
Benefits = Medium	< Cost >	Very Hi	4.5	3.4	2.2	1.1	0.0
		High	9.0	6.7	4.5	2.2	0.1
		Mediun	18.0	13.5	9.0	4.5	0.2
		Low	36.0	27.0	18.0	9.0	0.4
Benefits = Low	< Cost >	Very Hi	0.6	0.4	0.3	0.1	0.0
		High	1.1	0.8	0.6	0.3	0.0
		Mediun	2.2	1.7	1.1	0.6	0.0
		Low	4.5	3.3	2.2	1.1	0.0
		-					

Low-Moderate	Low	None	Negative	-
6	9	10	10	-
6	9	10	10	-
6	6	8	10	-
3	7	7	10	-
3	4	4	4	-
3	4	4	4	-
-	-	-	-	-

utes if low hanging fruit

anging fruit