						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Qal	Alluvium	Quaternary	Silt, sand, and gravel of stream beds, flood plains, and terraces			RB002	100	Ruby	Unconsol	100	Qs
ТКі	Intrusive rocks	Late Cretaceous(?) or	Granite, diorite, quartz monzonite, and may include dikes of varying composition and texture, older intrusives of the greenstone complex (mi), and hornfelds zones surrounding intrusive rocks			RB002	201	Ruby	Ian	1650	ТКі
			Basaltic, and esitic, and rhyolitic flows, tuffs,			KBUUZ	201	Kuby	Ign	1050	
TKe	Extrusive rocks	Cretaceous or Tertiary	interbedded sandstone and shale. Flows commonly porphyritic and gently dipping. Probably greater than 500 feet thick.			RB002	202	Ruby	Ign	1603	TKvr
Ks	Shaktolik group	late Early Cretaceous to Late Cretaceous	Graywacke, shale, grit, and conglomerate. Type section on the Shaktolik River approximately 120 miles west of the Ruby quad. Thickness estimated to be more that 4800 feet along the lower Yukon River. Unit is obsolete and no longer used. On map, this area of outcrop was replaced by later mapping.	plant fossils, marine mollusks		RB002	301	Ruby	Sed	2010	Km
Ku	Ungalik conglomerate	Cretaceous	Conglomerate, grit, some graywacke. Boulders as much as 2 ft in diameter: Sorting and bedding poor. Believed to be several hundred ft thick on the Melozitna River north of the Ruby quad. Patton and Bickel estimate minimum thickness of 1200 feet. Superceded on later maps.	2		RB002	302	Ruby	Sed	2170	Kuc
			Chert and argillite with interbedded rhyolitic	Fragmentary fossil imprint identified as small immature ammonite of Cretaceous or Jurassio	5						
Kc	Chert and argillite	Cretaceous	tuff, sandstone, and grit.	type.		RB002	303	Ruby	Sed	5745	Pig
ira	Intrusive rocks	Pre-Cretaceous	augen gniess and mica schist. Locally contains younger granitic dikes.			RB002	702	Ruby	Meta	9325	PzZrqs
mi	Metamorphic igneous rock	Carboniferous (?) Late Paleozoic	Greenstone, locally some gray to red chert, greenstone tuff, and graywacke. Greenstone altered from basalt, diabase, and andesite extrusives and diorite, diabase, gabbro, and pyroxenite intrusives. In Nulato quad assigned a Carboniferous(?) age. May include greenstone from older metamorphic complex.			RB002	401	Ruby	Meta	5133	JMtu
וח	Limestone	Devonian	Dark-gray, partly recrystallized limestone carrying light-colored, crushed crinoid columns, and associated slate, shale, and fine grained arkose. No longer on map, lumped in unit 1Mtu	light-colored, crushed		RB002	801	Ruby	Sed	6945	Ds
01	Limestone and dolomite	Ordovician	Dark-gray limestone and brownish-yellow dolomite. Dolomite is common near base of section. Lies unconformably on older metamorphic rocks. Massive unit overlain by thinner bedded limestone and dolomite, succeeded by the thickest beds of the series. Total thickness of 6000 to 8000 feet for the Ordovician series. Locally silicified, dolomitized, and recrystallized.			RB002	901	Ruby	Sed	7520	Ont

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Schist, crystalline limestone, quartzite,								
			greenstone, slate, and phyllite. Areas of								
			crystalline limestone mapped separately when								
mc	Metamorphic complex	Precambrian or Paleozoic	possible as mcl.			RB002	501	Ruby	Meta	8625	PzZm
			Crystalline limestone, may include rocks of								
		Precambrian or Paleozoic (Ordovican or Devonian but generally is more								
		may contain Ordovician	recystallized than Ordovican or Devonian								
mcl	Metamorphic complex	and Devonian)	rocks and is associated with schists.			RB002	502	Ruby	Meta	8620	Pzrm
			In eastern part of quad, metamorphic complex	<							
			mapped as two units, mca and mcb. The								
			older unit, mca is composed of crystalline								
			limestone and greenstone with some schist								
mca	Metamorphic complex	Precambrian or Paleozoic	and phyllite.			RB002	504	Ruby	Meta	8601	PzZrqs
			The younger unit, mcb, contains schist and								
			quatzite with some crystalline limestone,								
mcb	Metamorphic complex	Precambrian or Paleozoic	slate, and greenstone.			RB002	503	Ruby	Meta	8600	YZnm
	· · ·		, ,					,			
				The "Palisades" along							
			Undifferentiated alluvial, colluvial, and eolian	the Yukon have							
			terrace and slope deposits. Chiefly silt and	vielded Pleistocene							
			very fine sand. Terrace deposits largely	vertebrate fauna							
			fluival but in part lacustrine: slope deposits	including mammoth							
Oac	Alluvium	Ouaternary	primarily eolian and colluvial.	and bison remains.		MZ002	100	Melozitna	Unconsol	100	Os
L			Light-gray micaceous silt. Sand and gravel								- C ²
			along streams that drain bendrock uplands.								
			Characterized physiographically by badrs,								
			oxbows, meander scars, abandoned channels,								
	Younger flood-plain		and other evidence of recent flood-plain								
Ofv	denosits	Quaternary	building.			MZ002	110	Melozitna	Unconsol	100	05
			Dark-vellowish-orange and light-gray, fine- to								
			medium-grained eolian sand. Forms briad								
			sheetlike dune field mantling older floodplain								
			(Ofo) and alluvial terrace (Oac) deposits of								
	Modified eolian sand		the Dulhi Flats Denosits have a strong								
Oms	denosits	Quaternary	northeast-southwest trend			MZ002	120	Melozitna	Unconsol	100	05
QIIIS		Quaternary				112002	120	T TCTOZICITU	onconsor	100	23
			Chiefly light-gray and gravish-orange								
			micaeous silt Locally include peat reworked								
			eolian sand and gravel Deposits at or near								
			river level but youthful flood-plain features								
	Older flood-plain		are much modified or absent Contact with								
Ofo	denosits	Quaternary	Of locally gradational and poorly defined			M7002	130	Melozitna	Unconsol	100	0.5
2.0			Unsorted bouldery till and isolated moraines:			. 12002			5110011301	100	23
			may include some younger solifluction								
On	Glacial drift	Quaternary	denosits near valley sides.			MZ002	140	Melozitna	Unconsol	100	05
~9		Quaterniary	Gravish-white granule condomerate and				1.10				~~~
	Sandstone Claystone		sandstone reddish-brown claystone and								
	Conglomerate and		lignite coal Exposed at river level at the	Pollen of probable							
Ts	Lignite	Tertiary	"Palisades" along the Yukon River	Miocene age		MZ002	200	Melozitna	Sed	640	Tch
15	Lighte	Terelary		Thosene age.		112002	200	Ticlozitilu	Sea	010	100
			Indian River, Takhakhdona Hills, and Dulbi								
1			River areas- light-gray to pink rhvolite tuff							1	
1			welded (?) tuff, flows, and breccia								
			Subordinate pumice, dark vitronhyre, and								
			obsidian. In Takhakhdona Hills also	Obsidian chippings							
			includesdark-green to black vesicular basalt	and artifacts found in							
1			flows. Big Creek- dark-green to green dacite	archeological site in							
			and andesite porphyry flows and crystal tuffs	NW AK may have							
			Probabaly correlative with similar flows and	source in obsidian	Flows in Tanana and						
1		Tertiary to Late	tuffs in Tanana and Bettles guads.	occurrence north of	Bettles guads have K	4					
тку	Volcanic rock	Cretaceous	Reassigned to Tertiary by Patton (1998)	Little Indian River	Ar date of 58 m v	MZ002	210	Melozitna	Ian	1070	Tvr
		1					1		1-2	1 = 0 / 0	1 1 2 1

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Rock unic		//ge		10351	itadionicene age			Quadrangic		110/1 01035	Laber
					K-Ar date of 82.3						
					and 89.0 m.v. from						
					the Dulbatna						
					Mountain pluton and						
			Fine- to medium-grained hornblende-biotite		81.5 m v from the						
			granodiorite with subordinate quartz		Indian Mountain						
			monzonite and quartz diorite (Recoded NSA		pluton in adjoining						
Ka	Cranadiarita	Lata Cratacoous	2420 March 1000 per Bill Datton			MZ002	200	Molozitaa	Ian	2420	Kad
кy	Granoulorite		2420 March, 1999, per bill Patton.)		Hughes quau	142002	300	Meiozitiia	Ign	2420	Kgu
			Small bodies of primarily dasite and rhyelite								
			Small boules of primarily dacite and myolite								
			porphyry. These intrusives are widespread in								
		-	volcanic graywacke and mudstone unit (Kgm)						_		
Kh	Hypabyssal rocks	Cretaceous	and in andesitic rocks (Kv).			MZ002	310	Melozitna	Ign	2210	Kve
			Small isolated patches of light-gray quartz-								
			pebble conglomerate and quartzose								
			sandstone. Minor intercalated with light-								
			colored ashy tuff. Conglomerate almost								
			wholly of quartz and quartzite clasts.								
	Quartz-pebble		Intruded and thermally altered by granodiorite	2							
Kqc	conglomerate	early Late Cretaceous	(Kg)	1		MZ002	320	Melozitna	Sed	1990	Kqc
			Non-marine deposits of olive-green, fine- to								
			coarse-grained, crossbedded, quartzose								
			sandstone and grit; quartz-pebble								
			conglomerate, and dark micaeous shale and								
			siltstone. Ironstone lenses and concretions.								
			Better sorted and higher % quartz than Kgm.								
	Sandstone Quartz		Probabaly correlative with Upper Cretaceous								
	Conglomorato, shalo		plant-boaring popmaring strata in Katool Rivo	Abundant carbonized							
Ke	congiomerate, shale,	Brobably Late Crotacoous	guad	Abundant carbonized		MZ002	220	Molozitaa	Ead	1041	Kee
K5		Probably Late Cretaceous	quau.			142002	330	Meiozitiia	Seu	1941	N55
			Massive poorly corted conglemorate with								
			nassive poorly solled congromerate with								
			people to coople sized clasts primarily of man	-							
			Intrusive and extrusive rocks and varied								
			colored chert. Interbedded with fine-grained								
			to gritty (?), dark-green to green graywacke								
			and mudstone. grades upward into								
			sandstone, quartz conglomerate, shale, and								
		late Early Cretaceous	siltstone (Ks). In part overlies and in part								
	Igneous pebble-cobble	(Albian) may be as young	laterally gradational with volcanic graywacke	Indeterminate							
Kc	conglomerate	as Late Cretaceous	and mudstone (Kgm)	pelecypods		MZ002	340	Melozitna	Sed	2030	Kcg
			Dark-greenish-gray, fine-grained to gritty(?),								
			poorly sorted graywacke composed largely of								
			first- and second-cycle volcanic debris but								
			locally containing abundant granitic and								
1			metamorphic rock debris. Graded bedding								
			common. Dark gray mudstone interbeds								
			Some intercalated crystal tuffs Hornfols								
	Volcanic graywacke and	late Farly Cretaceous	bordering granodiorite (Kg) Age based on	1							
Kam	mudstone	(Albian)	correlation with HIL and KT guade			M7002	350	Melozitaa	Sed	2105	Kyam
Ngill					+	12002		i iciozicila	500	2103	i vgiii
			Volcaniclastic rocks of andesitic and decitic								
			composition Crystal-lithic tuff lithic tuff	1							
			volconic growworke and mudstone. Date								
			voicanic graywacke and muustone. Rare								
	Tuff under the even of		anuesite nows. Mapped only along northern								
	liuir, voicanic graywacke,		euge of this quad and in adjoining HU quad.	1			200				
кtg	and mudstone	Early Cretaceous	Overlies KV and may grad laterally into Kgm			MZ002	360	Melozitna	Ign	2320	Ktg
			PINKISN coarse-grained porphyritic biotite								
			quartz monzonite. Becomes gnessic in								
			southern part of the Melozitna pluton. Altered	1	K-Ar date 111 m.y.						
			and slightly cataclastic in small pluton east of		from Melozitna						
Km□	Quartz Monzonite	Early Cretaceous	Gold Mountain.		pluton	MZ002	370	Melozitna	Ign	2530	Kg

						Source		1	T		
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
		199	Koyukuk River- Pillow basalt and andesitic flows; andesitic tuffs, volcanic conglomerate, and breccia; chert and fine-grained cherty tuff; coquinoidal limestone composed largely of Buchia sp. Widely altered to a hard dark green hornfels. Dulbi-Melozitna Rivers- Andesitic and dacitic tuff, breccia, volcanic								
			conglomerate and tuffaceous graywacke.	Buchia sublaevis,							
		Earliest Cretaceous	Flows and hyabyssal bodies of andesite and	belemnite; Buchia							
Kv	Andesitic volcanic rocks	(Neocomian) but may	dacite porphyry. Dark-green nornfeis near	CT.B. Crassicollis; Buchia keyserlingi		M7002	380	Melozitna	Ian	2330	KVA
ЈРЬ	Basalt and diabase	Permian to Jurassic.	Spilitic basalt and diabase largely altered to greenstone. Along contact with Km, altered to mafic hornfels. Probabaly correlative with similar rocks on strike to the NE in the Tanana and Bettles quads			MZ002	400	Melozitna	Ign	5140	JMab
			Small bodies of serpentinized peridotite and								
10	Illtramafice	Permian to Juraccio	dunite with closely associated gabbro and			M7002	410	Molozitaa	Ian	E1E0	1000
JFU	oluanancs					112002	410	Meiozitiia	light	5150	Jaum
Pzm	Marble	Paleozoic	Small masses of white to light-gray coarsely crystalline dolomitic and calcareous marble. Locally altered to calc-silicate hornfels			MZ002	600	Melozitna	Meta	5525	Dm
PzpCs	Pelitic schist	Paleozoic or Precambrian	Quartz-chlorite-muscovite schist and micaceous quartzite. Greenschist facies metamorphism. Subordinate micaceous quartzite and glaucophane-chlorite-muscovite schist. Unit includes many small bodies of marble, greenstone and greenschist (believed to be altered mafics).			MZ002	700	Melozitna	Meta	9325	PzZrqs
PzpCq	Quartzite	Paleozoic or Precambrian	Fine-grained, light-gray quartzite and micaceous quartzite with subordinate quartz-mica schist, marble, and calc-silicate rock. Stratigraphic relationship to PzpCs uncertain.			MZ002	710	Melozitna	Meta	8803	PzZrpg
PzpCn	Gneiss and quartzite	Paleozoic or Precambrian	Quartz-feldspar-biotite gneiss commonly garnetiferous and locally contains sillimanite. Almandine-amphibolite facies metamorphism. Some augen gneiss. Gray coarse-grained quartzite with thin layers of biotite. Subordinate quartz-mica schist, marble, and calc-silicate rock. Contacts with PzpCs and Km are gradational and indefinite. Appears to underlie PzpCs.			MZ002	720	Melozitna	Meta	8801	PzZrpg
			Silt, sand and gravel of streambeds, flood								
Qal	Alluvium	Quaternary	plains and terraces			NL002	101	Nulato	Unconsol	100	Qs
Tki	Intrusive Rocks	early Tertiary or Late Cretaceous	Granite and some diorite. Includes numerous dikes and sills and may include hornfels zones			NL002	1650	Nulato	Ign	1655	TKg
K-	Chalded like av	Lata Casta as	Graywacke, shale, grit, and conglomerate. Thickness estimated at 4800 feet. Unit	Marine mollusks (late Early K) and plant		NU 000	201	Nulata	Cont	2010	1Kara
KS	Shaktolik group	Late Cretaceous	obsolete, no longer shown on map.	remains (Late K)		NL002	301	Nulato	Sed	2010	KM
Ku	Ungalik conglomerate		Conglomerate, grit, some graywacke. Clasts are angular to rounded. Sorting and bedding are poor. Boulders as much as 2 feet in diameter. Type section is near the Ungalik River west of Nulato quad. Thickness believed to be at least several hundred feet. Unit superceded on later maps			NL002	302	Nulato	Sed	2170	Kuc

						Source				T	
Rock unit	Linit hame	A.0.0	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Labol
ROCK UTIL		Age		103511	Kauloinetric age	coue		Quaurangle	RUCK CId55	INSA Class	Label
			Greenstone, and locally some gray to red								
			Greenstone, and locally some gray to reu								
			chert, dark-gray crystalline limestone,								
			greenstone, tuff, and graywacke. Greenstone								
			is altered basalt and diabase of probable								
			extrusive origin and diorite, diabase, gabbro,								
			and pyroxenite of probable intrusive origin.								
			Does not annear on published man later								
	Motomorphocod ignoous		manning chows as TrMb (Batton, written								
	Metallior priosed igrieous	and Carlo if	1007)			NU 000	101	Nulata		5350	M-Duri
mi	rocks	post - Carboniferous	commun., 1997)			INLUU2	401	inulato	Meta	5250	MZPMI
			Quartz-mica schist, quatzite-schist, mica								
			schist, albite-chlorite schist, albite-mica								
			schist, ottrelite-mica schist, glaucophane-mica								
		Late Precambrian or Early	schist, some phyllite, slate, sheared chert,								
mc	Metamorphic complex	Paleozoic	and quartzite Unit superceded			NI 002	501	Nulato	Meta	8625	P ₇ 7m
inc			Recystallized limestone - superceded, see			112002	501	Huldto	i iecu		122111
and all		Duran makaina an Dalaansia	Recystallized infestorie - superceded, see			NU 000	0010	NI. Jaka		0620	D
mci	Metamorphic complex	Precamprian or Paleozoic	source NL003			INLUU2	8610	inulato	Meta	8620	Pzrm
			Chiefly basalt and andesite. Rarely rhyolite,								
			tuff, chert, agglomerate, and breccia.								
			Probably of several different ages. Not shown								
			on map as this unit, rather is NSACLASS 1000								
vr	Volcanic rocks	unknown	and 2330			NI 002	601	Nulato	Ian	5120	MzPzi
03	Nono	Quatornary	Alluvium	1	1	0002	101	Ophir	Linconcol	100	00
Qa	None	Quaternary				0002	101	Ophir	Unconsol	100	QS
		-	Undifferientiated lowland silt, sand, muck, and								-
Qu	None	Quaternary	gravel			OP002	102	Ophir	Unconsol	100	Qs
Qt	None	Quaternary	Terrace alluvium			OP002	103	Ophir	Unconsol	100	Qs
0c	None	Quaternary	Colluvium			OP002	104	Ophir	Unconsol	100	05
45		Farly Tertiary and Late				0.002	101	opini	0110011001		45
TIZ	Valaaniaa		Valaaniaa			00000	201	Onhin	Tan	1000	TIZ
IKV	Voicanics	Cretaceous	Voicanics			OPUUZ	201	Ophir	ign	1000	IKV
	Maric to intermediate										
	volcano-plutonic	Early Tertiary and Late	Mafic to intermediate volcano-plutonic								
TKc	complexes	Cretaceous	complexes			OP002	202	Ophir	Ign	1630	TKiv
		Early Tertiary and Late									
TKm	None	Cretaceous	Monzonite			OP002	203	Ophir	Ian	1660	TKm
		Early Tertiary and Late				0.002	200	opini	19.1		
TIZ	Nama		Dileas and subvalantia tasks			00000	204	Onhin	Tan	1 6 0 1	TIZA
TKU	None	Cretaceous	Dikes and subvoicanic rocks			OPUUZ	204	Ophir	ign	1001	TKU
		Tertiary or Late									
		Cretaceous (Not									
TMg	None	designated on map)	Gabbro			OP002	205	Ophir	Ign	1680	TDg
Ju	Ultramafic rocks	Late Jurassic	Ultramafic rocks			OP002	301	Ophir	Ian	3498	Jtu
	Harzburgite tectonite of		Harzburgite tectonite of Mount Hurst					- P	5		
nh	Mount Hurst	Unknown	relations uncortain			00002	401	Onhir	Ian	E101	1
Ш		UNKIUWII	Cumulate ultramatic vealer of Mourt Units				101	opini	1911	13131	Julii
	Cumulate ultramatic		Cumulate ultramatic rocks of Mount Hurst:						_		
рс	rocks of Mount Hurst	Unknown	relations uncertain			OP002	402	Ophir	Ign	5191	Jium
1	Sandstone, shale, and				1						
Ks	conglomerate	Late Cretaceous	Sandstone, shale, and conglomerate		1	OP002	501	Ophir	Sed	2020	Kme
	Undifferentiated clastic		, , <u>,</u>							-	
Ku	rocks	Late Cretaceous	Undifferentiated clastic rocks		1	OP002	502	Onhir	Sed	1970	KK
Kaa	Nana	Late Cretaceous	Conditioned and conglements			0002	502	Ophin	Cad	1005	K
NSL .						UPUUZ	505	орпп	Jeu	11900	INKII
	Fine sandstone,										
Kss	siltstone, and shale	Late Cretaceous	Fine sandstone, siltstone, and shale			OP002	504	Ophir	Sed	1970	Kk
Kls	None	Late Cretaceous	Limy volcaniclastic sandstone			OP002	505	Ophir	Sed	1942	Kk
Kac	None	Late Cretaceous	Agglomerate, chert, tuff, and sandstone			OP002	506	Ophir	Ian	2260	Kyl
Kyc	Nono	Late Crotacoous	Volcaniclastic canditono		1	0002	507	Onhir	Sod	1007	Kyss
KVS	None		Candetene			0002	507	Ophin	Seu	1000	1.155
кѕа	None	Late Cretaceous	Sandstone			02002	508	opnir	Sea	1300	кѕа
Ksh	None	Late Cretaceous	Shale and siltstone			OP002	509	Ophir	Sed	1905	Ksh
	Volcanic graywacke and										
Κνα	conglomerate	Late Cretaceous	Volcanic graywacke and conglomerate		1	OP002	510	Ophir	Sed	2180	Kvm
		Triassic Permian			1						
1		Ponneylyanian and			1						
T	News	remisylvaniali, dilu	Condetence with end or 1999		1	00000	601	Orthin	Carl	5001	T. M.
ITMS	None	Mississippian	Sandstone, grit, and argillite			02002	601	opnir	Sea	5021	IrMis
1		Triassic, Permian,			1						
1	Chert, argillite, and	Pennsylvanian, and			1						
TrMc	volcaniclastic rocks	Mississippian	Chert, argillite, and volcaniclastic rocks	1	1	OP002	602	Ophir	Sed	5112	TrMica

						Source					
Rock unit	Unit hame	Are	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Rock and		Triassic Permian		10351	Rudiometrie uge	couc		Quadrangic		110/11000	Laber
		Poppeylyanian and									
TrMb	None	Micciccippian	Bacalt gabbro and chort			00002	603	Onhir	Ian	5133	1Mtu
THE	None	11133133122101				01002	005	Opini	ign	5155	Jintu
MDI	Limostono	Mississippian to Dovenian	Limostono			00002	701	Onhir	Sod	6280	MDI
I®IDI D= -	Linestone	Firstssippian to Devolian	Carbarata			0002	701	Ophin	Seu	5360	
PZC	None	Early Paleozoic	Carbonates			0002	801	Opnir	Sea	5340	Pzrm
	Schistose metamorphic	Early Paleozoic or Late									
PzpCs	rocks	Precambrian	Schistose metamorphic rocks			0002	802	Ophir	Meta	8601	PzZrqs
		Unknown but likely									
btu	Bedrock unknown	Precambrian or older	type unknown; relations uncertain			OP002	9001	Ophir	Unknown	9060	pCu
PzpCs/Tr											
Mc	None	Uncertain	Map shows questionable identification of unit.			OP002	901	Ophir	Uncertain	8601	PzZrqs
pc /TrMc	None	Uncertain	Map shows questionable identification of unit.			OP002	902	Ophir	Uncertain	99	bu
Qf		Quaternary	Floodplain deposits			?	100	Kateel River	Unconsol	100	Qs
Qt	Terrace deposits	Quaternary	Terrace deposits			KT?	101	Kateel River	Unconsol	100	Qs
	· ·	· ·									-
	Younger flood-plain		Light-gray micaceous silt. Sand and gravel								
Ofv	deposits	Ouaternary	along streams that drain bedrock uplands			KT002	102	Kateel River	Unconsol	100	Os
~ /			Active dunes. Circular body, nearly 5 mi in								
	Nogahabara sand dunes -		diameter. Entriely sand, free of vegetation								
Ona	- active dunes	Quaternary	cover.			KT002	110	Kateel River	Unconsol	100	Os
Q.1.0		Quaternary						indecer inter		100	40
	Nogababara sand dunes -		Scattered circular and elliptical bodies of								
One	- stabilized dunes	Quaternary	eolian cand			KT002	111	Katool Rivor	Unconsol	100	06
QII3	Stabilized dulles	Quaternary	Chiefly light-gray and gravish-orange			1002	111	Rateer River	onconsor	100	Q3
			micacoous silt Locally includes post								
Ofo	Older fleedplain deposite	Quatornary	roworked colian cand, and gravel			KT002	103	Katool Rivor	Unconcol	100	06
QIU	Older Hoodplain deposits	Quaternary	Dark-vollowish-orange and light-grave fine- to			KT002	105	Kaleel Kivel	UNCONSO	100	Q5
			madium grained colian cand Forms broad								
			sheet like dune field menting alluvial site								
			sneet-like dune heid mantling alluvial sit								
	Madified as line as and		deposits of the Koyukuk flats and all but tops								
0	Moullieu eollari sanu	Queterra	of bedrock mills in vicinity of Roundabout			1/TOOD	110	Kata d Divers	11	100	0-
Qms	deposits	Quaternary	Mountain.			KTUUZ	112	Kateel River	Unconsol	100	Qs
	High terrace and slope		Light-gray and grayish-orange micaceous silt.							100	
Qhs	deposits	Quaternary	Subordinate lenses of sand and peat.			K1002	104	Kateel River	Unconsol	100	Qs
			Nearly norizontal flows of vesicular olivine								
			basalt. Flows extruded over terrain of								
		early Quaternary or late	moderate relief, ranging in elevation from 175						_		
QID	Basalt	Tertiary	to over 1,600 feet.			K1002	500	Kateel River	Ign	350	QID
			Poorly sorted, muddy sandstone (graywacke)								
			interbedded with mudstone. Chiefly dark-								
			greenish-gray to pale-olive tuffaceous and								
			feldspathic, fine- to very coarse-grained								
			sandstone and subordinate dark-gray								
			mudstone. Abundant lenses of feldspar and								
	Graywacke sandstone		chert grit. Description is such that unit								
Kgs	and mudstone	Cretaceous	sounds like part of Shaktolik Group.				200	Kateel River	Sed	1825	Kgw
1				Graptolites of Early							
1				Cretaceous age						1	
1			Chiefly medium- to dark-gray mudstone and	(Albian) age in						1	
1			medium-gray to dark-greenish-gray	adjoining Nulato	1						
1			moderately to highly calcareous fine-grained	quadrangle. Not sure							
1			sandstone. Sandstone locally contains thin	what unit though (Ks						1	
1	Graywacke sandstone		lenses of feldspar and chert grit. Mudstone	on pub. map but this						1	
Kgm	and mudstone	Early Cretaceous	commonly banded and finely cross-bedded.	doesn't match)		KT002	201	Kateel River	Sed	2152	Km

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Nonmarine deposits of drak-gray to olive-gray micaceous shale and siltstone, and light-olive- gray to yellowish-orange, fine- to coarse- grained, crossbedded sandstone. Massive sandstone beds near base of unit. Coarse detrital fraction of sandstone chiefly quartz and choeft foldenare locally abundant. Micht of								
Kn	Nonmarine shale, siltstone and sandstone	Late Cretaceous	Kateel River, sandstone contains pyroclastic material. Conglomerate lense near base of quartz and chert. Coal beds as much as 6 in thick.	Abundant, well preserved flora.		КТ002	210	Kateel River	Sed	2021	Kme
Km	Marine shale and siltstone	Early Cretaceous	Littorial and offshore marine deposits of dark- gray shale and siltstone interbedded with subordinate dark-greenish-gray fine-grained sandstone in lower part and light-olive fine- to coarse-grained crossbedded sandstone in upper part. Volcanic conglomerate loccally along contact with andesitic volcanic rocks (unit KJV). Sandstone generally better sorted and more quartzose than that of units Kgm and Kgs.	Widespread occurrence of Inoceramus altiflummis (McLearn) of Early Cretaceous (Albian) age		кт002	211	Kateel River	Sed	2101	Ksse
	Undifferentiated		Undifferientiated units Km and Kn, western								
Knm	sedimentary rocks	Cretaceous	part of map.			KT002	212	Kateel River	Sed	2021	Kms
Kvg		Cretaceous	Volcanic graywacke conglomerate			?	200	Kateel River	Sed	1908	Kvg
			Volcanic graywacke conglomerate and								
Kvm		Cretaceous	mudstone			?	201	Kateel River	Sed	1825	Kvm
Kg	Granitic rocks	Cretaceous	Grantic rocks of acidic and intermediate composition Chiefly syenite at Roundabout Mountain and albite granite on Huslia River- Derby Creek divide.			КТ002	600	Kateel River	Ign	2410	Kg
Kly	Andositis volganis volga	Cretaceous and	Chiefly porphyritic pyroxene andesite and trachyandesite flows, andesitic crystal and lithic tuff, and massive andesite breccia, agglomerate, and conglomerate. Commonly altered and therefore pale green. Interbedded dark-greenish-gray tuffaceous graywacke, chert, shale, and impure limestone containing Buchia. Mildly deformed and unaltered vesicular basalt and associated pyroclastic rocks along Koyukuk River near Boundhouth Mt. may be of Tortingr. age	Buchia subokensis of earliest Cretaceous age in interbedded		47002	800	Kataol Biyar	Ice	2220	Kuo
Pze	Limestone and schist		Limestone and schist	Seumentary Tocks.		KT002	300	Kateel River	Sod	5310	DCd
Pzl	Limestone and schist	Paleozoic	Limestone and schist			KT002	301	Kateel River	Sed	5320	Pzld
Pzls	Limestone and schist	Paleozoic	Limestone and schist			KT002	302	Kateel River	Sed	5320	Pzld
1210	Undifferentiated alluvial, colluvial, and eolian terrace and slope		Chiefly silt and very fine sand. Includes							5525	
Qac	deposits	Quaternary	extensive loess deposits			MD002	105	Medfra	Unconsol	100	Qs
Qfy	Younger flood-plain deposits	Quaternary	Silt, sand, and gravel			MD002	101	Medfra	Unconsol	100	Qs
Qfo	Older flood-plain deposits	Quaternary	Largely silt and sand but probably includes abundant gravel along Tonzona River.			MD002	102	Medfra	Unconsol	100	Qs
0	Modified eolian sand	Quataman	Sheetlike dune fields of tan fine- to medium- grained eolian sand, locally overlain by peat			MD002	102	Madfra	Unconcol	100	0.0
Qms	aeposits	Quaternary	and loess			MD002	103	Medfra	Unconsol	100	Qs Qs
Qg	Gravel deposits on longe	Quaternary	Unsorted bouldery till Moderately dipping gravel exposed on Jones Creek near Nixon Fork fault approximately 25			MD002	104	medfra	Unconsol	100	Qs
QTg	Creek	Quaternary-Tertiary	m thick			MD002	151	Medfra	Unconsol	100	Qs
~ ~				1							

						Source			T	1	
Rock unit	Unit hamo	100	Description	Fossil	Padiomotric ago	codo	Class codo	Quadranglo	Pock class		Labol
ROCK UTIL		Age	Chiefly subscript flows of trachyandosite	103311	Radiometric age	coue	Class Coue	Quadrangle	KUCK Class	INSA Class	Laber
			Chieffy Subaerial nows of tracityanuesite,								
			basaitic andesite, and basait. Subordinate								
	Volcanic rocks of the	Latest Cretaceous, Earliest	intercalated flows and tuffs of rhyolite and								
TKn	Nowitna River area	Tertiary	dacite.		63 to 64 Ma	MD002	202	Medfra	Ign	1605	TKvi
	Volcanic rocks of the										
	Nowitna River area	Latest Cretaceous, earliest	Altered rhyolite domes and associated rhyolitic								
TKnr	rhvolite	Tertiary	tuff and breccia.			MD002	201	Medfra	Ian	1603	TKvr
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,						-				
			Altered basalt, andesite, and trachyandesite								
			norphyry flows and hypohyscal intrusive								
	Mafia ta intermadiata		bodies Altered metic and intermediate								
	Maric to Intermediate		bodies. Altered matic and intermediate								
	Volcano-plutonic	Latest Cretaceous, earliest	crystal and lithic tuffs. Subordinate olivine		K-Ar ages of 65-71						
TKc	complexes	Tertiary	basalt and dacite flows.		Ma	MD002	204	Medfra	Ign	1630	TKiv
	Mafic to intermediate										
	volcano-plutonic	Latest Cretaceous earliest	Small bodies of monzonite quartz monzonite								
TKcm	complexes monzonite	Tortiary	and granodiorito			MD002	203	Modfra	Ian	1650	TVI
TRUIT	complexes monzonite					MD002	205	Meuna	Ign	1030	IN
		Latest Cretaceous, earliest	White to light gray, fine- to coarse-grained						L_		
TKg	Granite	Tertiary	biotite granite.		63-/1 Ma	MD002	211	Medfra	Ign	1655	IKg
			Includes monzonite, quartz monzonite, quartz								
		Latest Cretaceous, earliest	monzodiorite, and monzodiorite. Subordinate								
TKm	Monzonite	Tertiary	monzogabbro and gabbro		66-70 Ma	MD002	205	Medfra	Ign	1660	TKm
	Volcanic rocks of Nixon	, í		1					1		
	Fork-Upper Sulukna	Latest Cretaceous earliest	Sills dikes flows and plugs of rhyolite								
TKY	Biver area	Tortion/	dasita and trachyandesita		62 67 Ma	MD002	206	Modfro	Ian	1602	TUUR
INV	River died	Tertiary			02-07 Ma	MD002	200	Meuna	Ign	1003	INVI
			Light-gray to purplish-red banded rhyolite and								
	Volcanic rocks of the	Latest Cretaceous, earliest	dacite subaerial flows and domes, locally								
TKs	Sischu Mountains	Tertiary	containing interlayered breccia and tuff.		66-71 Ma	MD002	207	Medfra	Ign	1603	TKvr
	Conglomerate.	Latest Cretaceous, earliest							1		
TKsc	sandstone and lignite	Tertiary	Conglomerate sandstone and lignite			MD002	209	Medfra	Sed	1510	TKca
TROC	Sanastone, and lighte	Latest Crotacoous, carliest	Dike like body of dark brown to gray andesite			110002	205	Ticunu		1510	They
TIZAR		Tertiers	Dike-like bouy of uark-brown to gray andesite			MD000	200	Madfin	Tan	1001	TIZA
TKSd		Tertiary	porphyry.			MDUUZ	208	Meurra	Ign	1001	тка
			Sills, dikes, and small plutons of gabbro								
			intruding rocks of early Paleozoic and								
TDg	Undifferentiated gabbro	Devonian to Tertiary	preCambrian(?) age			MD002	210	Medfra	Ign	1680	TDg
			Chiefly dark-gray carbonaceous, largely								
			nonfossiliferous shale, siltstone, and very fine-								
			grained sandstone Includes massive								
			limestene conglemente of uncertain age and								
			attrationa bio offinition. Conclomente alegte								
			stratigraphic annities. Congiomerate clasts								
	Undifferentiated shale,	Cretaceous, early and late	consist of Paleozoic limestone and unit may be								
Ksu	siltstone, and sandstone	[possible Permian(?)]	as old as Permian.	reworked Paleozoic		MD002	301	Medfra	Sed	1970	KK
			Chiefly fine- to coarse-grained, greenish-gray								
			to gray, thinly cross-bedded "salt and pepper"	locally abundant							
1			sandstone and quartz-chert pebble	plants and fresh and						1	
	Sandstone and		conglomerate. Poorly exposed interbeds of	brackish water							
Ksc	conglomerate	Late Cretaceous	dark shale and siltstone	mollusks		MD002	302	Medfra	Sed	1985	Kkn
1.00	congronnerate		Eine- to modium-grained dark-groonich-gray	mondono			502			1505	
			think eres hadded feesilifereus condetens	The sector marks							
1	Fine condeter -	anyly Lata Custa	and nearly expected doub minerous sandstone								
	Fine sandstone,	early Late Cretaceous	and poorly exposed dark-gray slitstone and	concentricus, and I.							
Kss	siltstone, and shale	(Cenomanian)	shale.	pictus		MD002	303	Medfra	Sed	1940	КК
				Buchia sublevis, B.							
1				crassicolis,						1	
1			Fine- to coarse-grained guartz-carbonate	Cylindroteuthis,						1	
1	Quartz-carbonate	Early Cretaceous	sandstone and conglomerate, quartzose	Inoceramus.							
1	sandstone and nebbly	(Valanginian, Hauterivian	limestone and dark-gray pebbly mudstone	Acroteuthis						1	
Kac	mudstone	Barremian Antian)	and siltstone	Tropaeum		MD002	305	Medfra	Sed	2125	Ksm
NYC	Industone		Dearly carted fine to coorce grained	nopaeum		110002	505	incuit a	Jeu	12125	1.5111
1			roony soliceu nine- to coarse-graineu	1						1	
1			graywacke, sandstone, grit, and people to	1						1	
			copple conglomerate composed chiefly of								
1	Volcanic graywacke and		volcanic rock and chert detritus; interbedded	1						1	
Kvg	conglomerate	earliest Cretaceous	dark mudstone.	Inoceramus		MD002	304	Medfra	Sed	2180	Kvm

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ITrt	Cherty tuff, crystal and lithic tuff, and volcanic breccia	Triassic and possible early	Dark-greenish, very fine grained cherty tuff grading into greenish-gray radiolarian chert. Fine to coarse-grained dark greenish-gray crystal and lithic tuff. Volcanic breccia and conglomerate composed of poorly sorted clasts of mafic volcanic rocks and cherty tuff in a crystal and lithic tuff matrix.	Radiolaria and		MD002	401	Medfra	Ian	3851	ITrta
5110				conodones		110002	101	ricultu	Ign	5051	5110
Trs	Spiculite and sandy limestone	Late Triassic (Norian)	Dark-gray banded spiculite and chert, yellowish-orange-weathering sandy fossiliferous limestone and conglomerate and dark-gray shale	Monotis ochotica, M. of M. scutiformis, Halobia, Heterastridium		MD002	402	Medfra	Sed	4032	Trsl
	Sandstone, sandy		Fine- to coarse-grained yellowish-orange-	Kuvelousia,							
Ps	limestone, and	Permian	weathering sandstone, limy sandstone,	Spiriferella, Waagenoconcha		MD002	501	Medfra	Sed	6010	PDsc
13	congiomerate	Pennsylvanian and	Chiefly greenish-gray, dark-gray to black, and	Waagenoconcila		110002	501	Hearra	Jeu	0010	1030
PMc	Chert and limestone	Mississippian	red radiolarian chert.	Radiolarians		MD002	502	Medfra	Sed	6080	TrMica
TPMcl	Limestone and sandstone	Mississippian	Lenticular beds of fossiliferous limestone having subordinate beds of sandy limestone, chert grit, and arkosic sandstone.	Conodonts and foraminifera		MD002	503	Medfra	Sed	6320	MDI
DOsl	Shaly limestone	Ordovician to Middle Devonian	Dark-gray to grayish-orange finely laminated limestone and dolomitic limestone. Suborbinate laminated dolomite, dark chert, and silicous siltstone. Interpreted as deep- water facies of Osl, Od, and DSI carbonate units.	Conodonts		MD002	508	Medfra	Sed	5310	DCd
DSI	Reefy limestone and dolomite	Late Silurian, Early Devonian (Siegenian- Emsian), early Late Devonian (Frasnian)	Unit composed of a lower sequence of dolomite containing ostracodes of probable Late Silurian age, a middle sequence of mixed limestone and dolomite having favostid reefs and shelly fossils of probable Early Devonian age and an upper sequence of Amphipora- bearing dolomite and rugose coral bearing limestone	ostracodes, favostid, Ampihpora, Smithiphyllum		MD002	504	Medfra	Sed	6960	DSwc
		Silurian (latest									
SIs	Thin-bedded limestone	Llandoverian to early Wenlockian)	Dark-gray to black platy limestone and limy	graptolites		MD002	505	Medfra	Sed	6620	Snf
Od	Massive dolomite and limestone	Middle to Late Ordovician (White Rockian to Maysvillian)	Light-brown to dark-gray massive dolomite and limestone cyclically interbedded with shallow-water yellowish-orange-weathering algal and lime mudstone.	Gastropods, corals, brachiopods, ostracodes, conodonts		MD002	506	Medfra	Sed	7520	Ont
Osl	Silty limestone and siltstone	Early Ordovician	Chiefly yellowish-orange-weathering, thin- bedded, shallow-water, silty limestone and limy siltstone.	Conodonts, trilobites, gastropods, cephalopods		MD002	507	Medfra	Sed	7520	Ont
			Banded light-gray to black sooty impure radiolarian chert, green talcy phyllite and slate, thin-bedded shalk limestone, and								
Pzc	Chert and phyllite	early Paleozoic	calcareous quartzite.			MD002	509	Medfra	Meta	7580	SCpl
PzpCq	Quartzite, grit, and argillite	early Paleozoic or preCambrian	Fine- to coarse-grained quartzite, quartz grit, quartz-feldspar grit, and argillite grading upward in to very fine grained quartzite, argillite, calcareous argillite, phyllite, and chert.			MD002	601	Medfra	Meta	8300	CZw
			Sheared and foliated guartz and guartz-		276 Ma K-Ar						
Dan Ca	Quartzite, grit, and	early Paleozoic or	feldspar grits and quartzite intercalated with quartz-muscovite-chlorite and quartz- muscovite-bioite schists. Subordinate		muscovite and 421 Ma K-ar(?) hornblende on	MD002	602	Modfer	Mata	9640	VZna
rzpus	Tarymite	precamprian	phymie, thin imestone, and metachert.	1	pina asion (?) to unit.	בטטעוייון	1002	rieurra	Inteld	0040	177112

						Course	1			1	
Rock unit	Unit hame	Ane	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class		Label
ROCK UTIL	Onichame	Age	Description	103311	Radiometric age	coue		Quadrangle	RUCK Class	NJA Class	Laber
			Tan, light-gray, pink, and green banded fine-								
			grained felsic volcanic rocks having well-								
			developed foliation Choifly perphyry								
			compared of large phonographics of ombayed								
			composed of large prienocrysts of embayed								
			quartz and plagloclase in a very fine grained								
		early Paleozoic or	quartzo-feldspathic groundmass which has a								
PzpCv	Metavolcanic rocks	preCambrian	distinct micaeous overprint.			MD002	603	Medfra	Meta	8700	YZnv
			Light to medium-gray calc-schist and thin-								
			bedded schistose impure marble White to								
		early Paleozoic or	light-gray, fine-grained massive sandy								
PzpCc	Calc-shist	preCambrian	marble. Subordinate quartz-mica schist.			MD002	604	Medfra	Meta	8610	YZnc
			Chiefly pelitic and quartzose metasedimentary								
			rocks of greenschist facies. Light-gray								
			micaceous quartzite and greenish quartz-								
			chlorite-muscovite schist grading into dark-								
			grav guartz-muscovite-biotite-garnet schist								
			Subordinate cale ophict and marble Locally								
			Suborumate calc schist and marble. Locally								
			includes greenstone and greenschist								
			metamorphic igneous rocks composed of		K-Ar mica ages from						
			chlorite, epidote, actinolite, and plagioclase.		274-514 Ma,						
		early Paleozoic or	Also includes a small body of pink granitic		correlatives as old as						
PzpCp	Pelitic schist	preCambrian	gneiss		921 Ma	MD002	605	Medfra	Meta	8640	YZns
			Glacial drift of several ages, including								
			moraines outwash and lake denosits								
			alluvium and colluvium. All mainly consist of								
0.0	Curficial deposite	Quataman	uncerneelideted grouel cond cilt and clou			115000	100	Lleeby	Unconcol	100	0.0
QS	Surficial deposits	Quaternary	unconsolidated gravel, sand, silt, and clay.			ILCUU2	100	пеаіу	Unconsol	100	QS
		DI:	Subvolcanic intrusive rocks (nornblende		K-Ar hornblende age		1000		-	1000	
Tha	Hornblende dacite	Pliocene	dacite) of Jumbo Dome		ог 2.79 Ма	HE002	1022	Неају	Ign	1022	Ind
			Poorly consolidated, buff to reddish-brown,								
			fluvial sequence of pebble- to boulder-								
			conglomerate and coarse-grained sandstone								
			with interbedded mudflow deposits, thin								
Tn	Nenana gravel	Pliocene and Miocene	claystone layers, and local thin lignite beds.			HE002	570	Healy	Sed	570	Tn
	gran a		Unit mostly comprises in ascending order, the								
			Healy Creek, Sanctuary, Suntrana, Lignite								
			Creek and Grubstake Formations Coal-								
			bearing recks comprise terrestrial cyclical								
			bearing rocks comprise terrestrial cyclical								
			sequences, naving varying proportions of								
			siltstone, claystone, mudstone, shale,								
			generally cross-bedded and pebbly sandstone								
			(both arkosic and quartz-rich), subbituminous								
			coal and lignite, and minor amounts of								
			dominantly guartz- and chert-pebble								
Tch	Coal-bearing rocks	Miocene to Focene	conglomerate	Floral assemblages		HE002	645	Healy	Sed	640	Tcb
			Poorly consolidated fluviatile sequence of	i lorar abberriblageb			0.0	neary	000	0.0	1.05
			dark-gray shalo, vollowish-gray sandstone								
			ilitation and a shall an allow share (as a single share)								
1			sitistone, and people congiomerate (consisting								
_			of dominantly gray quartz and black chert								
ls	Sedimentary rocks	Miocene? to Paleocene?	clasts).	Indeterminate plants		HE002	500	Healy	Sed	500	Isu
1											
1	Volcanic rocks volcanic		Subaerial flows and associated pyroclastic								
1	flows, pyroclastic rocks,		rocks ranging in composition from rhyolite to								
1	and subordinate		basalt. Tend to be dominantly moderately	1							
1	subvolcanic intrusive		altered rhyolite and basalt, but andesite.	1	K-Ar sanidene age of						
Tvv	rocks	Oligocene to Paleocene	dacite, and latitie also occur		53.9 Ma on rhyolite	HE002	1000	Healy	Ian	1000	TVI
+	Volcanic rocks mafic		Dikes and small hypabyssal bodies of dark-	†			1		-9	1000	1
1	subvolcanic intrucivo		aray bacalt diabaco, and subordinate		K-Ar ago of 54 7 Ma						
Tuim	rocke	Oligocono to Poloocono	andocito	1	on bacalt dike		1012	Haaly	Inn	1012	Thm
11/11/1	LIUCKS	Ungocerie to Paleocerie	ומוועכאולל	1	Juli Dasalt ülke	TIEUUZ	11012	Inediy	11911	11012	1.000

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Tvif	Volcanic rocks felsic subvolcanic intrusive rocks	Oligocene to Paleocene	Dikes and small hypabyssal bodies with subordinate associated pyroclastic rocks, of dominantly tan-colored, aphanitic to very fine grained, locally porphyritic rhyolite, quartz latite, latite, and dacite.		K-Ar ages ranging 32.5 to 35.2 Ma on rhyolite	HE002	1011	Healy	Ign	1011	Thf
Tfu	Fluviatile and subordinate volcanic	ostly Eccopo?	Intercalated, fluviatile, only slightly deformed sequence of conglomerate, sandstone, siltstone, and mudstone, and a few interlayed thin flows of basaltic andesite. Clasts in conglomerate contain Late Devonian conglomerate	Metasequoia occidentalis		HE002	880	Hoaly	Sod	880	Tfs/
Tev	Cantwell Formation	Balageone	Intercalated, moderately deformed sequence of andesite, generally zeolitized basalt, rhyolite and dacite flows, dominantly felsic pyroclastic rocks, a few interbeds of sandstone and carbonaceous mudstone, and a few small bodies of related subvolcanic intrusive rocks		K-ar Hornblende age of 64.6 Ma on dacite, basalt, andesite, and diabase ages ranging from 50.9 (>42.9 min.) to 61.0 (>62.2 min.) Ma	HE002	1140	Healy	Ian	1140	Tou
Tres	Cantwell Formation sedimentary rocks	Paleocene	Fluviatile, intercalated sequence, in various proportions, of dominantly polymictic conglomerate, sandstone (including arkose), siltstone, argillite, shale, and a few thin coal beds. Locally contains thin flows and related tuff layers of mafic to intermediate composition. Conglomerate clast are of locally variable composition, indicating derivation from a number geologically different source areas.	Plant fossils of Paleocene age, including Metasequoia occidentalis (Newberry) Chaney	K-Ar biotite ages on granitic intrusions were 71.9 and 78.7 Ma, ages of dubious geologic value	HE002	920	Healy	Sed	1920	Krs
Tor	Cranitic rocks		Wide variety of epizonal granitic rocks, most commonly granite and grandiorite but including together the standard grand grant	(newserry) enancy	K-Ar ages ranging	HE002	1221	Hook	Ian	1200	Togr
Tami	Granitic and volcanic		Extensive border zone between rocks of late Tertiary granitic pluton (unit Tgr) and slightly younger, numerous felsic dikes and small subvolcanic intrusive rocks (unit Tvv), as well as small erosional remnants of rhyolite flows		1011 30.7 10 39.0 Ma	115002	1221	Healy	Ign	1210	Tiu
TKgr	Granitic and hypabyssal intrusive rocks	Paleocene? and Late Cretaceous	Two small granodiorite plutons of medium- grained granodiorite		K-Ar biotite ages of 71.9 and 78.7 Ma, probably of dubious geologic meaning (very low K20 in biotite)	HE002	1655	Healy	Ign	1655	TKg
TrPzvs	Volcanic and sedimentary rocks of the Talkeetna superterrane	Triassic and Paleozoic	Appears only in cross-sections			HE002	5030	Healy	Ign	5030	TrPzvs
Kvb	Basaltic subvolcanic rocks	Late Cretaceous	Dark-gray to black, porphyritic basalt, occurring in dike swarms. Only know to intrude preCambrian and Paleozoic rocks (units PzpCp and Dmb).		K-Ar hornblende age of 79.1 Ma on basalt	HE002	2256	Healy	Ign	2256	Kvl
MDt	Totatlanika Schist	Early Mississippian to Middle Devonian	Predominantly metavolcanic and metavolcaniclastic (both felsic and mafic), and subordinate amounts of intercalated metasedimentary rocks such as black pelitic schist, and at one lacality a thin interbed of fossiliferous marble.	Crinoids, gastropods, Syringopora sp., conodont Polygnathus sp.		HE002	6510	Healy	Meta	6510	MDt

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
MDt?	Totatlanika Schist?	Early Mississippian to Middle Devonian	Predominantly metavolcanic and metavolcaniclastic (both felsic and mafic), and subordinate amounts of intercalated metasedimentary rocks such as black pelitic schist, and at one lacality a thin interbed of fossiliferous marble.			HE002	6511	Healy	Meta	6510	MDt?
Dmf	Felsic metavolcanic rocks	Late Devonian?	Massive, thick section of generally dark- to medium-gray, fine- to medium-grained schists and locally phyllites, with relict phenocrysts of quartz. orthoclase, and plaqioclase.	conodonts from		HE002	7243	Healv	Meta	7240	Dvv
Dmb	Metabasalt and subordinate metasedimentary rocks	Late Devonian	600 m thick intercalated sequence of schistose and phyllitic, generally medium to dark greenish-gray, fine-grained and massive metabasalt; dark gray to black, generally fine- grained carbonaceous pelitic schist and phyllite and associated metasiltstone; aand a few thin onterbeds of black metachert, and fine- to medium-grained, dark-gray marble.	Conodonts Palmatolepis sp., Iciodus sp., Polygnathus sp.	K-Ar muscovite age of 114.6 Ma on black phyllite	HE002	7320	Healy	Meta	7320	Pzsc
Dms	Metasedimentary rocks	Late Devonian	Intercalated, generally thinly bedded, locally laminated, thick, marine sequence of dark- gray to black, carbonaceous, fine-grained, carbonaceous, fine-grained pelitic schist or phyllite; dark-gray, fine-grained, carbonaceous metasiltstone (quartzose phyllite); fine-grained, medium-gray quartzite; thin interbeds of dark-gray to black metachert; and a few interbeds of dark-gray, fine-grained fossiliferous marble.	Amphipora? sp., Disphyllum? sp., Grypophyllum? sp., Phillipsastraea? sp., Tabulophyllum? sp.		HE002	7300	Healy	Meta	7300	Pzsc
Pzk	Keevy Peak Formation	early Paleozoic	Intercalated sequence of fine- to medium- grained quartz-sericite or muscovite schist, fine-grained black quartzite, black carbonaceous pelitic schist and phyllite, stretched pebble conglomerate, greenish-gray or purple schist and slate, and a few thin marble interbeds			HE002	5660	Healy	Meta	5660	Pzk
PzpCp	Pelitic and quartzose schist sequence [old, abandoned Birch Creek Schist]	early Paleozoic and preCambrian?	Intercalated in various proportions: medium- to fine-grained, generally medium-gray quartz sericite and (or) muscovite pelitic schist; fine- to medium-grained, medium-gray quartzite; quartz-sericite and (or) muscovite-calcite pelitic schist; fine-grained dark-gray to black carbonaceous schist or phyllite; a few interbeds, as much as several tens of meters thick of medium-gray, fine-to medium-grained massive marble; and a few small bodies and layers of chloritc schist.	1		HE002	8630	Healy	Meta	9322	PzZaqs
Trcs	Calcareous sedimentary rocks	Late Triassic; middle? Norian to late Karnian	A generally thin-bedded, commonly cross- bedded, carbonaceous, dark- to medium-gray, marine, intensely deformed thick sequence of intercalated calcareous shale, argillite, sandstone, siltstone, and sandy to silty and argillaceous limestone. Sequence also contains numerous large dikes, sills as much as several tens of meters thick, and small plugs of altered diabase and gabbro. Unit locally metamorphosed (east and south). Turbidites and intercalated hemipelagic sedimentary rocks	Conondonts: Neogondolella polygnathiformis, Epigondolella primitia, also Monotis cf. M. subcircularis, Chrondites sp.		HE002	4033	Healy	Sed	4033	Trcs

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
		<u>//yc</u>	Intensely deformed, thick marine sequence of dominantly metasedimentary and metavolcanic rocks. Bulk of sequence is dark- gray to black carbonaceous shale with intercalations of thin-bedded, commonly bioturbated, medium- to dark-gray, normally graded, both cross- and parallel-laminated, fine- to medium-grained lithic sandstone and siltstone (turbidites). Most regionally metamorphosed into siliceous mudstone, argillite, slate, phyllite, semischist, and	russii	тадиотецис аде	Lone		Quaurangie	RUCK Class	INDA Class	Lavei
			impure quartzite. Also contains thin interbeds	Padiolariano							
			gray, banded chert or metachert and other	conodont Palmatolepis							
Dy	Yanert Fork sequence	Late Devonian	units, largely metavolcanic.	sp.		HE002	7242	Healy	Meta	7242	Dy
	Andositic subvolcanic		Two large sills or dikes consisting of altered,		K-Ar on bornblondo						
Kva	rocks	Late Cretaceous	hornblende andesite.		of 97.3 Ma	HE002	2255	Healy	Ign	2255	Kvl
KJf	Flysch sequence	Early Cretaceous and Late Jurassic	Monotonous, intensely deformed and locally highly metamorphosed, probably several thousand of meters thick, flyschlike turbidite sequence. Consists of dark-gray to black argillite; fine- to coarse-grained, generally dark-gray polymict pebble conglomerate; subordinate black chert-pebble conglomerate; a few thin interbeds of dark-gray to black radiolarian chert and a few thin beds of dark- gray impure limestone. Same as unit KJf, mapped separately for structural reasons. Monotonous, intensely deformed and locally highly metamorphosed, probably several thousand of meters thick,	Fossils sparse but age considered well controlled	K-Ar reset ages yielded Late Cretaceous and Tertiary	HE002	2850	Healy	Sed	2850	KJf
KJfk	Overthrust flyschlike rocks	Early Cretaceous Late Jurassic	flyschlike turbidite sequence. Consists of dark gray to black argillite; fine- to coarse-grained, generally dark-gray polymict pebble conglomerate; subordinate black chert-pebble conglomerate; a few thin interbeds of dark- gray to black radiolarian chert and a few thin beds of dark-gray impure limestone.	Fossils sparse but age considered well controlled	K-Ar reset ages yielded Late Cretaceous and Tertiary	HE002	2851	Healy	Sed	2851	KJfk
KJcg	Conglomerate, sandstone, siltstone, shale, and volcanic rocks	Early Cretaceous and Late Jurassic	Intercalated sequence of polymictic pebble and cobble conglomerate, sandstone, siltstone, shale, and flows and dikes of andesitic to latitic feldspar porphyry.	Buchi spp.		HE002	2821	Healy	Sed	2821	КЈсд
Trvs	Metavolcanic, metavolcaniclastic, and subordinate metasedimentary rocks	Late Triassic; late Norian	Consists of intercalated sequences several hundreds of meters thick, ocurring as thrust slices. Most common rock type is dark- greenish-gray aphanitic metabasalt contiaing numerous amygdules and occurring in thick, commonly pillowed massive flows. Metavolcaniclastic rocks comprise dark-gray or dark-greenish-gray, generally fine-grained, tuffaceous metasandstones and metasiltstones. Metasedimentary rocks comprise dark-gray, locally greenish-gray slate and argillite and subordinate dark-gray finely crystalline, thinly bedded marble.	Monotis subcircularis, Heterastridium sp.		HE002	4440	Healy	Meta	4440	Trmm

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Trcn	Chitistone and Nizina Limestones, undivided	Late Triassic; early Norian and Late Karnian	consists variably of medium- to thick-bedded, medium-gray weathering, brownish-gray lime mudstone with chert nodules and streamers, or medium- to thin-bedded, commonly thinly laminated, dark-gray to dark-brownish-gray lime mudstone, or thin- to medium-bedded, dark-gray lime mudstone and wackestone.	Halobia sp. and several conodonts		HE002	4030	Healy	Sed	4030	JTrlm
Trn	Nikolai Greenstone	Late and (or) Middle Triassic	An over 3,000-m-thick, slightly metamorphosed sequence of massive basalt flows with subordinate amounts of intercalated basaltic tuff and breccia, some bedded volcaniclastic rocks such as pebble conglomerate, sandstone, and siltstone, and possibly a few thin limestone interbeds.	Halobia superba collected from an interbed?		HE002	4420	Healy	Ign	4420	Trn
TrPam	Metasedimentary rocks	Middle Triassic to Late	Lower and principal part of section (700-m- thick) consists of black argillite with laminae and thin interbeds of volcanic sandstone and lesser amounts of thin-bedded crinoidal limestone, apparently turbidite deposits forming discontinuous interbeds as much as 10-m-thick, and a few interbeds several tens of meters thick of mafic volcanic breccia. Upper part of sequence, approximately 100-m thick consists of gray-green, red, or black thin bedded radiolarian chert. Numerous large diabasic and gabbroic dikes and sills occur throughout the sequence. (Lower part thought to be equivalent to Slana Spur Fm of Mankomen Gp and upper part to Eagle Creek Em also of the Mankomen Gn)	Crinoids, conodonts,		HE002	5202	Healy	Meta	5202	Pe
PPay	Andesitic volcanic rocks (Correlated with Tetelna	Early Permian? and	Over 2,000-m-thick sequence of gray-green massive volcanic flows, breccias, and subordinate volcaniclastic rocks, all largely andesitic in composition			HF002	6120	Healy	Ian	6120	Pat
Kgr	Granitic rocks	Late and Early Cretaceous	Most commonly tonalite but granodiorite, quartz diorite, diorite, and quartz monzodiorite.		K-Ar age range from 105 to 49 Ma, most 50 to 70 Ma thought to be reset. For NSAclass coding, ages less than 85 Ma = 2460, ages 85-110 Ma = 2470, all others = 2410	HE002	2410	Healy	Ign	2460	Kg
		Early Cretaceous or	Dark greenish- or brownish-gray, coarse- to medium-grained, plagioclase-bearing ultramatic that occurs in a small, sill-like								
KJum	Ultramafic rocks	Jurassic	intrusive			HE002	2945	Healy	Ign	2945	Jum
Kgrt	Tourmaline-bearing granite	Late or Early Cretaceous	Medium- to fine-grained, tourmaline bearing granite with a granitic to seriate texture.			HE002	2411	Healy	Ign	2411	Kgt
Jgb	Alkalic gabbro	Late Jurassic	Extremely heterogeneous series of alkali gabbros, ranging from mafic theralites through essexites and monzogabbros into monzodiorites and monzonites. Dark greenish-gray, fine- to medium-grined		K-Ar age on biotite and hornblende 132 and 146 Ma	HE002	3390	Healy	Ign	3390	Jmu
Dmg	Metagabbro	Late Devonian?	well-foliated gabbro.			HE002	7330	Healy	Meta	7330	Dmg

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
KJa	Argillite, chert, sandstone, and limestone	Early Cretaceous and Late Jurassic	Dark-gray argillite, dark-gray to greenish-gray bedded chert, thick-bedded gray sandstone, thin-bedded gray sandstone, and rare thin beds of shelly limestone.	Radiolarians, Inoceramus sp., Buchia sublaevis		HE002	2820	Healy	Sed	2820	KJfn
JTrrs	Red and brown sedimentary rocks and basalt	Early Jurassic and Late Triassic	Maximum thickness of more than 2,000m. Basal part consists of a red-bed sequence of sandstone, siltstone, argillite, and conglomerate, with a few thin interbeds of brown fossiliferous sandstone, pink to light- gray dense limestone, and intercalated basalt flows. This sequence grades upward into brownish-gray siltstone with yellowish-brown limy concretions.			HE002	3830	Healy	Sed	3830	JTrsu
Trlb	Limestome and basalt sequence	Late Triassic; Norian?	Interlayed sequence, at least several hundreds of meters thick, of limestone, partly recrystallized to marble, and flows of altered amygdaloidal basalt.	Spondylospira(?) sp.		HE002	4021	Healy	Sed	4021	Trlb
Trr	Red beds	Late Triassic	About 500 m of red sanstone, siltstone, argillite, and conglomerate, similar to red beds of unit JTrrs			HE002	4060	Healy	Sed	4060	Trr
TrDv	Volcanogenic and sedimentary rocks	Early Triassic to Late Devonian	Heterogeneous intercalated sequence over 500m thick, of greenish-gray to black tuffaceous chert, volcanic conglomerate, lesser amounts of maroon volcanic mudstone, breccia composed largely of basaltic detritus, laminated flyschlike graywacke and shale, large lenses of light-gray, thick-bedded limestone, and poorly exposed thin beds of ammonite-bearing limestone.	Ammonites, conodonts, brachiopods		HE002	5110	Healy	Meta	5110	TrDv
Dsb	Serpentinite, basalt, chert, and gabbro	Late Devonian	Tectonically intermixed assemblage a few hundreds of meters thick largely of sheared serpentinite. Remaining component rocks occur in varying proportion is in lenticular and podiform tectonic blocks as much as several hundred meters in extent.	Radiolarians		HE002	7325	Healy	Meta	7325	Dmgs
KJfl	Flysch sequence	earliest Late Cretaceous (Cenomanian) to Late Jurassic	Lithologically identical to rocks of unit KJf: Monotonous, intensely deformed and locally highly metamorphosed, probably several thousand of meters thick, flyschlike turbidite sequence. Consists of dark-gray to black argillite; fine- to coarse-grained, generally dark-gray polymict pebble conglomerate; subordinate black chert-pebble conglomerate; a few thin interbeds of dark-gray to black radiolarian chert and a few thin beds of dark- gray impure limestone.	Only mapped flysch unit to have fossils as young as earliest Late Cretaceous (Cenomanian).	5	НЕ002	2852	Healy	Sed	2852	KJfk

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
JTrta	Crystal tuff, argillite, chert, graywacke, and limestone	Late Jurassic to Late Triassic?	Four-fifths of the sequence is composed of massive cliff-forming crystal tuff, while remaining rocks form a narrow belt along western margin of unit. Contact between two parts of sequence may be tectonic. Crystal tuff is light- to dark-gray, locally having a greenish tint, and weathers to various shades of brown. Tuff composed of abundant small feldspar crystals (albite?) in a very fine- grained matrix of devitrified volcanic glass. Argillite and chert are dark-gray to black; the graywacke is medium- to dark-gray, very fine- to medium-grained, locally having graded bedding. Limestone is medium-gray, generally phosphatic, in part sandy, and locally associated with limy siltstone and conglomerate. Some cherty beds yielded radiolarians	Radiolarians (of Callovian to early Tithonian age [Late Jurassic]), Artoasteroceras jeleskyi, Paltechioceras (Orthechioceras?) sp., Weyla sp. indicating a late Sinemurian (Early Jurassic) age		HE002	3850	Healy	Ian	3850	JTrct
Trea	Conglomerate and	Late Triassic: late Norian	Lower part (40-50 m) of three unit division consists of cobble to boulder conglomerate composed of green volcanic rocks and red radiolarian chert clasts. Middle part, 40 to 50 m thick, composes of finer grained volcanogenic (andesitic?) conglomerate containing locally abundant fossils. Upper part of sequence consists of about 50 m of massive volcanic sandstone.	Permian radiolaria in lower part in clasts; Heterastridium sp. (Late Triassic, late Norian) in middle		HE002	4050	Healy	Sed	4050	Trea
Doc	Sodimentary converse	Middle Devonian to	Medium- to dark-gray, thinly graded bedded to laminated, medium- to fine-grained sandstone; dark-gray to black argillite; intercalated layers, a few tens of meters thick, of dark-gray, generally thinly bedded, locally thick-bedded limestone and dark-gray argilite; and near the top of the section, an approximately 200-m-thick interbed of medium- to light-gray, massive, finely to medium- to capartoly ac unit "Ic")	Gastropods. Middle Devonian fossils reported from massive limestone		45002	6970	Hoaly	Sod	5270	1Cmd
ls (DOs)	Limestone (Sedimentary sequence)	Middle Devonian (to Ordovician)	Approximately 200-m-thick interbed of medium- to light-gray, massive, finely to medium-crystalline, partly dolomitic limestone (mapped separtely as unit 'ls'). Part of unit DOs.	Middle Devonian fossils reported from massive limestone (ls).		HE002	6971	Healy	Sed	6931	DSml
Trbd	Basalt, diabase, and subordinate sedimentary	Late Triassic; Karnian and	Submarine sequence of several hundred, perhaps several thousand meters thick of basalt flows, mostly pillowed, with associated sills and dikes of diabase and gabbro. Subordinate interbedded sedimentary rocks are dark-gray to dark-grayish-green, fine- grained sandstone, siltstone, and argilite, some containing abundant angular tuffaceous	haboloid bivalve,		45002	4422	Hooly	Ice	4420	Ten
TrPas	Flyschlike sedimentary rocks	Late Triassic to Pennsylvanian	Interential. Intensely folded marine sequence of at least several hundred meters of dark-gray to black, massive to thin-bedded, flyschlike rocks: conglomerate, sandstone, siltstone, argillite, a few thin interbeds of impure limestone and near top of section, thin interbeds of chert intercalated with argillite.	Abundant trace fossils and displaced bryozoans, echinoderm fragments, rare brachiopods, corals, crinoids, condonts		HE002	5040	Healy	Sed	5040	TrPas

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Kms	Melange south of McKinley fault	Late and (or) Early Cretaceous	Fault-bounded tectonic and probably sedimentary melange of Paleozoic and upper Mesozoic rocks Three distinct suites: 1) Medium- to thin-bedded, greenish-gray to tan- colored, locally black, cherty tuff, chert, argiillite, and fine-grained volcanic sandstone; 2) Dark-gray to black, flyschlike rocks of argillite, slate, shale, fine- to medium-grained graywacke, subordinate bedded chert, and both chert-pebble and polymictic conglomerate (Lithologically idnetical to units KJf, KJfl, and KJfk); 3) Lenses and elongate blocks of medium-gray, generally medium- bedded and rarely massive, fine- to medium- grained fossiliferous limestone (mapped separately as unit 'msl')	Radiolaria, conodonts in cherty tuffs (Late? Devonian to Missisppian). Megafossils and conodonts from limestone (Silurian to Middle Devonian)		HE002	2192	Healy	Melange	2192	Kmar
Kmn	Melange north of McKinley fault	Late and (or) Early Cretaceous	Fault-bounded tectonic and probably sedimentary melange of Paleozoic and upper Mesozoic rocks Four disparate, intricately intermixed and pervasively sheared rock suites: 1) Blocks of medium-gray, medium- grained limestone of Silurian(?) to Devonian age (mapped as unit 'mnl'); 2) Blocks of medium-gray, medium-grained massive limestone of Late Triassic age (mapped as unit 'mnl'); 3) Dark-gray to black, flyschlike rocks of argillite, slate, shale, fine- to medium- grained graywacke, subordinate bedded chert, and both chert-pebble and polymictic conglomerate (Lithologically idnetical to units KJf, KJfl, and KJfk); 4) A poorly exposed small sliver of serpentinized ultramafic rocks, altered basalt, green and maroon tuff, and recrystallized chert, all of unknown age (mapped as unit 'mno').	Radiolaria, Buchia sp. (also see mnl)		HE002	2195	Healy	Melange	2195	Kmar
msl (Kms)	Limestone of Melange	Late and (or) Early Cretaceous	Lenses and elongate blocks of medium-gray, generally medium-bedded and rarely massive, fine- to medium-grained fossiliferous limestone mapped separately as unit 'msl' but is unit 3 of unit KMs, which is a fault-bounded tectonic and upoet Mesozoic rocks.	Labechia sp., Favosites sp., Dendrostella? sp., massive stromataporoid, and conodonts (Silurian to Middle Devonian)		HE002	2193	Healy	Melange	2193	TrSI
mni (Kmn)	Limestone of Melange north of McKinley fault	Late and (or) Early Cretaceous	Parts 1 and 2 of unit Kmn, a fault-bounded tectonic and probably sedimentary melange of Paleozoic and upper Mesozoic rocks. Parts are: 1) Blocks of medium-gray, medium- grained limestone of Silurian(?) to Devonian age; and 2) Blocks of medium-gray, medium- grained massive limestone of Late Triassic age.	Conodonts, Sagenites?, Tryplasma sp., Lyrielasma? sp., Zelophyllum? sp.,Clavidictyon sp., Ampipora sp., Mysidia sp., Belemnite sp. interdeterminate, Cladopora sp., Coenites? sp., coral, molluscs, brachiopods, conodonts, crinoid fragments		HE002	2196	Healy	Melange	2196	TrSI

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Rock unit		, ige		10331	Rudiometrie uge		Clubb Couc	Quuunungie		110/11000	Laber
			Part 4 of unit Kmn, a fault-bounded tectonic								
			and probably sedimentary melange of								
			Balaazais and upper Masazais racks. Consists								
			aleozoic and upper Mesozoic rocks consists								
			or a poorty exposed small silver of								
			serpentinized ultramatic rocks, altered basalt,								
mno	Melange north of	Late and (or) Early	green and maroon tuff, and recrystallized								
(Kmn)	McKinley fault	Cretaceous	chert, all of unknown age.			HE002	2197	Healy	Melange	2197	mlu
	Young and old landslide		Chiefly debris avalanches and large block								
QI	deposits	Quaternary	glides in areas of steep slopes			TL002	100	Talkeetna	Unconsol	100	Qs
			Chiefly boulders, gravel, and sand with local								
			areas of silt and clay. Alluvium on active floo	d							
			plains, older alluvium on terraces of major								
			streams alluvial fans outwash swamp								
			march and bog deposits and alluvial deposit	-							
0.211	Allunium undivided	Quatarpary	and bog deposits, and and an deposit	5		TI 002	101	Talkootaa	Unconcol	100	00
Qau	Anuvium, unuvided	Quaternary	on broad pediment surfaces.			11002	101	Taikeetiia	UTICOTISOI	100	QS
0.7		Quataman	Chiefly whhle and diamistan			TI 002	110	Talliastas	Unconcol	100	0.0
Qr	active rock glaciers	Quaternary	Chieffy rubble and diamicton			TLUUZ	110	такеецпа	Unconsol	100	QS
<u> </u>	Giacial deposits		Chiefly rubble and diamicton. Includes end			-		- u .		100	
Qa	Alaskan glaciation	Quaternary	and lateral moraines.			1L002	1111	Talkeetna	Unconsol	100	Qs
			End, lateral, and ground moraine, postglacial								
			alluvial, pond, and swamp deposits, fluvial								
			glacial deposits of all stages of Naptowne								
	Glacial deposits		glaciation and glaciolacustrine deposits forme	d							
Qn	Naptowne glaciation	Quaternary	during Knik and Naptowne glaciations			TL002	120	Talkeetna	Unconsol	100	Qs
_	Glacial deposits Knik		Well-developed end and lateral moraine,								-
Qk	glaciation	Quaternary	shown only northwest part of quadrangle.			TL002	121	Talkeetna	Unconsol	100	Qs
	5	, , , , , , , , , , , , , , , , , , ,									
			South of the Alaska Range, lateral and ground	1							
			moraine have subdued geomorphic expression	- n							
			and include alluvial swamp marsh and bog								
	Glacial deposits		deposite North of the Alaska Range end and	1							
00	Eklutan alaciation	Quatarpary	lateral meraines are relatively fresh	·		TI 002	120	Talkootaa	Unconcol	100	00
Qe		Quaternary	Subdued lateral(2) and ground mornings on			112002	150	Taikeetiia	UNCONSO	100	Q3
			Subuled lateral () and ground moralles on								
			north side of Alaska Range, although glacial								
1			retratics and weil-modified drift on top Yenio								
-	Glacial deposits pre-	-	Hills are probably also deposits of this								-
Qpe	Eklutna age glaciations	Quaternary	glaciations.			TL002	131	Talkeetna	Unconsol	100	Qs
			About 30 m of subituminous coal, with								
			individual beds up to 9 m thick. Coal-bearing								
		Possible Oligocene and	rocks contain interbeds ferruginous siltstone								
Tc	Coal-bearing rocks	Miocene	and silty shale.			TL002	200	Talkeetna	Sed	640	Tcb
			Chiefly medium- to dark-gray phyllitic shale,								
			shale, sandstone, grit, and conglomerate with	1							
1	Continental sedimentary		minor carbonaceous shale and tuffaceous								
Ts	rocks	Tertiary, Paleocene	sandstone.	Metaseguoja		TL002	201	Talkeetna	Sed	1920	Kcs
			Dark-greenish-gray elongate bodies of				1				
1			massive-weathering, resistant pillow basalt.								
			The unit includes interbeds and lenses of								
			mudstone shale and siltstone. The basalt								
1		Farly Crotacoous and	locally includes gabbre which may represent								
K1b	Billow bacalt	luraccic(2)	lits foodor source			TI 002	300	Talkootna	Ian	2800	1Trtv
KJU	FINOW Dasalt	ן או מאאר (י	Into requer Source.	1		TLUUZ	1000	raikeetiia	liðli	2090	

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Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Moderate- to deep-water, intertonguing marine sedimentary rocks consisting chiefly of gray to black phyllite, argillite, graywacke,								
			and siltstone which are in part turbidite deposits; lesser amounts of gray, green, and red chert, conglomerate, grit, and thin beds of								
			limy mudstone and impure limestone. Conglomerate contains clasts of medium- to	belemnites, Buchia, and occasional							
	Undivided marine	Farly Crotacoous and	dark-gray chert, phyllite, and sandstone in a	Inoceramus of							
KJs	sedimentary rocks	Jurassic(?)	North of Denali Fault	Barremian age)		TL002	302	Talkeetna	Sed	2852	KJfn
			Marine sedimentary rocks that typically form a thin- to medium-interbedded sequence of black, sooty, carbonaceous, and calcareous shale, dark-gray calcareous siltstone, medium to dark-gray limestone, and minor gray	-							
			quartzite. Shale locally amounts to as much								
			and contains thin laminae of dark-grav								
Pzsl	Shale and limestone	Early Paleozoic?	siltstone.			TL002	400	Talkeetna	Sed	4033	Trcs
	Quarteita comischist		Tan to light-greenish-gray, low-grade (greenschist facies), regionally metamorposed quartzite, quartz semischist, quartz grit, metavolcanic rocks, and minor conglomerate, lieacthere brullite and grunt muscuret								
Pzsv	Quartzite, semiscrist, and metavolcanic rocks	possibly late preCambrian	schist Isoclinally folded			TI 002	401	Talkeetna	Meta	9322	PzZags
		<u> </u>	Small composite biotite-muscovite granite								
Tmt	Tonzona pluton	Early Tertiary	pluton			TL002	210	Talkeetna	Ign	1320	Tpgr
ткі	dikes	Cretaceous	not shown on map as too small			TL002	211	Talkeetna	Ian	1601	тка
MzPzg	Gabbro and quartz diorite	Mesozoic and (or) Paleozoic	Dark-green, rust-weathering coarse-grained altered gabbro and minor guartz diorite.			TL002	600	Talkeetna	Ian	5180	MzPzi
		Mesozoic and (or)	Orange- to light-brown-weathering, light- to dark-green, fault-bounded body of								
MzPzu	Serpentinite	Paleozoic	serpentinite and minor talc schist.			TL002	601	Talkeetna	Meta	5290	MzZum
			estuarine and nonmarine clastic sedimentary Tertiary formations assigned to the Kenai								
Tk	Kenai Group, undivided	Pliocene and Miocene	Group.			TL002	220	Talkeetna	Sed	560	Tk
			Orange, light-tan, or light-gray, massive- bedded conglomerate, distinguished from conglomerate in the Tyonek Fm by color, relative coarseness, and clast lithology. As								
Tps	Sterling(?) Formation	Pliocene	much as 770 m thick.			TL002	221	Talkeetna	Sed	540	Tsf
	Tyonek(?) Formation		Approximately 80 percent sandstone, 20 percent siltstone and claystone, and less than 1 percent conglomerate, coal, and volcanic ash. Occurs in repetitive cycles 7- to 23-m-								
Tts	Sandstone member	Miocene	thick.			TL002	230	Talkeetna	Sed	600	Tty
Tte	Tyonek(?) Formation	Mincene	At least 40 percent conglomerate, 20 percent sandstone, and less than 40 percent siltstone, claystone, and coal. Conglomerate is light- brown, light-gray, or bluish-gray and poorly indurated. Sandstone is coarse, poorly sorted and nebbly, and year, poorly indurated			TI 002	231	Talkeetna	Sed	600	Thy

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
itoeit unie			Interbedded tuff, mafic volcanic flows,	1.00011	radiometric age			Quuunungie		110/1 01000	2000.
			sandstone, shale, and minor calcareous								
			mudstone. Volcanic rocks are chiefly medium	-							
			to coarse-grained greenish-gray crystal lithic								
	Undivided volcanic and		lapilli tuff and volcanic rubble flows in units as								
Tvs	sedimentary rocks	Tertiary	much as 150 m thick.			TL002	240	Talkeetna	Ign	1000	Tvu
			Medium- to dark-gray, generally isoclinally								
			folded, thick sequence of lithic graywacke,								
			phyllite, and shale with local lenses of quartz-								
			chert conglomerate. Minor fossiliferous								
			limestone, radiolarian chert, and red								
			ferruginous sandstone and siltstone.								
			[Description suggests could include rocks of								
			the Talkeetna Formation, Matanuska	Inoceramus,							
			Formation, and Nelchina Ls. or Herendeen	ammonites,							
	Undivided marine	Cretaceous and Early	Fm., along with other units.] South of Denali	brachiopods, and							
KJs	sedimentary rocks	Jurassic	Fault.	pelecypods		TL002	301	Talkeetna	Sed	2850	KJf
			Chiefly dark-greenish-gray massive pillow								
			basalt and petrographically similar coarse-								
			grained pyroxene gabbro and basaltic dikes								
			and sills. as mapped, includes varying								
			amounts of interstratified agglomerate, flow								
			breccia, aquagene tuff, and thick, chaotic								
			sequences of eugeosynclinal sedimentary								
Pzbs	Pillow basalt	middle or late Paleozoic	rocks.			TL002	410	Talkeetna	Ign	5450	JTrtv
			Dark-greenish-gray massive-weathering mafic								
			volcanic rocks that include pillow basalt,								
			breccia, agglomerate, tuff, and massive basalt								
			flows. Volcanic rocks commonly contain								
			interbeds of black phyllite, chert-pebble								
	Volcanic and		conglomerate, light-green tuff, and								
Pzv	sedimentary rocks	middle or late Paleozoic	graywacke.			TL002	411	Talkeetna	Ign	5410	Pzvs
									-		
				Limestone clasts in							
			Dark-brown to yellowish-brown-weathering	conglomerate contain							
			sequence of conglomerate, sandstone,	Middle Devonian(?)							
			siltstone, and shale mainly of continental	fossils. Shale and							
			origin that forms a broad, open, east-plunging	sandstone beds locally	r						
			syncline. Unit is chiefly massive lenticular	contain abundant							
	Conglomerate of Mount		beds of conglomerate and sandstone with	plant fossils of Middle							
Pad	Dall	Middle Pennsylvanian	numerous cut and fill channels.	Pennsylvanian age.		TL002	420	Talkeetna	Sed	6010	PDsc
			A depositionally and structurally complex								
			terrane of chiefly marine flysoid sedimentary								
			rocks which include: 1) trench assemblages								
			characterized by terriginous turbidites, cherty								
			pelagites, and basaltic pillow lavas; 2) slope								
			and shelf assemblages that include chert,								
			shale, reefoid limestone, and, locally,								
		Mississippian,	terrestrial conglomerate and redbeds, and 3)								
	Undivided sedimentary	Pennsylvanian, and (or)	a thick locally terrestrial conglomerate and	Fossils of varying late							
Pzus	rocks	Devonian	sandstone assemblage.	Paleozoic ages		TL002	421	Talkeetna	Sed	5370	JCmd
				-							
1		1		Conodonts of Late							
				Devonian; abundant							
				coral and shelly							
1		1		faunas of late Middle							
1		1	Thin-bedded gray micrites grading upward	and early Late							
		1	into fossiliferous, massive to reefoid,	Devonian; locally late							
1		1	biostromal beds of colonial rugose corals and	Early or Middle							
DI	Limestone	Middle and Late Devonian	massive stromatoporoids.	Devonian		TL002	500	Talkeetna	Sed	6615	DSmdl
			Dark-gray phyllite, phyllitic shale, and								
Pzp	Phyllite	Paleozoic	argillaceous siltstone.			TL002	430	Talkeetna	Meta	5370	JCmd

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
								Quality of the			
			Light-gray to light-brown massive-weathering	Graptolites,							
			marbleized limestone and local areas of thin-	dasycladacean algae,							
SI	Limestone	Silurian	bedded to laminated limestone.	corals		TL002	700	Talkeetna	Sed	6615	DSmdl
			Chaotically folded allochthonous sequence of								
			interbedded graptolitic shale and chert and					- 11 .		7500	
UC	Chert and shale	Early to Middle Ordovician	minor sandstone and siltstone.	Graptolites		11002	800	Talkeetna	Sed	7580	SCPI
			Thick sequence of sedimentany rocks								
			consisting of an undetermined thickness of								
			interhedded lime mudstone and shale more								
			than 900 m of annarently unfossiliferous deep	Cardiolacea of late							
			water, well-bedded lime mudstone (micrites).	Wenlockian (Silurian)							
	Sedimentary rocks of		and at least 900 m of interbeeded sandstone.	age, conodonts of							
Pzd	Dillinger River (limev)	Paleozoic	shale, and limestone.	Silurian age.		TL002	431	Talkeetna	Sed	5310	DCd
			Medium-grained, equigranular biotite and								
Tf	Foraker pluton	Eocene	hornblende granodiorite.		K-Ar? of 38 MA	TL002	241	Talkeetna	Ian	1292	Toem
-	McKinley Sequence		Medium- to coarse-grained, hypidiomorphic-							-	
Tm	McKinley pluton	Early Tertiary	granular biotite granite.			TL002	250	Talkeetna	Ign	1320	Tpgr
			Medium- to coarse-grained, hypidiomorphic-								
			granular biotite and biotite-muscovite granite								
	McKinley Sequence		and minor phases of biotite-hornblende								
Tmc	Cathedral pluton	Early Tertiary	granodiorite.			TL002	251	Talkeetna	Ign	1320	Tpgr
			Two bodies, southwest is fine- to coarse-								
			grained, hypidiomorphic-granular biotite and								
			biotite-muscovite granite and granodiorite.								
			Northeast body is medium- to coarse-grained,								
L .	McKinley Sequence		hypidiomorphic-granular biotite-muscovite						L		_
Imk	Kahiltna pluton	Early Tertiary	granite.			1L002	260	Talkeetna	Ign	1320	Ipgr
			Three hodies. Chulitae hody is modium- to								
			coarco-grained, weakly foliated								
			hypidiomorphic-granular biotite granite								
			South body is coarse-grained, hypidiomorphic-								
			granular biotite granite and granodiorite.								
			North body is medium- to coarse-grained.								
	McKinley Sequence		hypidiomorphic-granular biotite and biotite-								
Tmr	Ruth pluton	Early Tertiary	muscovite granite.			TL002	261	Talkeetna	Ian	1320	Tpar
	· ·										
			Medium-grained, hypidiomorphic-granular		K-Ar ages on						
	Granodiorite of Mount		biotite-hornblende granodiorite. Tourmaline is	5	hornblende of 65 and						
Те	Estelle	Early Tertiary	a characteristic accessory mineral.		66 Ma	TL002	270	Talkeetna	Ign	1350	Thgd
			Average composition is quartz monzonite but		K-Ar ages range from						
Тср	Composite plutons	Early Tertiary	ranges from peridotite to granite.		64.6 and 67.4 Ma	TL002	271	Talkeetna	Ign	1320	Tpgr
	Unidivided intrusive	Late Cretaceous or	Probably range in composition from granite to					- 11 .	-	1650	
ТКІ	rocks	Tertiary	tonalite			1L002	211	Talkeetna	Ign	1650	ТКІ
			Dark-gray to greenish-gray dikes and sills								
M-D-i		Magazaia an Dalaazaia	ranging in composition from basait to			TI 002	C10	Talliastes	Tan	F1C0	M-D-:
ITIZPZI	IULKS	Mesozoic or Paleozoic	granoulonite.			11002	010	raikeeulia	1911	3100	IMZP2I
1	Undivided dupito and		Alpine-type ultramatic rocks and minor tals								
MzPzd	corportinite	Mesozoic or Paleozoic	schist Chromite-bearing dunite in sills			TI 002	611	Talkootna	Ian	5190	MzZum
ITIZE ZU	Chulitna sequence		Massive cliff-forming outcrops of arcillite			12002	011	TUNCCUIA	1911	5150	112Zum
1	Sedimentary and		radiolarian chert siltstone minor pillow								
ITrsv	volcanic rocks	Jurassic to late Triassic	basalt, and impure micritic limestone			TL002	900	Talkeetna	Sed	3850	ITrct
			, = = = = , =				1			1	1

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
	Chulitna sequence		Distinctive light-green to maroon volcaniclastic rocks that range from tuffaceous shale to a quartz-pebble conglomerate having a tuffaceous matrix. Commonly contain interbeds of massive micritic and bioclastic limestone, minor chert, argillite, rust-	Thecosmilia, Heterastridium, and	y						
17	Volcanic and	Early Jurassic to late	weathering siltstone and sandstone, and	Septocardia(?) of Late		TI 000	201	T - U h	T	1225	17
Trlb	Chulitna sequence Limestone and basalt	Faileozoic Early Jurassic to late Paleozoic	Limestone and basalt which grades southwestward into interbedded gray limestone, dark-green pillow basalt, massive and locally semischistose basaltic tuff, calcareous sandstone, and minor black chert and silty limestone.	Monotis subcircularis, Heterastridium, and Cassianella of Late Triassic (Norian) age		TL002	290	Talkeetna	Sed	4021	Trlb
			Chiefly unconsolidated sand and gravel. Flood	-							
0a	Alluvial deposits	Holocene	be outwash.			мн002	100	Mount Haves	Unconsol	100	05
Qfl	Fluviolacustrine deposits	Holocene	Chiefly consisting of sand, silt, and clay. Lake, pond, and low-gradient streem deposits.			MH002	112	Mount Hayes	Unconsol	100	Qs
Qc	Colluvial deposits	Holocene	Chiefly rubble, gravel, sand, silt, and clay. Talus and other slope debris deposits, also includes alluvium of minor streams, and locally glacial, rock glacier, and mass-wasting deposits. May include older glacial drift and locally grades into glacial deposits.			MH002	107	Mount Hayes	Unconsol	100	Qs
	· · · · · · ·							· · · ·			
Qam	End and lateral moraines of Alaskan glaciation	Holocene	Chiefly rubble and diamicton			мноо2	130	Mount Hayes	Unconsol	100	Qs
Qwm	End and lateral moraines of Wisconsin glaciation	Holocene and Pleistocene	Poorly sorted and unstratified till of unconsolidated sand and gravel. Chiefly rubble and diamicton, local sand and gravel.			MH002	135	Mount Hayes	Unconsol	100	Qs
Qwf	Glaciofluvial deposits of Wisconsin glaciation	Holocene and Pleistocene	Moderately well-stratified layers and lenses of well-rounded gravel with a matrix of silt and sand. Poorly to moderately well sorted with lenses of well-sorted sand locally.			MH002	140	Mount Hayes	Unconsol	100	Qs
Qog	Drift of older glaciations	Pleistocene	Glacial deposits of subdued geomorphic expression, probably of early Wisconsin or Illinoian age occurring beyond limit of Wisconsin moraines. At higher elevations, chiefly unconsolidated diamicton and boulder deposits. At lower elevations, consist chiefly of unconsolidated glaciofluvial deposits of moderately well stratified and sorted gravel and sand.			МН002	190	Mount Hayes	Unconsol	100	Qs
Tn	Nenana Gravel	Pliocene	Consists chiefly of poorly cemented conglomerate but includes some sandstone and siltstone. Clast composition in the MH D- 6 quadrangle is (in decreasing order of abundance) schist, quartzite, granitic rocks, gabbro, and metagabbro. Top of unit is eroded. Unconformably overlies MH units grgm and jcs and locally unit Ts. Overlies unit Tsju. Uncomformably overlain by Pleistocene glacial denosits.			MH002	570	Mount Haves	Sed	570	Tn

Rack und Unit hand Age Description Food Read common gas on des Class code Quadrange Read costs Read costs<							Source					
The sense were proved by the sense were proved by the sense were provided and sense is board and sense were provided and sense were p	Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
IndexIndexCharley transmit statutes and approved to and dot applied. Consenting that bounds. dot applied. Consenting that bounds. Composition where from all transmits that bounds. Composition where from all transmits. Composition where from all transmits. Comp											1	
In the second				Chiefly brown conditions and graywacks but								
and the application of the control y number of biologication o				includes some interbedded condomerate and								
rs Sundation Sundation is finite to medium granted, poorty of granted, and contain angular grants, n of classific matrix. Conjugnments, elegand metals, not all classific matrix. Conjugnments, elegand metals, notable, and blackes, net classific matrix. Conjugnments, elegand metals, notable, and blackes, net classific matrix. Conjugnments, elegand metals, notable, and blackes, strained metals, notable, and strained provide free confined - instrained metals, notable, and strained provide free confined - instrained metals, notable, notable, notable, strained metals, notable, not				dark argillite. Generally fault bounded.								
Substrate Substrate Substrate Substrate Parts of Glocome, Nucleon, and Restore from substrate regimes in a Rests of Glocome, and Restore from substrate rests of Glocome, Nucleon, Parts Market of Glocome, Congenerate Mar				Sandstone is fine- to medium-grained, poorly								
Fin Composition varies from quarty graters in a fair/shift matrix (and gratery independence) Final Software Final So				sorted, and contains angular grains.								
Fa Sandstone Piecone, Mocrea, and Clapocate Classical (dispace), month, scorphilos, and grantic rock and schist, month, month, scorphilos, maldane, and grantic rock and schist, month, month, month, scorphilos, maldane, and grantic rock and schist, month, month, month, scorphilos, maldane, and grantic rock and schist, month, month, month, month, month, month, month, month, manual, month, month, month, month, month, month, month, manual, month, month, month, month, month, month, month, month, month, month, mon				Composition varies from quartz grains in a								
Sendence Income, Moorne, And Granter, Protecter, Jonothe, and Blotte in processes Plants of Oligocete and const. Unit processes Minute Plants of Oligocete and const. Unit Plants				clay-rich matrix to quartz, plagioclase, K-								
The Sendence Pilocene, Audor Pilocene, and Pilocene, and Pilocene, Mocele, Pilocene, Mocele, Pilocene, Mocele, Pilocene, Mocele, Pilocene, Mocele, Pilocene, M				feldspar, pyroxene, hornblnde, and biotite in a	Plants of Oligocene,							
15 Statisticity modes of arrives (see call field)	-		Pliocene, Miocene, and	clay-rich matrix. Conglomerate clasts chiefly	Miocene, and Pliocene			500			500	-
Tarvis Creek call Terms of the set of	IS	Sandstone Sedimentary recks of	Oligocene	Granitic rocks and schist.	age		MHUUZ	500	Mount Hayes	Sea	500	TSU
Total Individed Parky Tertiary 1953. The status of		larvis Creek coal field		and coal (Unit of Wabraffig and Hickcox								
Selfmentary rocks of Jarvis Creek call field - early Tertary extend call below is 300 m. Early Tertary extend call below is 300 m. Tertary plant fossils MH002 911 Mount Hayes Self of the selfmentary rocks of Jarvis Creek call field - prominent coal and shale zone at base. Provide and seatcerd coal beds and a prominent coal and shale zone at base. Parking the member 911 Mount Hayes Self of the selfmentary rocks of Jarvis Creek call field - prominent coal and shale zone at base. Parking the member 911 Mount Hayes Self of the selfmentary rocks of Jarvis Creek call field - prominent coal and shale zone at base. Parking the member 911 Mount Hayes Self of the selfmentary rocks of Jarvis Creek call field - prominent coal and shale zone at base. Parking the selfmentary rocks of Jarvis Creek call field - Selfmentary rocks of Jarvis Creek call field - To Creak could be diverted at Jarvis Creek call field - grad diverte rise of Jarvis Jarvis Creek could be diverted at Jarvis Creek could be diverted files, sills, and small plutons. The coarse-graned, prophyritic texture - prophyritic - texture - prophyritic - texture - prophyritic - texture - pr	Tsi	undivided	Farly Tertiary	1955.)	Teriary plant fossils		мноо2	910	Mount Haves	Sed	910	Tic
Tay Darvis Creek confliction Early Tertiary Containing scattering containing scattering containing scattering containing contreal dontecontecontaining contreal donte containing containing co		Sedimentary rocks of		Chiefly dark-gray mudstone and sandstone				510	rioune nayes		510	. je
Type Upper member Early Tertiary estimated thickness is 300 m. Tertary plant fossils MH002 911 Mount Hayes Sed 910 Tpp Middle member Early Tertiary Chiefly Upin Arabits ansistence containing permisence of any ship zone at base. no Prefav plant fossils MH002 911 Mount Hayes Sed 910 Tpp Sedimentary rocks of Javis Creek coll field Early Tertiary Mount Hayes Sedimentary rocks of Chiefly angular quarts andstone and coun- comptionments, some dispace and count mount Hayes Sed 910 Tpp Javis Creek coll field Early Tertiary Mount Hayes Sed 910 Tpp Justice Creek coll field Early Tertiary Mount Hayes Sed 910 Tpp Lamprophyre, alkali diotrie Early Tertiary and Late Createous Undifferentiated disks, sils, and small platons. Predominantly file- to medium- porphyritic texture. Tro clusters of K-Ar ages in the taxt. NH002 1690 Mount Hayes Ign 1690 Tpi Ia Bardy Ferdage and Sils of Createous Early Tertiary and Late Indifferentisted disks, sils, and small platons. <td< td=""><td></td><td>Jarvis Creek coal field</td><td></td><td>containing scattered coal beds. Maximum</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		Jarvis Creek coal field		containing scattered coal beds. Maximum								
Sedimentary rock of Tig Sedimentary rock of Berly Tertiary Chefly buff anomalies and schere of all befa and a charged member MH002 912 Mount Hayes Sed 910 Tic Sedimentary rock of Jarvis Creek coal field Tay Enry Tertiary Chefly public quert can all buff and as conglomerate; sone chystone and coal. MH002 913 Mount Hayes Sed 910 Tic Sedimentary rock of Jarvis Creek coal field tary Lower member Enry Tertiary Undifferentiated dikes; sils on publics. Predominantly fine- to medium- arge and 69.3 to particitie the faberbane mixed alon te MH002 913 Mount Hayes Sed 910 Tic I amprophyre, sikali aborte Enry Tertiary Undifferentiated dikes, sils, and small publics. Predominantly fine- to medium- arge and 69.3 to particit the faberbane mixed and the faberbane mixed prophyritic sedura- mon conte and quart faberbane prophyritic sedura- mon conte and diorite MH002 1661 Mount Hayes Ign 1660 Tic grand Grand faberbane prophyritic sedura- mon conte and quart faberbane prophyritic sedura- mon conte and quart faberbane prophyritic sedura- mon conte faberbane prophyritic sedura- mon conte faberbane prophyritic sedura-	Tsju	Upper member	Early Tertiary	estimated thickness is 300 m.	Teriary plant fossils		MH002	911	Mount Hayes	Sed	910	Tjc
Sedmentary rocks of Typ Cardian end are statemed coal backs and a prominent coal and shall come at base. MH002 912 Mount Hayes Sed 910 Tic Tgim Sedmentary rocks of Janvis Creek coal field Early Tertiary Cheffy angular quartz standstone and coal. Teriary plant fossils MH002 912 Mount Hayes Sed 910 Tic Tgi Lower member Early Tertiary Cheffy angular quartz standstone and coal. Teriary plant fossils MH002 913 Mount Hayes Sed 910 Tic Tgi Lower member Early Tertiary Maximum estimated thickness is 150 m. Teriary plant fossils Two clusters of K-Ar args in the east- central part of quad. G2.0 to 69.2 Me in the Roserson Reve promover and part of quad. G2.0 to 69.2 Me in the Roserson Reve promover and part of quad. G2.0 to 69.2 Me in the Roserson Reve promover and part of quad. G2.0 to 69.2 Me in the Roserson Reve promover and part of quad. G2.0 Mount Hayes Ign 1660 TKr md Monzonite and quart chines Monzonite and quart chines Min002 1660 Mount Hayes Ign 1660 TKr gam Grantic unt 1 Late Cretaceous Grantic duadiante, includes tenser quarts Mi				Chiefly buff arkosic sandstone containing								
Type Parvis Creek coal Field - Barvis Creek coal Field - Bar		Sedimentary rocks of		claystone and scattered coal beds and a								
Isym Middle member Early lettary Maximum estimated thickness is 300 m. Inerary plant tossils MH002 912 Mount Hayes Sed 910 Type Tgil Lower member Early Tetlary Maximum estimated thickness is 150 m. Terlary plant tossils MH002 913 Mount Hayes Sed 910 Type Tgil Lower member Early Tetlary Maximum estimated thickness is 150 m. Terlary plant tossils MH002 913 Mount Hayes Sed 910 Type Lamprophyre, alkili Lamprophyre, alkili Lamprophyre, alkili Early Tetlary and Late Undifferentiated dikes, sills, and small plutons. Two clusters of K-Ar ages in the east. Two clusters of K-Ar ages in the east. Image: the east. I	L	Jarvis Creek coal field		prominent coal and shale zone at base.								
Selfine mark y robes of Tyj Chiefy anguar quark sensore and the property of the sensore and the sensore and the sensore and the sensore and the sensore and the sensore and the sensore and the	Isjm	Middle member	Early Tertiary	Maximum estimated thickness is 300 m.	Teriary plant fossils		MH002	912	Mount Hayes	Sed	910	Iјс
Total Construction Early Tertiary Multiplicitie and construction Tertary plant fossils MH002 913 Mount Hayes Sed 910 Tjc Image: Construction in the constructin the co		Sedimentary rocks of		Chiefly angular quartz sandstone and								
Cycle Content manage	Tsil	Lower member	Farly Tertiary	Maximum estimated thickness is 150 m	Teriary plant fossils		мноо2	913	Mount Haves	Sed	910	Tic
IndexInterprophyre, alkali gabbo, and alkalelic gabbo, and alkalelic gabboo, and alkalelic gabboo	13)1	Lower member		Maximum estimated thickness is 150 m.	Teriary plane rossils		1111002	515	Flouric Hayes	Jea	510	i je
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Granite of Buchanan Crieety Tertiary or Late Granite of Buchanan Early Tertiary or Late medium-grained, hypautomorphic granular grbc Creek MH002 1656 Mount Hayes Ign 1655 TKg grmh Granite of Mount Hayes Creaceous Chiefly biotite granite, with fine- to medium- granular texture. MH002 1657 Mount Hayes Ign 1655 TKg				Chiefly highing househouse anning with larger								
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grmh Granite of Mount Hayes Cretaceous Chiefly biotite granite, with fine- to medium- grained, hypautomorphic granular texture. MH002 1657 Mount Hayes Ign 1655 TKg	3.00		0.000000						curic riuyes	- 3/1	1000	
grmh Granite of Mount Hayes Cretaceous grained, hypautomorphic granular texture. MH002 1657 Mount Hayes Ign 1655 TKg	1		Early Tertiary or Late	Chiefly biotite granite, with fine- to medium-								
	grmh	Granite of Mount Hayes	Cretaceous	grained, hypautomorphic granular texture.			MH002	1657	Mount Hayes	Ign	1655	ТКд

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
					K-Ar biotite and			Q ====:_j:=			
			Chiefly biotite-hornblende granodiorite, with		hornblende dates and						
			lesser granite and quartz diorite. Medium-		U-Pb zircon ages						
	Granodiorite of		grained, hypautomorphic granular texture,		ranging from 84 to						
grmr	Molybdenum Ridge	Late Cretaceous	locally porphyritic.		93 Ma	MH002	2480	Mount Hayes	Ign	2480	Kg
			Chiefly biotite-hornblende granite, includes								
	Granite of Granite		minor quartz diorite. Fine- to medium-		U-Pb zircon age of 90				_		
grgm	Mountain	Late Cretaceous	grained, hypautomorphic granular texture.		Ма	MH002	2461	Mount Hayes	Ign	2475	Кд
			Chiefly bornblanda granita, biatita granita								
			borphlanda biotita granita borphlanda								
			arapediarite, and minor quarta diarite. Van		Bh alpha ages of 00						
	Granite of Macomb		fine- to medium-grained hypautomorphic		and 110 Ma (Highly						
arma	Plateau	Late Cretaceous	granular texture locally porphyritic		suspect)	мноор	2462	Mount Haves	Ian	2475	Ka
grina	Thateau		Chiefly biotite-bornblende granite and		suspect)	1111002	2402	Flound Hayes	Ign	2475	ity
			granodiorite Fine- to medium-grained								
			hypautomorphic granular texture, locally		K-AR hornblende age						
arrc	Granite of Rumble Creek	Late Cretaceous	porphyritic.		of 89 Ma	мноо2	2463	Mount Haves	Ian	2475	Ka
5			P P J						-5		
			Chiefly hornblende metagabbro, metadiabase,								
			and minor amphibolite. Undifferentiated								
			dikes, sills, and small plutons. Metagabbro								
			and metadiabase generally fine- to medium-								
			grained with hypautomorphic granular to								
	Gabbro, diorite,		diabasic texture, locally porphyritic.								
	metagabbro,		Amphibolite is fine- to medium-grained with								
	metadiorite,		granoblastic to porphyroblastic texture,								
	metadiabase, and		containing hornblende porphyroblasts up to 2								
mgb	amphibolite	Cretaceous	mm in size. Correlative with unit gbm.			MH002	2670	Mount Hayes	Meta	2670	Kmum
			Gabbro of fine- to medium-grained with								
a la ma	Cabbra of Mount Moffit	Creteseeus2	hypautomorphic granular to diabasic texture.			MUIOOD	2440	Mount Linuag	Tan	2440	Kanaura
gom	Gabbro of Mount Moint	Cretaceous?	Correlative with unit high.			MINUUZ	2440	Mount hayes	ign	2440	Kmum
					Intrusion from LI-Ph						
					zircon age of 333 to						
					345 Ma from Big						
			Chiefly medium-grained, mylonitic gneiss.		Delta guadrangle to						
			Intensely deformed, exhibiting a strong		north and						
			schistosity showing gentle north or south dips		metamorphism from						
			Contains diagnostic amphibolite facies		Rb-Sr ages on						
		Mississippian (intrusion	minerals and shows retrogression to		multiple phases of						
lga	Augen gneiss and schist	age)	greenschist facies.		110 Ma	MH002	6520	Mount Hayes	Meta	6521	MDyao
			Chiefly metagranite but includes some								
			metamorphosed quartz diorite and meta								
			granodiorite. Relict hypautomorphic granular		Intrusion from U-Pb						
			texture. Intensely deformed, exhibiting a		zircon age of 360 Ma						
			strong schistosity. Contains diagnostic		and metamorphism						
1	Medium-grained		amphibolite facies minerals and locally shows		from Rb-Sr isochron	1000	7252	Mariat	N4-1-	7050	MD
Igr	gneissose granitic rocks	Devonian (intrusion age)	retrogression to greenschist facies.		at 110 Ma	MH002	/252	Mount Hayes	Meta	7250	мруао
			Chiefly fine- to modium-grained new								
			deformed mylopitic politic schiet and miner								
			quartzite and calc-schist Unit intensely								
			deformed exhibiting a strong schiptopity that		II-Ph zircon age from						
			dine gently north or south Metamorphicod to		atz-bio-feld schist in						
1	Pelitic schist and		middle to upper amphibolite facies and locally		Big Delta quadrangle						
las	quartzite	Devonian and older	retrograded to lower greenschist facies.		to north was 365 Ma	MH002	7403	Mount Haves	Meta	8630	PzZvsa

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
mg	Medium-grained granitic gneiss	Devonian (intrusion age)	Chiefly fine- to medium-grained mylonitic gneiss derived from granite, granodiorite, and quartz diorite. Includes minor augen gneiss. Texture varies from protomylonitic to mylonitic schist. Intensely deformed exhibiting strong schistosity. Schistosity and parallel composition layering dip moderately southwest and strike northwest. Metamorphosed to epidote amphibolite facies, locally to amphibolite facies.		U-Pb zircon ages about 372 Ma indicate intrusion, Rb- Sr mineral isochron indicates metamorphism at 102 Ma	мноо2	7250	Mount Hayes	Meta	7250	MDyao
ms	Metamorphosed pelitic, calcareous, and quartz- feldspar sedimentary rocks	Devonian or older	Chiefly fine-grained, mylonitic, metasedimentary schists. Quartz-mica schist and lesser calc-schist. Intensely deformed exhibiting strong schistosity. Schistosity and parallel composition layering dip moderately southwest and strike northwest. Metamorphosed to epidote amphibolite facies, locally to amphibolite facies.			МН002	7400	Mount Hayes	Meta	9322	PzZaqs
icq	Fine- to medium-grained gneissose granitic rocks	Devonian (intrusion)	Chiefly schistose metagranodiorite, and augen gneiss. Intensely deformed exhibiting strong schistosity.		Intrusion age from U- Pb zircon determination of 372 Ma	MH002	7251	Mount Hayes	Meta	7250	MDyao
icy	Fine-grained schistose metavolcanic rocks and metasedimentary rocks	Devonian (eruption)	Chiefly fine-grained, mylonitic, metavolcanic rocks interlayered with lesser metasedimentary rocks. Metavolcanic rocks consist chiefly of metamorphosed quartz keratophyre, dacite, and andesite and lesser metarhyodacite and metabasalt derived from fine-grained tuffs and flows. Metasedimentary rocks chiefly quartz-mica schist and some calc schist, marble, skarn, and quartzite. Protoliths thought to be pelite, quartz sandstone, siltstone, marl and limestone. Metamorphism ranges from lower greenschist to lower amphibolite facies. Intensely deformed exhibiting strong schistosity which dins gently to moderately, north or south.	7	U-Pb zircon age determinations on metavolcanic rocks yielded ages of 364, 372, and about 375 Ma	MH002	7241	Mount Haves	Meta	7320	Pzsc
jcs	Fine-grained metasedimentary rocks	Devonian and older	Chiefly fine-grained, mylonitic, metasedimentary rocks. Rocks consist of 65 percent quartz-mica schist, 15 percent quartzite, and 5 percent each of chlorite- wihite mica schist, quartz-biotite schist, calc- schist, and marble. Metamorphism ranges from lower greenschist to lower amphibolite facies. Intensely deformed exhibiting strong schistosity which dips gently to moderately north or south.		K-Ar ages on white mica range from 106 to 118 Ma, thought to be metamorphic age rather than cooling age (?)	MH002	7401	Mount Hayes	Meta	9322	PzZaqs
hgv	Fine-grained schistose volcanic rocks and phyllite	Devonian (extrusion)	Chiefly fine-grained, metavolcanic and metasedimentary phyllonites and blastomylonites. Metavolcanic rocks chiefly metamorphosed quartz keratophyre and andesite and sparse dacite and basalt. Metasedimentary rocks chiefly quartz-mica phyllonite, quartzite, quart-calc phyllonite, and marble. Protoliths thought to be siltstone, sandstone, graywacke, marl and limestone. Unit intensely recrystallized and ductily deformed. Metamorphosed at lower to middle greenschist facies.		U-Pb zircon yield ages of 375 Ma	мноо2	7240	Mount Hayes	Meta	7240	Dyv

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
hgs	Fine-grained schistose sedimentary rocks and volcanic rocks	Devonian and older	Chiefly fine-grained, pale-yellow, pale-green, and graphitic black metasedimentary phyllonite and blastomylonite with minor metavolcanic blastomylonite. Predominant lithologies are quartz-mica phyllonite, quartz- calc phyllonite, quartzite, marble, and metavolcanic blastomylonite. Protoliths thought to be siltstone, shale, marl, limestone, quartz-rich volcanic rocks, and volcanic graywacke. Intense recrystallization and ductile deformation, exhibits strong schistosity. Metamorphosed to lower to middle greenschist facies.			мноо2	7402	Mount Hayes	Meta	7402	Dys
ag	Metamorphosed granitic rocks	Late to middle Cretaceous	Consists chiefly of metamorphosed stocks, dikes, and sills of diorite and minor quartz diorite, granite, granodiorite, and gabbro. Fine- to medium-grained, having relict hypautomorphic granular texture. Unit moderately deformed and exhibits moderate schistosity that dips steeply to vertically and strikes west-northwest.		U-Pb zircon age of 71 Ma. In adjacent Healy quadrangle, Ar- Ar analysis of hornblende yielded 106 Ma. K-Ar ages on biotite range from 18.2 to 27 Ma and hornblende 36.8 Ma	мноо2	2600	Mount Hayes	Sed	2600	Kmi
as	Metamorphosed	Triassic to Silurian	Chiefly of fine- to medium-grained, mylonitic, calc-schist, marble, quartz-mica schist, and quartzite. Protoliths thought to be marl, limestone, pelite, and sandstone. Unit intensely ductily deformed and schistosity dips steeply to vertically and strikes west- northwest. Exhibits evidence of multiple metamorphism, earlier at upper amphibolite facies and later at middle greenschiet facies.	Conodont fragments		мноо2	5201	Mount Haves	Meta	5201	Tres
wm	Melange	Cretaceous, Devonian, and Silurian	Structural melage consisting of two assemblages: 1) Cretaceous flysch and volcanic rocks consisting mainly of argillite, and weakly metamorphosed quartz silitstone, quartz sandstone, graywacke, and conglomerate and minor andesite and acite and 2) Small to large fault bounded lenses of Silurian(?) and Devonian limestone and marl.	Cretaceous ammonite in unit 1 and Silurian(?) and Devonian mega- and micro-fossils.		MH002	2195	Mount Hayes	Melange	2195	Kmar
Tsc	Sandstone and conglomerate	Miocene to Eocene	Chiefly continental clastic deposits of light- colored, fine-grained, poorly sorted sandstone and having locally interbedded siltstone, pebbly sandstone, pebble to cobble conglomerate, and sparse thin coal layers. In vicinity of "The Hoodoos", contains very sparse rhyodactic ash layers. Conglomerate clasts predominantly andesite porphyry, fine- grained granitic rocks, schist, quartz(?), and locally abundant ultramafic rocks and coal.	Plants and pollen of late Eocene to Pliocene ace	K-Ar ages of hornblende from included ash were 5.5 and 31.1 Ma	MH002	510	Mount Haves	Sed	500	Tsu

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Te	Conglomorate	Econo	Chiefly continental clastic deposits of poorly sorted, crudely bedded to massive, polymictic conglomerate and lesser sandstone. Contains clasts of rhyodacite to dacite tuff, the Nikolai Greenstone, argilite, volcanic sandstone, andesitic to dacitic rocks of the Eagle Creek and Slana Spur Formations, quartz Diorite, greenschist, gabbro and ultramafic rocks. Local thin beds of coal occur in sandstone			мноор	840	Mount Havon	Sod	500	Teu
IL.	Congiomerate	Locene				MHUUZ	040	Mount naves	Seu	500	TSU
Tv	Volcanic rocks	Eocene	Chiefly vitric-lithic-crystal ash-flow tuff, breccia, agglomerate, flows, dikes, and sills, and minor volcanic sandstone, conglomerate, and fossiliferous limestone.	?	K-Ar whole-rock age on tuff was 49 Ma	мноо2	1100	Mount Hayes	Ign	1140	Тсу
grs1	Granitic unit 1	Cretaceous and Late Jurassic	diorite dikes, stocks, and small plutons. Fine- to medium-grained, hyautomorphic granular texture. Locally metamorphosed to lower greenschist facies.			MH002	2900	Mount Hayes	Ign	2900	KJg
grs2	Granitic unit 2	Cretaceous and Late Jurassic	Chiefly hornblende-biotite granodiorite and hornblende granodiorite and minor granodiorite and granite dikes, stocks, and small plutons. Includes sparse syenodiorite and quartz diorite. Fine- to medium-grained, hyautomorphic granular texture. Locally metamorphosed to lower greenschist facies.			MH002	2905	Mount Hayes	Ign	2900	KJg
~~~2	Caracitia unit 2	Cretaceous and Late	Quartz diorite and diorite dikes, stocks, and small plutons. Includes sparse syenodiorite and quartz diorite. Fine- to medium-grained, hyautomorphic granular texture. Locally			MU002	2010	Mount House	Ten	2000	1/10
grs3	Granitic unit 3	Jurassic	metamorphosed to lower greenschist facies.		Three K-Ar	MHUUZ	2910	Mount Hayes	Ign	2900	кја
grsg	Granite of Susitna Glacier	Early Tertiary	Chiefly biotite-white mica granite. Fine- to medium-grained, hyautomorphic granular texture.		hornblende and biotite ages of 35.5 to 36.1 Ma	MH002	1276	Mount Hayes	Ign	1290	Toegr
grcl	Granite porphyry of Caribou Lake	Early Cretaceous and (or) Late Jurassic?	Chiefly biotite granite porphyry. Fine-grained; locally medium-grained. Local hyautomorphic granular texture. Local extensive hydrothermal alteration.			MH002	2901	Mount Hayes	Ign	2900	KJq
grrm	Granodiorite of Rainbow Mountain	Early Cretaceous and (or) Mississippian	Chiefly biotite granite porphyry. Fine-grained; locally medium-grained. Local hyautomorphic granular texture. Local extensive hydrothermal alteration.		A possible Late Mississippian age from K-Ar hornblende analysis 326 Ma.	MH002	5170	Mount Hayes	Ign	5170	MzPzg
um	Ultramafic and associated rocks	Mesozoic?	Chiefly variably serpentinized pyroxenite, peridotite, dunite, schistose amphibolite, serpentinite, and hornblende-plagioclase gneiss derived from gabbro. Locally intruded by gabbro dikes, tonalite, and granite. Intensely deformed and fault-bounded.		K-Ar ages on hornblende and biotite of 123 and 126 Ma	MH002	4890	Mount Hayes	Ign	4890	Mzum
gg	Gneissose granitic rocks	Early Tertiary and Late Cretaceous	Chiefly gneissose granodiorite and quartz diorite and minor granite. Fine- to medium- grained, with relict hypautomorphic granular, seriate, and porphyritic textures. Locally grades to migmatite. Unit metamorphosed at middle to upper amphibolite facies.		U-Pb zircon and sphene and K-Ar mica and hornblende ages range between 29.2 to 70 Ma.	MH002	1720	Mount Hayes	Meta	1720	ТКдд

						Source	1				
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
sa	Schist and amphibolite	Late Cretaceous or older	Chiefly garnet-biotite-plgioclase schist and hornblende amphibolite. Relatively older, more mafic, and more highly metamorphosed variation of gneissose granitic rocks (unit gg) which locally intrude this unit. Intensely regionally metamorphosed and penetratively deformed gabbro, quartz gabbro, diorite, and quartz diorite. Includes local pelitic schist and pelitic gneiss. Fine- to medium-grained.			МН002	5205	Mount Hayes	Meta	5205	Mzsa
mig	Migmatite	Cretaceous?	Transitional rock unit between mimatitic schist (unit mgsh) and gneissos granitic rocks (unit gg). Grades from gneissose granitic rocks, containing fragments of nearly completely assimilated schist and amphibolite, to highly contorted schist and amphibolite with diffuse veins of granodiorite to diorite.	:		MH002	2631	Mount Hayes	Meta	2630	Mzsa
mgsh	Migmatitic schist	Cretaceous?	Grades from schist and amphibolite (unit sa) containing diffuse granitic dikes concordant to schistosity, to contorted and partly assimilated schist and amphibolite.		K-Ar ages range from 31.9 to 65.9 Ma, hornblende ranging from 58.5 to 65.9 Ma and biotite from 31.9 to 56.9 Ma.	МН002	2630	Mount Hayes	Meta	2630	Mzsa
sq	Schist, quartzite, and amphibolite	Triassic?	Unit of relatively older calc-silicate schist, quartzite, and amphibolite. Moderately to intensely deformed with a moderate schistosity. Fine- to medium-grained. Evidence suggests calc-silicate schist and amphibolite developed from marl.	Lithologically similar rocks in Healy quadrangle to west contain Pennsylvanian to Triassic conodonts and fragments of late Triassic bivalves.		мноо2	5207	Mount Haves	Meta	5207	Trcs
msh	Quartz-mica schist, calc- schist, and amphibolite	Late Jurassic or older	Chiefly quartz-mica schist, amphibolite, and calc-schist. Protoliths chiefly pelite, sandstone, graywacke, and minor marl, andesite, and gabbro. Intensely deformed, with a strong schistosity. Metamorphosed to amphibolite facies.		K-Ar analyses of biotite and muscovite range from 30.6 to 48.0 Ma, Single hornblende yielded age of 69.6 Ma.	MH002	5206	Mount Hayes	Meta	5206	Mzpca
mph	Phyllite	Late Jurassic or older	Chiefly fine-grained white mica-quartz phyllite, and minor quartz-plagioclase-white mica phyllite, clinozoisite-chlorite-quartz phyllite, calcite-chlorite phyllite, and quartz- rich marble and metaandesite. Protoliths chiefly siltstone, metavolcanic siltstone, marl, limestone, and andesite. Intensely deformed, with a strong schistosity. Metamorphosed to upper greenschist facies.			MH002	5215	Mount Hayes	Meta	5215	Мzрса
ma	Argillite and metagraywacke	Late Jurassic or older	Chiefly argillite, metagraywacke, and metaandesite locally. Protoliths of siltstone, calcareous mudstone, and volcanic graywacke. Unit strongly schistose. Metamorphosed to lower greenschist facies.			MH002	5210	Mount Haves	Meta	5210	Mzpca

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Rock unit	Unit hame	Ane	Description	Fossil	Radiometric age	Source	Class code	Quadrangle	Rock class	NSA class	Lahel
csv	Schistose metasedimentary and metavolcanic rocks.	Late Triassic	Chiefly fine-grained quartz-white mica-schist, chlorite-calcite-quartz schist, marble, greenstone, and sparse metadacite. Protoliths of quartz-siltstone, calcareous silty sandstone, limestone, fine-grained basalt, and fine- grained dacite. Unit exhibits a weak schistosity striking northeast to east and dipping moderately to steeply northward. Chiefly dunite, olivine-clinopyroxene	, Correlative rocks in southeast Healy quadrangle contain Heterastridium sp. of Late Triassic age.		MH002	4410	Mount Hayes	Meta	4410	Trnm
umm	Ultramafic and mafic igneous rocks occurring along Broxson Gulch thrust	Cretaceous to Triassic?	cumulates, serpentinite, metagabbro, and metadiabase. Unit occurs in scattered fault bounded exposures. Local, low-grade metamorphism.		K-Ar ages on hornblende in gabbro dikes of 91.9 and 97.7 Ma	MH002	4891	Mount Hayes	Ign	4891	Mzum
JTrm	McCarthy Formation	Early Jurassic and Late Triassic	Chiefly rhythmically, thin- to medium-bedded, calcareous argillite and impure limestone, mainly spiculitic, skeletal, or intraclastic lime packstone. Estimated maximum thickness of a few hundred meters.	Monotis M. subcircularia(?) of Late Triassic age		MH002	3820	Mount Hayes	Sed	3820	JTrmc
ga	Gabbro, diabase, and metagabbro	Late Triassic?	Chiefly hornblende gabbro, clinopyroxene gabbro, and hornblende-clinopyroxene gabbro and sparse quartz gabbro and hornblende quartz diorite. Dark-gray, fine- to medium- grained, and mainly relict hypautomorphic granular texture, but locally porphyritic, ophitic to subophitic, and diabasic. Locally intensely metamorphosed and weakly schistose. In some areas, may be late Paleozoic in age and part of the Slana Spur Formation and Tetelna Volcanics.			МН002	4320	Mount Hayes	Ign	4320	Trgb
cu	Cumulate mafic and ultramafic rocks	Late Triassic?	Chiefly consists of 1) fault-bounded lenses of olivine-cumulate and olivine-pyroxene cumulate in Slana River subterrane, and 2) large sills of olivine cumulate, olivine- pyroxene cumulate, and pyroxene-plagioclase cumulate in Tangle subterrane. Include Fish Lake Complex of Stout (1976). Locally intensely metamorphosed to lower greenschis facies exhibiting granoblastic texture.	t		МН002	4321	Mount Hayes	Ign	4321	Trgb
KJs	Marine metasedimentary rocks	Early Cretaceous and Late Jurassic	Principally deep-marine turbidite deposits consisting of graded beds of metamorphosed dark-gray to gray argilite, siltstone, and graywacke, pebbly graywacke, pebble to cobble conglomerate, and sparse andesite. Graded beds well-developed locally; consist of rhythmically alternating units that range from 1 cm to more than 30 cm in thickness. Unit locally intensely faulted and isoclinally folded. Local weak to moderately developed schistosity. Metamorphosed to lower greenschist facies.	Late Jurassic megafossils, locally abundant Buchia in Nabesna quadrangle.		МН002	2970	Mount Hayes	Meta	2970	KJfm

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
Trl	Limestone	Late Triassic	Chiefly dark- to light-gray micrite, dismicrite, or microsparite. Conformably overlies Nikolai Greenstone (unit Trn). Fine- to medium- grained, medium- to massive-bedded containing lenses and nodules of gray and black chert and irregular patchworks of disseminated fine-grained quartz. Generally metamorphosed to lower greenschist facies.	Locally contains moderately abundant Late Triassic mega- and microfossils.		MH002	4030	Mount Hayes	Sed	4030	JTrlm
Trn	Nikolai Greenstone	Late Triassic	Chiefly massive dark-gray-green, dark-gray- brown, reddish-brown, and maroon-gray subaerial, amygdaloidal basalt flows, separated locally by thin beds of reddish- brown nonmarine volcaniclastic rocks. Unit pervasively metamorphosed to lower greenschist facies. Disconformably overlies Eagle Creek Formation (unit Pe), overlain by Upper Triassic limestone (unit Trl). In southeastern Mount Hayes quadrangle, unit locally composed of Middle Triassic shale, limestone, and chert.			MH002	4420	Mount Hayes	Meta	4420	Trn
Pe	Eagle Creek Formation	Early Permian	Chiefly conformable sequence of alternating marine argillite and limestone. Divided into either an upper argillite and lower limestone unit in south central part of Mount Hayes quadrangle or two limestone and two argillite units in the eastern part of the quadrangle. Unit metamorphosed mainly to greenschist facies	Abundant mega- and microfossils, mainly brachiopods, corals, and foraminifers, indicated an Early Permian age		MH002	5950	Mount Hayes	Meta	5950	Pe
Pi	Shallow-level intrusive stocks, dikes, sills, and small plutons.	Early Permian?	Sparse to locally abundant andesite, and lesser dacite and rhyolite, stocks, sills, and dikes that intrude Slana Spur Formation and Tetelna Volcanics. Granoblastic overprint metamorphic texture with local weak schistosity. Metamorphosed to lower greenschist facies. Local intense hydrothermal alteration.			мноо2	5860	Mount Hayes	Ign	5860	Pmi
PaPs	Slana Spur Formation	Early Permian to Middle	Chiefly a thick sequence of marine calcareous and noncalcareous volcaniclastic rocks and lesser limestone, tuff, and volcanic breccia. Disconformably overlies Tetelna Volcanics. Correlative with volcaniclastic member of Station Creek Formation of Skolai Group. Lower greenschist facies metamorphism.	Megafossils and microfossils, mainly brachiopods, corals, and foraminifers, range from Middle Pennsylvanian through Early Permian.	K-Ar age on hornblende from a weakly metamorphosed mafic nodule was 94.4 Ma, possible age of low-grade regional metamorphism of Wrangellia terrane.	MH002	5620	Mount Hayes	Meta	5620	Pat
PaPsu	Slana Spur Formation Calcareous volcaniclastic rocks member	Early Permian to Middle Pennsylvanian	Predominantly gray-green, clastic, locally fossiliferous limestone and marble, and gray- green coarse-grained calcareous volcanic sandstone. Includes minor volcanic conglomerate, light-gray-green lailli tuff, and andesite. Metamorphosed to lower greenschist facies.			MH002	5621	Mount Hayes	Meta	5621	Pat

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
PaPsl	Slana Spur Formation Volcaniclastic rocks member	Early Permian to Middle Pennsylvanian	Dark-gray, dark-green, and maroon volcanic and volcaniclastic rocks. Chiefly volcanic flows interbedded with lapilli tuff, volcanic breccia, graywacke, argillite, and limestone to marble. Local massive to bedded conglomerate, graywacke, and siltstone. Metamorphosed to lower greenschist facies.			MH002	5631	Mount Hayes	Meta	5630	PPasc
Pat	Tetelna Volcanics	Pennsylvanian	Chiefly dark-green, dark-gray-green, and purplish-gray-green volcanic flows, mud and debris avalanches, locally graded, and lapilli- pumice tuff interbedded with fine- to coarse- grained volcaniclastic rocks. Flows mainly andesite, unit metamorphosed to lower greenschist facies. Correlative with volcanic flows member of the Station Creek Formation of the Skolai Group.			МН002	6120	Mount Hayes	Meta	6220	Pat
Рад	Granitic plutons south of Denali fault	Pennsylvanian	Chiefly granite. Generally medium-grained hypautomorphic granular texture, locally pornbyritic.		U-Pb zircon age of 309 Ma, interpreted as intrusive age. K- Ar hornblende age of 326 Ma of granodiorite at Rainbow Mountain, older than wall rocks at locality.	- MH002	6110	Mount Haves	Ian	6110	PPagi
Trl	Limestone	Late Triassic	Fine- to medium-grained, medium- to massive bedded limestone. Generally calcite clasts in a very fine-grained matrix of calcite and quartz. Moderately to highly recrystallized, locally weakly schistose.	Late Triassic cephalopods and pelecypods.	a rocarty.	MH002	4030	Mount Hayes	Sed	4030	JTrlm
Trnf	Nikolai Greenstone Subaerial basalt flows member	Late Triassic	Chiefly dark gray-green, gray, purple, black, or brown, massive amygdaloidal basalt flows. Fine- to medium-grained. Includes sparse basaltic breccia and basaltic aquagene tuff and sparse limestone, siltstone, shale, and chert occur in south-central part of Mount Hayes quadrangle. Unit metamorphosed to lower greenschist facies			МН002	4421	Mount Hayes	Meta	4421	Trn
Trnp	Nikolai Greenstone Pillow basalt flows member	Late Triassic	Chiefly interlayered dark gray-green pillow basalt flows and minor basaltic flow breccia, aquagene and epiclastic tuff, breccia, argillite, and radiolarian chert. Unit metamorphosed to lower oreenschist facies.	Middle or Late Triassic Daonella or Halobia in one locality.		MH002	4422	Mount Haves	Meta	4422	Trn
Pzt	Aquagene tuff, argillite, limestone, chert, andesite tuff, and greenstone	Late Paleozoic	Chiefly andesite flows, mud and debris avalanche deposits, and tuff interbedded with fine- to coarse grained volcaniclastic rocks. Contains lesser interlayered basaltic aquagene tuff, gray-green andesite tuf, gray-green basalt, dark-gray siliceous argillite, light-gray to white calcite, limestone, and marble, and red and black chert. Unit generally granoblasitc, locally weakly schistose; metamorphosed to lower greenschist facies.	Fragements of Late Paleozoic bryozoans. Correlative unit in Talkeetna Mountains D-2 quadrangle contains Early to Late Permian conodonts.		MH002	5630	Mount Hayes	Meta	6120	Pat

Rock unit     Unit hame     Age     Description     Forsil     Radiometric age     code     Class code     Quadrange     Rock Lists     MEA Lass     Lass     Real       main     Intermorpheed     maphicitif     Intermorpheed     maphicitie     Sintermorpheed     Nume     Nume     Sintermorpheed     Nume     Nume     Sintermorpheed     Nume							Source					
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Jk   Kotsina Conglomerate   Middle or Late Jurassic?   Feldspathic sandstone, siltstone, and carbonaceous shale are interbedded in many places and increase in proportion west of Long Plant scraps   Ma and on hornblende from cross-cutting dike of 145 Ma   VA002   3110   Valdez   Sed   3110   Jkt     Jk   Kotsina Conglomerate   Middle or Late Jurassic?   Glacier.   Plant scraps   Plant scraps   VA002   3110   Valdez   Sed   3110   Jkt     McCarthy Formation   Early Jurassic? and Late   Marine limestone, shale, and chert. Lower member consists of interbedded finely-laminet, dark-gray, impure limestone, silicious microfostis intruding granodiorite microfostis microfostis intruding granodiorite silicious microfostis intruding granodiorite silicious microfostis intruding granodiorite microfostis microfostis intruding granodiorite microfostis intruding granodiorite microfostis intruding granodiorite microfostis intruding granodiorite microfostis microfostis intruding granodiorite microfostis microfostis intruding g				bouldery strata. Olive-gray lithic and		from a clast of 161						
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Incluing conground congregation congregatio	1k	Kotsina Conglomerate	Middle or Late Jurassic?	Glacier	Plant scrans	145 Ma	VA002	3110	Valdez	Sed	3110	14+
Marine limestone, shale, and chert. Lower member consists of interbedded finely- Itrme lower member Triassic (Norian) subordinate fissile shale and minor chert	51				nanc scrups	1.0 1.0	0,002	5110	VUIUCZ	Jou	5110	JAL
McCarthy Formation Early Jurassic? and Late laminated, dark-gray, impure limestone, calcareous and intruding granodiorite limestone and intruding granodiorite laminated, dark-gray, impure limestone, calcareous and intruding granodiorite laminated and minor chert silicious microfossils of 144 Ma V4002 3821 Valdez Sed 3821 Urroc			1	Marine limestone shale and chert Lower								
McCarthy Formation Early Jurassic? and Late laminated, dark-gray, impure limestone, calcareous and intruding granodiorite			1	member consists of interbedded finely-	Monotis and both	Minimum age from						
Trime Lower member Trissic (Norian) subardinate (sie sale and minor chert silicious and minorally granulated Values See 3821 Trime	1	McCarthy Formation	Farly Jurassic? and Late	laminated dark-gray impure limestone	calcareous and	intruding granodiorite						
13000000000000000000000000000000000000	JTrm	lower member	Triassic (Norian)	subordinate fissile shale, and minor chert	silicieous microfossils.	of 144 Ma	VA002	3821	Valdez	Sed	3821	JTrmc

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
Trl	Chitistone and Nizina Limestones	Late Triassic (Karnian and Norian)	Light- to medium-gray limestone of diverse textural varieties and include minor dolomite lower in the sequence and nodules and lenses of dark-gray chert high in the sequence. Lower thicker-bedded sequence is Chitistone Limestone, upper, thinner-bedded sequence is Nizina Limestone.			VA002	4030	Valdez	Sed	4030	JTrlm
Trn	Nikolai Greenstone	Middle and (or) Late Triassic	Weakly metamorphosed, lightly altered tholeiitic basalt that is characteristically amygdaloidal and poorly bedded. Metamorphosed to prehnite-pumpellyite facies		K-Ar whole-rock isochron of 112 +/- 11 Ma thought to indicate collosion of Wrangellia with North America	VA002	4420	Valdez	Ign	4420	Trn
Pzs	Skolai Group - greenstone unit	Late Paleozoic, Middle Pennsylvanian to Early Permian	Diverse Upper Paleozoic volcanic, volcaniclastic, and marine sedimentary rocks. Unit consists largely of two lithologies, map unit Pzs is dark, greenish-gray poorly bedded greenstone, characterized by prehnite- pumpellyite mineral assemblages, locally retaining relict pillows and map unit Pzm is subordinate light- or medium-gray and buff calcareous rocks, mostly recrystallized to marble but containing scanty fragments of fossils, interbedded with minor dark-gray calcareous siltstone and shale.			VA002	5631	Valdez	Meta	6220	Pat
Pzm	Skolai Group marble unit	Late Paleozoic, Middle Pennsylvanian to Early Permian	Subordinate light- or medium-gray and buff calcareous rocks, mostly recrystallized to marble but containing scanty fragments of fossils, interbedded with dark-gray calcareous siltstone and shale. Change unit designator to ma, per Winkler (1998)	Scanty fragments of bryozoans, crinoids, corals, and brachiopods.		VA002	5620	Valdez	Meta	5955	Pzskm
Psm	Strelna Metamorphic Complex	Mesozoic or Paleozoic	A diverse and intimately mixed group of low- to medium-grade greenschist and amphibolite which also includes abundant pelitic and psammitic schist, metachert, and gneiss having pronouced mortar structure. Contains no marble but does contain extensive massive to gneissose mafic to intermediate (meta?) plutonic rocks. Rocks are tightly folded on all scales and pervasively faulted; they are strongly foliated and partially mylonitic and are cut by post-metamorphic Late Jurassic and Early Cretaceous plutons. Has been thought to metamorphosed equivalent of the Strelna Formation or the Skolai Group, however it lacks any meta-limestone as would be expected for the Skolai Group. Unit is also similar to Triassic and Jurassic diorite complex of the Nabesna quadrangle.		K-Ar age on hornblende from metagabbro of 152 +/- 6 Ma; thought to be reset.	VA002	5209	Valdez	Meta	5920_	PPast
175111			Two small discordant stocks of biotite- hornblende granite and granodiorite. Unfoliated, fine- to medium-grained hypiomorphic granular rocks. Faual			VAUUZ	5205		Ineta	3920	rrdsl
Тg	Granite and granodiorite	Tertiary? (Eocene?)	proportions granite and granodiorite.			VA002	1305	Valdez	Ign	1300	Tgr

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Jc	Chitina Valley batholith	Late Jurassic	Weakly to strongly foliated compositionally diverse plutonic rocks. Dominant lithology is fine-to medium-grained hypiomorphic granular quartz monzodiorite, but quartz diorite, tonalite, and granodiorite are nearly as abundant.		K-Ar hornblende ages range from 147 +/- 7 to 157 +/- 8 Ma, biotite ages are 134 and 144 +/- 7 Ma; one mineral pair is slightly discordant.	VA002	3403	Valdez	Ign	3403	Jqd
Pzg	Gabbro and leucogabbro	Late Paleozoic, Permian to Pennsylvanian	Gabbroic rocks rocks consisting of sills, dikes, and discordant plutons. Medium- to coarse- grained, massive to foliated, altered gabbro, leucogabbro, and minor diorite. Coextensive with layered gabbro in the McCarthy guadrangle.		K-Ar age on actinolitic amphibole of 246 +/- 12 Ma, thought to be minimum age, may be partially reset by intrusion of nearby Late Jurassic hornblende granodiorite pluton.	VA002	5460	Valdez	Ign	5460	Pagb
Klc	Schist of Liberty Creek	mid-Cretaceous? or Jurassic??	Well-foliated, multiply-deformed greenschist and transitional blueschist facies mafic metavolcanic and metasedimentary rocks. Schistocity is well-developed although primary sedimentary or volcaniclastic features are retained locally. There are no marker strata and units do not persist laterally.	,		VA002	3610	Valdez	Meta	3610	Jsch
Кbс	Bernard Creek terrane, deleted, now McHugh Complex	mid-Cretaceous?	Mylonitic greenschist. Relict bedding and volcaniclastic textures are retained locally. Elsewhere unit is nearly massive, but cataclasis and neomineralization generally are so pervasive that they obliterate any primary features.			VA002	2190	Valdez	Meta	2190	Kmk
Kfc	Fox Creek terrane Unit deleted on new VA map	mid-Cretaceous?	Intercalcated lower greenschist and transistional blueschist facies metasedimentary and mafic metavolcanic rocks. Over broad areas the rocks have a cataclastic fabric, locally relict primary sedimentary and volcaniclastic textures are retained. Unit is distinguished from Bernard Creek terrane (unit Kbc) by the dominance of dark, very-fine-grained metapelitic rocks; where green metavolcanic rocks are present in the Fox Creek terrane they indistinguishable from greenschist of the Bernard Creek terrane.			VA002	2700	Valdez	Meta	2700	Kvs
Khc	Haley Creek terrane	mid-Cretaceous?	Metamorphosed complexly deformed and tectonically mixed plutonic and sedimentary rocks. Metaplutonic rocks are most abundant in southern part of the terrane and are compositionally diverse and weakly to strongly foliated. Although diorite and granodiorite are most abundant lithologies, compositions range from trondjhemite to hornblende gabbro and hornblendite. Amphibolite is is widespread within the metaplutonic rocks. Metasedimentary rocks are dominant in northern part of terrane where marble, metaplelite, metapsammite are structurally mixed with subordinate metaplutonic rocks.			VA002	2601	Valdez	Meta	2600	Kmi

Rock unit	Unit hame	Age	Description Metamorphosed complexly deformed and tectonically mixed plutonic and sedimentary	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Metamorphosed complexly deformed and tectonically mixed plutonic and sedimentary								
Kag	Haley Creek terrane - metaplutonic rocks	mid-Cretaceous?	rocks. Metaplutonic rocks are most abundant in southern part of the terrane and are compositionally diverse and weakly to strongly foliated. Although diorite and granodiorite are most abundant lithologies, compositions range from trondjhemite to hornblende gabbro and hornblendite. Amphibolite is is widespread within the metaplutonic rocks.		K-Ar ages on hornblende range from 122 to 148 Ma. A muscovite age is 133 +/- 4 Ma	VA002	2600	Valdez	Meta	2600	Kmi
м	Haley Creek terrane - schistose marble Hornblende andesite or	mid-Cretaceous?	Schistose marble. Individual marble layers can be traced for several km, however the layers vary greatly in thickness, terminate abruptly in places, and are generally thoroughly folded. Small isolated bodies of marble mark unmapped fault within the Haley Creek terrane. Porphyritic hornblende andesite or dacite		K-Ar ages on hornblende range from 122 to 148 Ma. A muscovite age is 133 +/- 4 Ma	VA002	2720	Valdez	Meta	2720	PPaskm
Tif	dacite dikes	Eocene	dikes			VA002		Valdez	Ign	1105	Tva
Tt	Altered biotite and hornblende tonalite	Eocene	Small, sericitized hornblende-biotite tonalite plugs. Rocks are fine- to medium-grained sericitized tonalite with minor quartz diorite and granodiorite. In most sample, muscovite replaces biotite or has formed from alteration of plagioclase.		K-Ar hornblende 46.6 +/- 1.4 and muscovite of 52.4 +/- 2.6 Ma	VA002	1310	Valdez	Ign	1310	Tegr
Jgl	Hornblende gabbro and leucogabbro	Early Jurassic or older	Layered gabbro and leucogabbro; layered gabbro is dominantly hornblende gabbro; hornblende-augite gabbro is common, however, with the hornblende replacing or molded upon the augite; and layers and lenses of hornblendite occur at several places. Mafic part of the Tonsina Complex (now shown on Winklers map as Jtg). Dunite, harzburgitic dunite, wehrlite,		K-Ar ages on hornblende of 419+/- 21, 188 +/- 8, and 171 +/- 5 Ma; the older age is considered suspect.	VA002	3540	Valdez	Ign	3540	Jmu
lum	Illtramafic rocks	Farly Jurassic or older	Websterite, and clinopyroxenite comprise the Tonsina ultramafic complex. The rocks are folded but not intensely sheared or cernentinized			VA002		Valdez	Ian	3545	lmu
Kmu	Matanuska Formation upper part	Late Cretaceous mid- Coniacian to Maestrichtian	A very thick sequence of marine siltstone, claystone, and sandstone in interbedded with lenticular and channelized deposits of sandstone and conglomerate. Contact with lower part of unit presumed to an unconformity. Deposition thought to occur on the fringes of a deep-sea fan. Thinly interbedded siltstone, claystone, and sandstone, which predominate, represent deposition in interchannel areas; whereas thick beds and lenses of sandstone and conglomerate represent distributary channels.			VA002	2011	Valdez	Sed	2010	Km
Kml	Matanuska Formation	Late Cretaceous late- early-Albian, Cenomanian, Turonian, and early	Marine siltstone, shale, sandstone, and pebbly sandstone are interbedded with subordinate silicieous, foraminiferal shale and fine-grained zeolitized sandstone. Contact with upper part of unit (unit Kmu) presumed to be an unconformity and is angular unconformity with the lower Talkeatra Formation (unit 1kk)			VA002	2012	Valdez	Sad	2010	Km

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Marine and non-marine andesitic and basaltic tuff, tuff breccia, and volcanogenic sedimentary rocks. Small, isolated bodies of light- to dark-gray unfossiliferous saccharoida limestone may be parts of the units in the	Mollusks and							
Jtk	Talkeetna Formation	Early Jurassic	Valdez quadrangle.	brachiopods		VA002	3250	Valdez	Ign	3250	JTrtk
Jgr	Biotite-epidote granite	Middle Jurassic	Irregularily shaped small stocks of pink- weathering medium-grained granite. Green biotite and granular to coarse-grained epidote are constant accessories			VA002	3401	Valdez	Ign	3401	Jgr
Jgd	Biotite-hornblende granodiorite	Middle Jurassic	Irregularily shaped small stocks of pink- weathering medium-grained granite. Green biotite is a constant accessory; hornblende and epidote are less abundant and are not present in all samples.			VA002	591	Valdez	Ign	3402	Jgd
Jmp	Mafic plutonic complex	Early or Middle Jurassic	Consists dominantly of layered hornblended- pyroxene gabbro and leucogabbro, with minor ultramafic, dioritic, and tonalitic rocks. The southern margin of complex is a major fault zone; cataclastic modification of mineral layering in the complex near the fault zone is severe; in many places the complex is thoroughly sheared and includes boudins of country rock. Mylonitic layering is also conspicious along a a major east-west fault within the complex.		K-Ar ages on low- potassium hornblende and chloritized biotite range from 153 to 171 Ma.	VA002		Valdez	Ign	3480	Jan
Ju	Ultramafic rocks	Jurassic?	Serpentized pyroxenite? Occurs within mafic plutonic complex (unit Jmp), generally localized in strongly sheared zones. Many areas of unit are too small to map. Tholeiitic pillow basalt, pillow breccia, and			VA002	3345	Valdez	Ign	3345	Jmu
Τον	Orca Group volcanic rocks, undivided	Paleocene and Eocene?	minor aquagene tuff. Thin sequences of dray gray argillite and siltstone are interbedded with the volcanic rocks and locally compressed between pillows. Volcanic rocks are exclusively of oceanic tholeite and are conformable with enclosing flyschoid sedimentary rocks.	1		VA002	1135	Valdez	Ign	1135	Τον
Tos	Orca Group sedimentary rocks, undivided	Paleocene and Eocene?	Marine argillite, siltstone, sandstone, and conglomerate. Argillite and siltstone are more abundant the coarser-grained rocks. Well- bedded, repetitive finer-grained and coarser- grained strata; primary sedimentary features are diagnostic of deposition by sediment- gravity flow. Finer-grained facies dominate west of Valdez Arm. Conglomerate clasts are of diverse extrabasinal lithologies.	2		VA002	950	Valdez	Sed	950	Tos
						Source					
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Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
Toc	Orca Group conglomeratic sedimentary rocks	Paleocene and Eocene?	Very poorly bedded conglomeratic sandstone and argillite mantle the tops of volcanic sequences. Conglomeratic rocks are very poorly sorted; clasts vary in size from granules to boulders and are supported by matrix. Basal parts of conglomeratic frequently contain angular to partly rounded clasts of basalt identical to substrate. Gradationally upward, the conglomeratic strata contain fewer volcanic clasts, but all other clasts are of lithologies that may be intrabasinal, in contrast to other			V4002	952	Valdez	Sed	952	Tor
TKm	Orca Group melange	Tertiary or Cretaceous	Consists of extensive serpentinized ultramafic rocks including dike-like bodies of rodingite, as well as blocks of layered gabbro, crossite schist, pillow basalt, marble, chert of probable Late Triassic or Early Jurassic age, and divers metamorphosed and virtually unmetamorphosed sedimentary rocks, including conglomerate that resembles lithologies within the Ckickaloon Formation of Paleocene age.	2		VA002		Valdez	Melange	1790	TKmx
Kvv	Valdez Group Metavolcanic rocks, undivided	Late Cretaceous	Mafic metatuff and minor massive or weakly foliated greenstone having rarely preserved vague pillow shapes. Lower greenschist facie metamorphism. Most of these metavolcanic rocks are schistose and the metavolcanic are often the loci of intense deformation in the Valdez Group.	5	K-Ar whole-rock age on metatuff of 53.5 +/- 1.6 Ma is thought to date matamorphism.	VA002	2705	Valdez	Meta	2705	Kvv
Kvs	Valdez Group Metasedimentary rocks, undivided		Weakly to strongly foliated marine argillite, siltstone, sandstone, and conglomeratic sandstone. Lower greenschist facies metamorphism. Probable volcanic source terrane	Maestrichtian pelecypods collected outside of Valdez		VA002	2700	Valdez	Meta	2700	Kvs
Kym	Valdez Group Phyllite and schist. Delete unit on new VA man	Late Cretaceous	Low-grade metamorphosed (lower greenschis facies) pelitic rocks consisting of homogeneous phyllite and schist. These rock shown much stronger foliation than the undivided metasedimentary rocks (unit Kvs) of the Valdez Group. Probable volcanic source terrane.	t s		VA002	2701	Valdez	Meta	2700	Kvs
KJm	McHugh Complex	Early Cretaceous and Jurassic?	Pervasively deformed assemblage of diverse lithologies (melange). Lithologies include gabbro, greenstone, marble, wacke, and diverse plutonic and metamorphic rocks including blueschist. Rocks occur in three discrete belts, the northernmost which yields Triassic radiolarians, a medial belt yielding Jurassic and Cretaceous age, and a southernh belt yielding radiolaria as young mid- Cretaceous age. Rocks typically shown prehnite-pumpellyite facies metamorphism.	Radiolaria from chert ranges from Triassic to mid-Cretaceous (Albian or Cenomanian).		VA002	2190	Valdez	Melange	2190	Kmk
1-6	Greenschist and		Chiefly intercalated greenschist and blueschist, but includes lawsonite, muscovite, or actinolite schist, carbonaceous schist, highly siliceous rocks containing stilpnomelane, and foliated calcareous rocks. Similar to Raspberry, Seldovia, and Knik River	-	K-Ar ages on crossite and muscovite range from 152 to 175 Ma, thought to be			No. 14	M-1-	2610	1
Jgb	rransitional blueschist	JURASSIC	SCRIST UNIT.	1	metamorphic ages.	vA002	1	valdez	Inteta	3610	JSCN

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
1a	Amphiholite facies rocks	Jurassic(2)	Portion of tectonic inclusion 10 by 15 km in McHugh Complex consisting of layered quartz gabbro, amphibolite, and orthogneiss. This unit consists of nondescript, amphibolite facies, weakly foliated to nonfoliated granular rocks of uncertain protolith. Many of the rocks are rich in feldspar and quartz and may have a sedimentary protolith. They are laced with numerous dike-like bodies of amphibolite that originate from underlying amphibolite and orthogneiss. The amphibolite-facies rocks are structurally complex and contain many lenses of incompletely serpentinized ultramafic and gabbroic rocks. Extensively retrograded to prehnite-pumpelllyite facies, as is surrounding McHugh Complex. Changed to Strelna ner Winkler 1998			V4007	5920	Valdez	Meta	5920	PPast
Pr	Amphibolite facies rocks	Jui dSSIC( ? )	Streind per Willkier, 1998.			VAUUZ	3920	valuez	meld	3920	rrdsl
Jag	Uranatina River metaplutonic unit	Jurassic and Middle Pennsylvanian	Portion of tectonic inclusion 10 by 15 km in McHugh Complex consisting of layered quartz gabbro, amphibolite, and orthogneiss. This unit consists of compositionally banded very mafic amphibolite to hornblende-biotic dioritic and quartz dioritic gneiss. Contains lenses of pyroxenite as much as 2 m across. Foliation of the rocks is swirled or tightly folded in many places and large hornblende or hornblende-plagioclase pods have grown in the hinges of many folds. Most of unit is likely of Jurassic age but is known to contain at least locally Middle Pennsylvanian metagranodiorite.	,	Low-potassium hornblende yielded K- Ar age of 267 +/- 8 Ma (mid-Permian), thought to approximate time of metamorphism. K-Ar age on pvroxene of 185 +/-	VA002	5245	Valdez	Meta	5245	JPaur
110	Lavered quartz gabbro	Jurassic	Conspicously layered, hypiodiomorphic- granular textured quartz gabbro. Layers enriched in clinopyroxene or in plagioclase and quartz give unit its prominent banded appearance. Prehnite-pumpellyite metamorphosed, little deformed and dips quite uniformly northward.		19 Ma is highly suspect, however matches ages on Afognak Pluton, the pluton of the Barren Islands and reputed ages on small dioritic plutons near Seldovia.	VA002		Valdez	Ian	33402	lmu
9			Symmetrical to irregular piles of artificially						-9		
Op	Placer mine tailings	Holocene (Historic)	water-worked, sorted gravel and in situ slab rock derived from bedrock.			ID002	100	Iditarod	Unconsol	100	Opm
QTs	Surficial deposits	Holocene to Pliocene(?)	Unconsolidated fluvial, terrace, colluvial, glacial, and eolian deposits, usually covered by vegetation. Deposits range between 3 and 20 m thick and generally contain permafrost to some degree. Unit primarily Pleistocene to Holocene in age, however stream gravel terraces from other unglaciated areas elsewhere in Alaska have yielded Pliocene pollen and it is possible other terraces in the map area may also. Very fine grained to aphanitic, dark- to			ID002	100	Iditarod	Unconsol	100	Qs
Th	Deceltic and th-	Tautian Missis	medium-gray, locally vesicular, augite basaltic		K-Ar whole-rock age	10002	200	Telito no d	Tan	1053	The
1D	Basaltic andesite	i ertiary Miocene	andesite.		or 6.9 and 13.0 Ma	10002	200	laitarod	lign	1052	IDa

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ТКу	Volcanic rocks of Yetna River area	Tertiary and Late Cretaceous	Chiefly subaerial lava flows of andesite, dacite, rhyolite, and minor basalt and subordinate welded to nonwelded rhyolitic to andesitic ash-flow tuff.		Eight of nine samples yielded K-Ar ages between 54.4 and 68.7 Ma, ninth sample yielded age of 25.5 Ma on tuff.	ID002	301	Iditarod	Ign	1605	TKvi
TKil	Iditarod Volcanics Andesitic to basaltic subaerial lava flows and mafic volcanic breccia	Tertiary and Late Cretaceous	Subaerial, locally columnar-jointed, aphanitic to porphyritic, olivine-clinopyroxene basaltic andesite, clinopyroxene andesite, and minor dacite; volcanic breccia locally interfingers with flow rocks.		K-Ar ages from 4 samples ranged between 58 and 66 Ma; one whole-rock yielded a 35.1 Ma minimum age.	ID002	302	Iditarod	Ign	1605	TKvi
Kit	Iditarod Volcanics Tuff, volcanic breccia, altered andesitic to dacitic flows and volcaniclastic sandstone	Late Cretaceous	Heterogeneous assemblage characterized by lithic, crystal, and water-laid tuff and altered intermediate lava flows.; locally includes volcanic breccia, volcaniclastic sandstone, and lahar deposits. Lithologically identical to unit Kkt; distinguished by surrounding rocks.		K-Ar ages from 5 samples ranged between 70.3 to 76.7 Ma; two youngest are considered minimum ages.	ID002	400	Iditarod	Ign	2270	Kvl
Kkq	Kuskokwim Group - quartzose sandstone and siltstone	Late Cretaceous, (Paleocene?) Campanian to Turonian?	Quartzose sublithic sandstone, conglomerate, siltstone, and siliceous shale. Finer-grained layers locally contain abundant coaly leaf and stem debris; thin coal seams are present locally. Coquina layers composed of brackish to fresh water bivalves are locally interbedded with sandstone and siltstone. Rocks are interpreted as shallow-marine to locally nonmarine.	Dicotyedon leaf fragment of probable Turonian to Paleocene age but may be as old as Cenomanian.	K-Ar age of 77 Ma on interbedded andesite tuff in upper part of section.	ID002	401	Iditarod	Sed	1985	Kkn
Kks	Kuskokwim Group sandstone, siltstone, shale, and conglomerate	Late Cretaceous, Campanian? to Cenomanian?	Thick assemblage of fine- to coarse-grained lithic sandstone, micaceous siltstone, shale, and minor chert-pebble conglomerate; major part of Kuskokwim Group in quadrangle. Sandstone is lithic rich; nearly all contain metamorphic lithic fragments, but plutonic rock, sandstone, chert, limestone, and/or volcanic rock fragments are abundant locally. Finer-grained layers locally contain coaly leaf and stem fragments.	Pelecypods of Turonian or probable Turonian age but may be as old as Cenomanian based on fossils outside of Iditarod quadrangle.		ID002	402	Iditarod	Sed	1970	Кk
Kkt	Kuskokwim Group volcanic tuff and agglomerate	Late Cretaceous	Hetergeneous assemblage of tuff, agglomerate, cherty tuff and locally, minor sandstone. Lithologically identical to unit Kit, units only distinguished by surrounding rocks.		K-Ar ages of 69.4 and 71.3 Ma on whole rocks, questionable due to alteration.	ID002	403	Iditarod	Ign	2260	Kvl
Kka	Kuskokwim Group altered andesite flows, tuffs, and sills?	Late Cretaceous; Campanian	Layers of intermediate igneous rocks 1 to 5-m thick interbedded with unit Kks. Consists of andesitic flows and tuffs, and possible sills.	-	K-Ar age of 77 Ma	ID002	404	Iditarod	Ign	2261	Kvl
Klav	Kuskokwim Group	Lata Crotacoauc	flow(s) and chlorite-calcite altered tuff.			10002	405	Iditarad	Ian	2261	Kul
NKV			Medium-grained to very fine grained sandstone, tuffaceous sandstone, and siltstone only exposed as colluvial chips in	Age based on Hauterivian to Barremian palynomorphs in one		10002	405			2201	
Ks	Sandstone and siltstone	Early Cretaceous	western part of Iditarod quadrangle.	sample.		10002	406	Iditarod	Sed	2020	Kme

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
TrMc	Chert, volcanic rocks, metasandstone, and limestone	Triassic to Mississippian	Radiolarian chert, clinopyroxene basalt to basaltic andesite, lithic tuff, water-laid tuff, metasiltstone, and minor fossiliferous shallow- water limestone. Occurs as fault slivers? in northeastern part of Iditarod quadrangle or associated with the Dishna River fault zone in north-central part of quadrangle. Prehnite- pumpellyite metamorphism. Age based on correlation with lithologically similar rocks in Ophir quadrangle to north.	Late Triassic (or possibly Jurassic) radiolarians and conodonts and crinoidal hash no older than mid- Mississippian.	K-Ar hornblende age of 302 +/- 9 Ma on porphyritic volcanic rock; 3 K-Ar whole- rock ages on greenstones (88.4 +/ 2.7, 110 +/- 3, 76.5 +/- 2.3 Ma)	ID002	500	Iditarod	Ign	5111	TrMica
Тр	Porphyritic granodiorite plug	Early Tertiary	Granodiorite consisting of abundant phenocrysts of hornblende and plagioclase in a finer-grained, phaneritic groundmass.		K-Ar age on amphibole of 52.8 Ma	ID002	201	Iditarod	Ign	1300	Tegr
ТКдр	Hypabyssal granite porphyry dikes, sills, and plugs	Tertiary and Late Cretaceous	Porphyritic to fine-grained phaneritic dikes, sills, and plugs of granitic composition.		22 K-Ar ages in two groups; 71.5 to 69.1 Ma and 65.7 to 63.5 Ma. Most reliable ages all in older group (FHW).	ID002	303	Iditarod	Ign	1602	ТКдр
ТКр	Pilotaxitic dacite- andesite plugs	Tertiary and Late Cretaceous	Three small bodies of subvolcanic dacite to andesite. Pilotaxitic texture to the fine- grained groundmass. Sparse phenocrysts of granophyric plagioclase and rare pyroxene.			ID002	304	Iditarod	Ign	1620	ТКd
TKm	Monzonite, quartz monzonite, syenite, granodiorite, granite, and minor lamprophyre	Tertiary and Late Cretaceous	Small stocks and plutons of fine- to coarse- grained, phaneritic to hypidiomorphic, clinopyroxene-biotite +/- olivine monzonite, hornblende-clinopyroxene-biotite quartz monzonite, biotite syenite, biotite-hornblende granodiorite, biotite granite, and rare lampophyric rocks.		20 K-Ar ages have bimodal distribution, 73.2 to 68.3 Ma and 63.4 to 59.4 Ma. Many of the younger ages are suspect due to very low K2O in the biotites (FHW).	ID002	305	Iditarod	Ign	1660	TKm
ТКd	Altered intermediate to mafic dikes	Tertiary and Late Cretaceous	Porphyritic biotite-clinopyroxene-plagioclase +/- olivine dikes, which are partly to extensively altered to chlorite-calcite-silica assemblages.		K-Ar age on biotite of 71.2 Ma	ID002	306	Iditarod	Ign	1601	TKd
ТКд	Alkali granite	Tertiary and Cretaceous	Poorly exposed, medium-grained, granophyric alkali granite Light colored unit (CI < 7) containing varying mafic mineral assemblages, alkali amphibole-pyroxene- biotite to chloritized biotite		K-Ar age on biotite of 140 Ma, suspect due to extremely low K2O, amphibole age from adjacent Holy Cross quadrangle of 62.9 Ma	ID002	307	Iditarod	Ign	1655	ТКд
Jdr	Dishna River mafic and ultramafic rocks	Jurassic	Poorly exposed mafic and ultramafic that include two-pyroxene gabbronorite, clinopyroxene-hornblende gabbro, hornblende gabbro, diabase, harzburgite, minor dunite, and rare pyroxenite. Original igneous textures well preserved in most samples, however secondary mineral assemblages indicate low-pressure hydrothermal metamorphism. Ultramafic rocks all partially to completely serpentinized.		Dubious K-Ar ages on hornblende (replicated) of 222 +/- 23 and 228 +/- 25 Ma and 92.2 +/- 2.8 Ma	1D002	600	Iditarod	Ign	5191	Jium

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Pock unit	Unit hamo	100	Description	Fossil	Padiomotric ago	Source	Class codo	Quadranglo	Pock class		Labol
KOCK UTIL		Age		105511	Radiometric age	coue		Quadrangle	KUCK CIASS	NSA Class	
		1	Generally poorly exposed, mixed assemblage		K-Ar biotite age from					'	
		1	of greenschist facies metamorphic rocks		granitic orthogneiss						
		1	including mafic meta-igneous rocks,		was 108 Ma, thought						
		1	subordinate metasedimentary rocks (pelitic		to be post-						
	Greenschist, pelitic	1	schist, phyllite, calcareous schist, and		metamorphic cooling						
PzPlg	schist, and metagranite	Paleozoic and Proterzoic?	quartzite) and minor granitic orthogneiss.		age.	ID002	700	Iditarod	Meta	8650	PzZrmc
			Foliated meta-plutonic rocks, lesser								
		1	amphibolite, and minor metasedimentary								
		1	rocks. Compositionally diverse metaplutonic								
		1	rocks are primarily biotite +/- muscovite								
		1	granitic orthogneiss but include orthogneiss of								
		1	tonalitic, granodioritic, quartz dioritic, and								
		1	quartz monzonitic composition, minor		LL Dh ringen ago of						
		1	Amphibalita varias little in composition and		2 Of Cat K An area						
		1	Amphibolite varies little in composition and		2.06 Gd; K-AF ages						
		1	foliated Motacedimentary rocks are well-		approximately 120						
		1	foliated schists. Complex is of amphibolite		Ma to approximately						
Xi	Idono Complex	Farly Proterozoic	facies		1 230 Ma	10002	800	Iditarod	Meta	9400	Xi
7.1			Exposed glacial ice locally mantled by		1,250 110.	10002	000	Idicalou		5100	74
		1	unsorted jumbles of fresh boulders, cobbles,							'	
	Glaciers and superglacial	1	sand, silt, and mud as much as several meters	5						'	
g	moraine	Holocene	thick.			AN002	101	Anchorage	Unconsol	101	g
		1	Widespread glacial, alluvial, colluvial, and							'	
		1	lacustrine deposits, rock glaciers, and								
		1	landslides; have not been subdivided. Glacial								
		1	deposits include extensive ground, lateral and								
		1	deposited during soveral advances and							'	
		1	retreate Drift mantling Anchorage lowland								
		1	almost optiroly Ploistocopo in 200. Other								
0.0	Surficial deposits	Quaternary	surfical denosits probably Holcene age			AN002	100	Anchorage	Unconsol	100	06
Q31		Quaternary	Sumai deposits probably holdene age.			ANOUZ	100	Anchorage		100	Q3
		1	Carbonaceous sandstone, siltstone, shale, and							'	
		1	claystone in several isolated outcrops near the								
		1	town of Eagle River and along the Little								
		1	Susitna River south of the Castle Mountain							'	
		1	fault . Maybe correlative with Tyonek								
		1	Formation of upper Cook Inlet. Outcrops on							'	
		1	Little Susitna River are stratifgraphically								
		1	above the Isadaka and Wishbone Formations							'	
		1	but no contacts are exposed. Gradational								
		1	in the Union Oil Dittman well west of								
		1	augurangle Maximum thickness is along axis							'	
		1	of upper Cook Inlet, where it is more than	oarly Soldovian Stago							
Ttk	Tyonek Formation	Miocene	2300 m thick in the subsurface.	nlants remains		AN002	300	Anchorage	Sed	600	Ttv
	Tyonek Formation	lindeene		planto remaino		711002	500	Alleholuge	Jea	000	
		1									
		1	Upper part of sequence consists of andesite		Whole-rock K-Ar age					1	
		1	and basalt flows and minor rhyolitic tuff,		60 ma near middle of					1	
		1	lithofeldspathic sandstone, and fluviatile		sequence; whole-					1	
		1	conglomerate. Lower part consists of stocks,		rock ages of 54 to 56					1	
		1	dikes, lenticular flows, and pyroclastic rocks,	Near Nelchina	ma from volcanic					1	
I_			chieriy of quartz latite, and rhyolite, and minor	voicaniciastics contain	rocks in the Arkose		240		-	1.000	-
IV	VOICANIC ROCKS	imiocene to Paleocene	andesite and basalt. Est. to be 1500 m thick.	Eocene plant fossils	Kidge Formation	ANUUZ	1310	Anchorage	līdu	1000	IIVU

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Tt	Tsadaka Formation	Oligocene	Poorly sorted cobble to boulder conglomerate, consisting of plutonic clasts, interbedded with lenses of feldspathic sandstone, siltstone, and shale. Local provenance, rapid lateral lithology and thickness changes; correlative with the Hemlock Conglomerate of the Kenai Group. Angular unconformity separates it from underlying Wishbone Formation at Wishbone Hill; on Moose Creek it rests directly on Chickaloon Formation entire Wishbone has been eroded away. Depositional top not observed. Approximately 200 m thick.	,		AN002	320	Anchorage	Sed	670	Tts
Tw	Wishbone Formation	Eocene	Fluvialtile conglomerate and thick interbeds of sandstone, siltstone, and claystone, with local partings of volcanic ash. Extends at least 30 km northward intoTalkeetna quadrangle. South of Castle Mountain and Caribou faults, contact with Chickaloon Formation is generally conformable, but locally is an angular unconformity. Thickness 600 to 900 m.	,		AN002	330	Anchorage	Sed	870	Tw
Tc	Chickaloon Formation	Eocene and Paleocene	Fluvialtile and alluvial carbonaceous mudstone, siltstone, conglomeratic sandstone, and polymictic conglomerate. Middle and upper portions of unit contain numerous beds of bituminous coal; lower part consists of conglomerate and lithic sandstone. A local facies in the northern Chugach Mountains consists of strongly deformed poorly sorted, massive to crudely stratified cobble and boulder conglomerate grading upward into well-stratified, thick bedded sandstone and conglomerate having a chloritic matrix. This facies is more than 1200 m thick. Total thickness of unit is greater than 1500 m.	Lower part extn\ends into Paleocene based on plant leaves which correlate to flora present in the Fort Union Formation. Also palonology studies by oil industry.□	K-Ar and fission- track ages ranging from 56 to 53 Ma on ash partings from coal beds in the upper Chickaloon NW of Jonesville	AN002	340	Anchorage	Sed	900	Tch
Tar	Arkose Ridge Formation	Eocene and Paleocene	Fluviatile and alluvial feldspathic and biotite- bearing sandstone, conglomerate, siltstone, and shale and thin beds of lignitic coal. West of Chickaloon River, lower part of formation contains intercalated basalt flows and rhyolite tuffs which may correlate to unitTv of Winkler and others (1992); outcrops north of the Caribou fault include 200 m of polymictic conglomerate which may correlate to the Wishbone Hill Formation. As much as 700 m thick.	abundant plant fragments some of late Paleocene age	metamorphic biotite age of 67.5 +/- 2.4; K-Ar whole rock dates range from 56 to46 Ma for lower part of fm.;K-Ar whole rock date of 46 Ma for a basalt dike from the middle of the fm.	AN002	350	Anchorage	Sed	890	Tar
Km	Matanuska Formation	Late and Early Cretaceous (Albian to Maestrichtian)	Fossiliferous marine shale containing conspicuous calcerous concretions and volcanic-lithic siltstone, sandstone, and subordinate conglomerate ;diverse shallow -to deep marine (turbiditic) deposits. Upper part, at least, is coeval with the Valdez Group to the south. Greater than 4300 m thick.			AN002	400	Anchorage	Sed	2010	Km

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Thin- to thck-bedded, fossiliferous marine siltstone, shale, and litho-feldspathic sandstone and conglomerate. Principally composed of pluton and volcanic detritus. Lower contact disconformable to slight angular								
Jn□	Naknek Formation	Late Jurassic (Oxfordian to late Kimeridgian)	unconformity and upper contact is unconformity.			AN002	500	Anchorage	Sed	3010	Jn
Jc	Chinitna Formation	Middle Jurassic (late Bathonian (?) and early and middle Callovian)	Shallow- marine shale, siltstone, and subordinate sandstone containing numerous large limestone concretions; incorporates volcanic and plutonic detritus from the Talkeetna arc. Disconformably overlies Tuxedni Group. Thickness varies locally but is as much as 600 m.	type not described but age late early Callovian		AN002	510	Anchorage	Sed	3030	Jc
Jt	Tuxedni Group	Middle Jurassic (Bajocian and Bathonian Stages)	Fossiliferous shallow-marine siltstone, shale, and sandstone; upper part consists of thin- to thick-bedded, dark siltstone and shale; lower part consists of thin- to thick-bedded sandstone which is pebbly in places. Lower contact is an angular unconformity. Thickness 300- 400 m, much thinner than at the type section on the Alaska Peninsula.	Three new collections range in age form early and middle Bajocian.		AN002	520	Anchorage	Sed	3180	Jtx
Jgd	Granodiorite	Middle Jurassic□□	Large, discordant, epizonal pluton and two satellitic stocks of hornblende-biotite granodiorite and lesser tonalite and quartz diorite. Plutons intrude the Talkeetna Fm. (JTrt) and quartz diortite (Jqd) and are overlain nonconformably by the Arkose Ridge Fm. (Tar).		K-Ar ages in the Talkeetna Mountains range from 173 to 168 Ma and include a concordant mineral pair. In Chugach Mountains, a date of 175 to 174 Ma by a concordant K-Ar mineral pair was obtained.	AN002	521	Anchorage	Ign	3402	bgt
lad	Quartz diorite	Middle 1urassic□□	Large, disconcordant, epizonal pluton ; medium to coarse-grained hornblende (+/- biotite) quartz diorite, but also includes diorite and tonalite. Large areas have been sheared and altered. Intrudes JTrt and Jma and is intruded by Jgd and is overlain ponconformably by the Arkose Ridge Em		Discordant K-Ar dates of 169 to 154 Ma (minimum ages)	AN002	522	Anchorage	Ian	3403	lad
Jqt	Quartz diorite and tonalite	Middle Jurassic	Series of discordant intermediate plutons. They are relatively homogeneous, fine- to medium-grained quartz diorite and tonalite. Large areas are sheared and altered. Plutons intrude JTrt and Jg and are intruded by Jgd		K-Ar ages range from 181 to 167 Ma and include a concordant mineral pair; zircon fission-track ages are 186 and 170 Ma	AN002	523	Anchorage	Ign	3404	Jqt
Jmip	Mafic and intermediate plutonic rocks	Middle to Early Jurassic□□	Complexly intermixed series of mafic to intermediate plutonic rocks. Plutons consist of gabbronorite, hornblende gabbro, diorite, and tonalite. Xenoliths of gabbro show ductile deformation as though they still were warm when intruded by silicic magmas. Migmatitic textures are common at contacts between lithologies. Steeply dipping faults cut the plutons.	r	K-Ar on hornblende and biotite are 194 to 165 Ma. Twelve other K-Ar dates on hornblende and biotite range from 187 to 160 Ma. U-Pb zircon ages range form 183 to 171 Ma.	AN002	524	Anchorage	Ign	3405	Jmu

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Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Jg	Gabbronorite	Middle to Early Jurassic 🗆	Fine- to coarse-grained gabbroic rocks consisting primarily of gabbronorite, leucogabbronorite, and pyroxene-hornblende gabbro, lesser hornblende gabbro, and minor anorthisitic gabbro. Primary magnetite and illmenite are abundant (as much as 15 percent) and cause a characteristic positive magentic anomaly. Correlative rocks occurr in Valdez 1 X 3 quad and extend for about 1000 km from SW of Kodiak Island to the Copper RIver.		K-Ar dates of about 177 Ma compare well with K-Ar and Ar/Ar dates from Valdez quad rocks (ranging from 181-175 Ma).	AN002	525	Anchorage	Ign	3490	Jmu
Jgs	Sheared gabbronorite	Middle to Early Jurassic□□	Intensely sheared and altered serpentinized gabbroic and ultramafic rocks. Serpentinized rocks occurr in most outcrops of gabbronorite (Jg) but have been mapped separately between the Nelchina and Matanuska Glaciers			AN002	526	Anchorage	Ign	3491	Jmu
Jum	Ultramafic and mafic rocks	Middle to Early Jurassic	Cumulate ultramafics and mafics forming two large fault-bounded sequences in the northerr Chugach Mountains; the Eklutna and Wolverine complexes. The Eklutna is 2-3 km thick and 11 km long. From base to top consists of chromite-bearing dunite, wehrlite, olivine clinopyroxenite, clinopyroxenite, and websterite. Associated with both positive gravity and magnetic anomalies. The Wolverine is 1-2 km thick and consists og chromite-bearing dunite grading up into clinopyroxenite. These rocks are correlative to the Tonsina sequence in the Valdez quad.		Both sequeces are undated but are intruded by dikes and plutons of Jmip.	AN002	527	Anchorage	Ign	3495	Jmu
Jma	Amphibolite and quartz diorite	Middle to Early Jurassic□□	Intricately intermixed amphibolite, foliated quartz diorite, and lesser trondhjemite. Some minor biotite-quartz-feldspar gneiss.		Correlated to rocks of the Talkeetna Moutains quad that have a K-Ar date of 176 Ma	AN002	528	Anchorage	Meta	5550	PPast
Jps	Pelitic schist	Jurassic	Quartz-muscovite-albite-chlorite (+/- garnet- biotite) pelitic schist. Uniform in lithology and has no correlative rocks nearby. Minerology indicates retrograded greenschist metamorphism. Age of prograde metamorphism is inferred to be Jurassic.		K-Ar on muscovite from schist ranges from 66 - 51 Ma are presumed to be reset by intrusion of TKt and TKg	AN002	529	Anchorage	Meta	3700	Jps
JTrt	Talkeetna Formation	Early Jurassic to Late	Andesitic, dacitic, and basaltic flows, flow breccia, tuff, shallow sills, and agglomerate. In many places contains subordinate interbedded volcaniclastic sandstone, conglomerate, and fossiliferous marine siltstone and shale. Limestone and marble bodies are mapped separately as Trl. Estimated to be 1000 to 2000 m thick but bottom contact is not exposed.			AN002	530	Anchorage	Ian	3250	JTrtk

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
JPzm	Metamorphic rocks undivided		Metasedimentary and metavolcanic rocks. Strongly to weakly foliated and variably metamorphosed from greenschist to amphibolote facies. Intruded by Jmip and Jg rocks. Sedimentary protoliths include shale, chert, tuffaceous arenite, and limestone. Volcanic protoliths are most probably basalt. The diversity of protoliths may indicate tectonic mixing prior to metamorphism. Fabric of metasedimentary rocks is cataclastic or recystallized.	Fusulinids dated as Permian	Minimum age of metamorphism of 177 Ma by K-Ar on actinolite. This age may have been reset by a nearby 165 Ma pluton. Hornblende K-Ar ages of 121 and 107 Ma and a hornblende Ar/Ar plateau age of 117 Ma on mafic schist indicate resetting during metamorphism associated with intrusion of Kt.	AN002	531	Anchorage	Meta	5200	Jsch
Tmg	Granitic phase Miners Bay Pluton	Oligocene□□	Altered, medium-grained leucrocratic biotite granite pluton and associated dikes. Granitic rocks include a slightly older mafic phase (Tmm), include both the Valdez and Orca Groups, and are cut by Contact fault		K-Ar age of 32.2+/- 1.6 Ma on biotite	AN002	321	Anchorage	Ign	1270	Togr
Tmm	Mafic phase Miners Bay Pluton	Oligocene□□	Texturally and compositionaly varibale composite mafic pluton east of Unakwik Inlet. Pluton consists of medium-grained clinopyroxene +/- orthopyroxene gabbro and lesser clinopyroxene-bearing diorite. Quartz gabbro and quartz diorite occur near pluton margins, and locally contain biotite. More mafic rocks contain disseminated pyrrhotite, pentlandite, and chalcopyrite. Mafic phase intrudes the Valdez Group, is intruded by the granitic phse (Tmg) and is bounded by the Contact fault		K-Ar age of 38.4+/- 1.9 Ma on hornblende	AN002	322	Anchorage	Ign	1292	Toem
Тдд	Granite and granodiorite	Oligocene or Eocene□□	Small plutons west of Columbia Glacier and south of Wells Bay that are coextensive with the Cedar Bay Granite and numeraous leucocratic dikes that intrude the Orca Group. Plutons consist of biotite+/- hornblende rganite and granodioriteic border phases, abundant alkali-feldspar. Plutons are undated but are correlated with Eocene plutons elsewhere in eastern Price William Sound (PWS) on the basis of similar major-oxide chemistry. An alternative correlation is with dated bimodal Oligocene plutons in western PWS.		K-Ar age of 38.4+/- 1.9 Ma on hornblende	AN002	323	Anchorage	Ign	1290	Toegr

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Tfo	Felsic Intrusions	Eorene 🗆	Leucoratic dikes, sills, and small stocks occurring widely south of Border Ranges fai Only a few meters thick but laterally extensive; Dacite predominates, but rholite also is present. Intrusions usually are pophyritic with fine-to medium-grained phenocrysts of plagioclase and occasional hornblende. Generally, phenocrysts and groundmass are extensively altered to seric and carbonate, and scare mafic minerals nearly always altered to chlorite. May correlate with hypabyssal felsic and intermediate intrusions north of the Border Danger fault	ult.	Two groups apparent using K-Ar and fission track: older group 55-48 Ma and younger group 44-43 Ma. Near Anchorage, A K-Ar age of 34 from a hornblende dacite dike	40002	334	Apphorage	Ion	1301	Td
пр			Small stocks and irregular-shaped dikes an	d		711002	554	Anchorage	1911	1501	10
Tim	Hypayssal mafic	Focene	sills of diorite porphyry, diabase, basalt, an lamprophyre widely exposed in the Matanus Valley	d ska	Primative initial Sr/Sr and whole-rock K-Ar age of 41 Ma	AN002	331	Anchorage	Ian	1012	Thm
Ti	Hypayssal felsic and intermediate intrusions	Eocene□□	Small stocks and irregular-shaped dikes an sills of rhyolite, quartz latite, latite, and dar widely exposed in Talkeetna Mountains and the Matanuska Valley. May correlate with felsic volcanic rocks in upper part of unit Tv	d ite	Primative initial Sr/Sr indicate little crustal contamination during intrusion and 4 whole rock K-Ar age of 46 to 38 Ma for stocks and 3 zircon fission tack ages of 41-37 Ma on felsic intrusions.	- AN002	332	Anchorage	Ign	1011	Thf
ТКс	Calaclasite	Eocene? and Early Cretaceous?	Chlorite-rich, fine-grained granular rocks formed by cataclasis and retrograde alterat of mafic and ultramafic plutonic rocks and mafic volcanic rocks; May be equivalent lithologically to sheared gabbronorite (Jgs). Lithologies and fabrics of these rocks may resemble parts of the Haley Creek metamorphic assemblage. Numerous compositionally variable, altered dikes, sills, and small stocks intruding the Talkeetna Formation and Jurassic plutonic	ion	Deformation in the Border Ranges fault is at least as old as Early Cretaceous; however, much of the fabric may be an Eocene overprint from reactivation of the old thrust as a strike-slip boundary. Whole-rock K-Ar	AN002	333	Anchorage	Meta	1710	ТКс
Tlds	Mafic and intermediate	Focene? to Jurassic?	rocks in the Chugach Mountains. Rocks typ consist of fine-grained basalt, prophyritic and site, and dacite	bes	ages of 130 and 38 Ma for two basalt dikes	AN002	341	Anchorage	Ian	1012	Thm
TKg	Granite	early Paleocene and Late Cretaceous	Large, epizonal, biotite-muscovite pluton. Pluton is principally granite, but also granodiorite and lesser quartz monzonite.		K-Ar ages on muscovite and biotite 67 and 65 Ma, respectively.	AN002	410	Anchorage	Ign	1655	ТКд
TKt	Tonalite	early Paleocene and Late Cretaceous□□	Large pluton of predominately biotite- hornblende tonalite and lesser biotite- hornblende quartz diorite. Pluton is epizon or mesozonal. Weakly developed foliation occurs in many places, and orbicular textur are present locally.	al	K-Ar ages 73-67 Ma (possibly reset).	AN002	420	Anchorage	Ign	1660	TKm

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Kw	Willow Creek pluton	Late Cretaceous□□	Pervasively altered, zoned pluton; based on its distincive aeomagnetic signature it is interpreted to extend at least to northern boundary of map area. Pluton has a 30- to 200-m wide outer margin of hornblende quartz diorite and lesser hornblende tonalite. Core is hornblende-biotite granodiorite, and lesser hornblende-biotite quartz monzonite and biotite quartz monzonite. Foliation is common, particularly along margins. Plutonics host mineralized veins.		Subconcordant K-Ar ages 79-72 Ma. K-Ar ages from propylitized pluton and gold-bearing veins and dikes that cut the pluton indicate episodes of alteration and quartz veining at 66 and 57 Ma.	AN002	430	Anchorage	Ign	2460	Kg
Kum	Serpentinized ultramafic rocks	Late Cretaceous	Small, structurally bounded, pervasively sheared, discordant bodies of serpentinized ultramafic rocks wholly enclosed in pelitic schist (Jps) near Bald Mountain Ridge. Monotonous sequences of thin- to thick-		Age of origin unknown, but early Late Cretaceous K-Ar minimum ages 91-89 Ma are presumed to date their emplacement.	AN002	440	Anchorage	Ign	2510	Kmum
Tos	Sedimentary rocks of the Orca Group	Eocene and Paleocene	bedded sandstone, siltstone, and mudstone. Primary sedimentary features indicate deposition by turbidity currents			AN002	342	Anchorage	Sed	950	Tos
Тос	Conglomerate of the Orca Group	Eocene and Paleocene□□	Massive, clast-supported pebble, cobble and boulder conglomerate to matrix-supported pebbly mudstone and sandstone; clasts generally are well rounded and consist entirely of sandstone and siltstone. About 900 m thick near Miners Bay.	,		AN002	343	Anchorage	Sed	952	Тос
Tovs	Sedimentary and volcanic rocks of the Orca Group	Eocene and Paleocene□□	Basaltic flows, pillow breccia, and tuff interbedded with fyschoid siltstone and sadstone southeast of Miners Bay. Volcanic interbeds weather a conspicuous rusty color.			AN002	344	Anchorage	Sed	951	Tovs
Kvs	Metasedimentary rocks	Late Cretaceous□□	Thick sequences of drab, rythmically alternating multiply deformed turbidites, including metasandstone, metasiltstone, argillite, slate, and phyllite, and rare beds of pebbly argillite and metasandstone; generally beds are a few centimeters to a few meters thick, but locally massive metasandstone is as thick as several tens of meters. In some places, primary sedimentary structures such as graded bedding, current-ripple cross- lamination, convolute bedding, and sole markings are preserved.			AN002	441	Anchorage	Meta	2700	Kvs
Kvt	Mafic metatuff of the Valdez Group	Late Cretaceous	Altered chlorite-epidote-actinolite semischist interbedded with metasedimentary rocks in a small area near the divide between Coal Creek and Metal Creek. Believed to represent aquagene tuff analogous to widespread thicker metavolcanic rocks in Cordova and Valdez quads.			AN002	442	Anchorage	Sed	2705	Kvv

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Mzm	McHugh Complex of the Valdez Group	Mesozoic□□	Strongly deformed, melange-like assemblage of diverse lithologies between Eagle River and Border Ranges faults. Broad zones as wide a 1 km of intense shearing lack any stratal continuity and, in many places, are marked b angular, elongate phacoids, either enclosed ir pervasively sheared matrix or juxtaposed against other phacoids. Larger phacoids are lithologically diverse, consisting of schist, amphibolite, marble, sandstone, conglomerate, diorite, gabbro, serpentinized ultramafic rocks, and mafic volcanic rocks.	i s y		AN002	443	Anchorage	Melange	2190	Kmk
кt	Leucotonalite and trondhjemite	Early Cretaceous□□	Medium-grained plugs and elongate irregular shaped, sill-like bodies of leucocratic plutonic rocks in northern Chugach Mountains in a zone about 5 km wide near Border Ranges fault. Rocks are foliated and contain less tha 10% mafic minerals including muscovite, biotite, or hornblende (and minor carnet).	n	K-Ar on hornblende 126-124 Ma, biotite 116 MA, and muscovite 110 Ma, and a concordant U- Pb age of 103Ma. Ar/Ar ages on hornblende 129,125, and 114 Ma, biotite 123 Ma, and muscovite 118 Ma, and two Rb/Sr isochrons 133 and 130 Ma.	AN002	450	Anchorage	Ign	2570	Ktt
Jtr	Trondhiemite	Late Jurassic 🗆 🗆	Two discordant, NE-trending, elongate, epizonal, muscovite-biotite, leucocratic plutons intruding Jurassic quartz diorite (Jqd) and amphibolite (Jma) in Talkeetna Mountains. Bodies are generally altered and sheared and have a faint foliation locally.		K-Ar age from the northern pluton is 129 Ma and 2 K-Ar ages for hte southern pluton range from 134-142 Ma. Four K- Ar ages from the northern pluton which extends in to the TK quad are tightly clustered from 143 to 149 Ma.	AN002	501	Anchorage	Ian	3380	Jtr
Trl	Limestone and marble	Late Triassic	Unfossiliferous, massive to poorly bedded limestone near head of east fork of Kings River, and limestone lenses as much as 30 m thick in broad shear zones in the Talkeetna Formation along the Castle Mountain fault; medium- to coarse-grained marble occurring as roof pendants in epizonal plutons in the Talkeetna Mountains is thought to be correlative.			AN002	600	Anchorage	Sed	4030	JTrlm
			Glacial and alluvial deposits, chiefly					Talkeetna			
Qs	Surficial deposits	Quaternary	unconcolidated gravel, sand, and clay			TK002	200	Mountains	Unconsol	100	Qs
Tv	Volcanics	Paleocene to Miocene	Over 1500 m of felsic to mafic subaerial volcanics and related shallow intrusives. Small stocks, irregular dikes, lenticular flows, and thick layers of pyroclastic rocks; predominately consists of fine- to medium- grained, generally medium-gray quartz latite, rhyolite, and latite.		K-Ar (3 samples) from andesite in the middle of the sequence	ТК002	321	Talkeetna Mountains	Ign	1000	Tvu

<b></b>						Sourco	1				
Pock unit	Linit hamo	100	Description	Fossil	Padiomotric ago	source	Class codo	Quadranglo	Pock class		Labol
ROCK UTIL		Age	Small stocks and irrogular dikes of digrite	FUSSII	Radiometric age	coue	Class coue	Quaurangle	RUCK CIASS	INSA CIdSS	Labei
			prophyry diabase and basalt. Probably the								
	Hyabyccal Mafic		subvolcanic equivalent of the andesite flows of	f				Talkootna			
Tim	Intrucivos	Palaacana ta Miacana	upit Ty	1		TKOOD	250	Mountaine	Ian	1012	Thm
TIM	Intrusives	Paleocerie to Miocerie	Utill IV.			TKUUZ	350	Mountains	ign	1012	Inm
			Small stocks and irregular dikes of myolite,								
	Utor house all Ealaite		quartz latite, and latite. Probably correlative					Tallessee			
	Hyabyssal Felsic		with the feisic subvolcanic equivalent of unit					Talkeetna			
Lif	Intrusives	Paleocene to Miocene	Iv.			1K002	340	Mountains	Ign	1011	Thf
			The Tsadaka consists of cobble-boulder								
			conglomerate with thin interbeds of								
			sandstone, siltstone, and shale; about 200m								
			thick. The Wishbone Formation								
			unconformably underlies the Tsadaka. It								
			comprises well-indurated fluvitile								
			conglomerate with thick interbeds of								
			sandstone, siltstone, and claystone; about 600								
	Tsadaka and Wishbone	Miocene and (Paleocene to	to 900 m thick. Unit also includes over 150 m					Talkeetna			
Ttw	Em Undivided	Focene) respectively	of fluvatile conclomerate and coaly sandstone			TKOO2	331	Mountains	Sed	790	Ttw
1000	THI Ollawaed	Electric) respectively	Well-indurated continental dominately	•		11002	551	Flouricums	Jeu	750	1000
			fluvatile sequence of massive feldsnathic								
			candetena, ciltetena, clayetena, and								
			sanusione, sinsione, claysione, and					Talliastina			
<b>T</b> -	Chieles In an Eng	Delesson	bituminate, containing numerous beus of			TKOOD	220	Manuela	C . 1	000	T - I-
IC	Chickaloon Fm	Paleocene	Dituminous coai; over 1500 m thick			TKUUZ	330	Mountains	Sea	900	ICN
			Fluxetile and seconds and the second								
			Fluvatile conglomerate, sandstone, and								
			claystone with a few interbeds of lightic coal.								
			Looks similar to the sedimentary rocks of the								
			southern Talkeetna Mountains but lacks fossil								
			evidence for definitive correlation. The								
	Sedimentary,		sequence is over 160 m thick. It resembles					Talkeetna			
Tsu	undifferentiated	Tertiary	the Chickaloon Formation, lithologically.			TK002	371	Mountains	Sed	500	Tsu
					K-Ar on biotite 48.8						
			Contains hornblende and biotite. Part of a		+/- 1.5 m.y. and on						
			small pluton along the northern edge of map		hornblende 44.8 +/-			Talkeetna			
Tad	Granodiorite	Eocene	area.		1.3 m.v.	тк002	370	Mountains	Ian	1300	Tear
. 5 .									- 5		
			Granodiorite predominates, but locally it								
			grades into adamellite, tonalite, and guartz								
			diorite All of these rocks are medium to dark								
			gray medium grained generally structurless								
			and have granitic to coriate textures. In all of								
			them hemplands is the shief mafie minaral								
			Distite and bouchlands viels una slittle and								
			Biotite- and nornbiende-rich xenoliths are								
	Biotite-Hornblende		common in every pluton. These epizonal		K-Ar age on biotite			Talkeetna			_
Inga	Granodiorite	Paleocene and Eocene	plutons are equivalent to feisics in TV.		58.6 and 54.8	1K002	341	Mountains	Ign	1320	Ipgr
			Biotite granodiorite and adamellite in about								
1			equal proportions. These rocks are light to	1							
1			medium gray, medium- to coarse- grained,	1							
1			and have granitic to seriate textures. Biotite	1							
1			is the chief mafic mineral. Faint flow	1	Considered to be the						
1			structures evident. Plutons are shallow	1	same age as Thgd. K	F					
1			epizonal occurrances commonly with aplitic	1	Ar ages on biotite						
1			and pegmatitic dikes. Considered to be	1	range from 56.3 to			Talkeetna			
Tbqd	Biotite Granodiorite	Paleocene and Eocene	plutonic equivalent of felsic volcanics of Tv.	1	58.6.	ТК002	311	Mountains	Ign	1320	Tpgr

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Tsmg	Schist, migmitite, and granite	Paleocene	Undifferentiated terrane of andalusite and sillimanite-bearing schist, lit-par-lit type migmatite, and small granitic bodies with moderately to well-developed foliation. Contacts generally gradational between these rocks as it is between the schist and its unmetamorphosed pelitic rock equivalent (Kag). Pelitic schist is medium-grained, has well-developed but wavy foliation. Minerology of the schist includes biotite, quartz, plagioclase, minor K-spar, muscovite, garnet, and sillimanite which coexists with andalusite.		K-Ar age on biotite of 58.7 m.y.	ТК002	361	Talkeetna Mountains	Meta	1720	ТКдд
Tkt	Tonalite	Late Cretaceous and early Paleocene	Dominately biotite-hornblende tonalite, locally grades into quartz diorite. The tonalite is medium gray, coarse to medium grained, has a granitic texture and a fairly well-developed primary foliation.		K-Ar age ranges on biotite of 61.7 to 72m.y. K-Ar ages on hornblende 61 to 74.4 m.y.	ТК002	301	Talkeetna Mountains	Ign	1660	TKm
ТКа	Adamellite	Late Cretaceous and early Paleocene	Occurs in large epizonal plutons dominately adamellite but locally includes granodiorite. Biotite is the chief mafic mineral. Medium to coarse grained, medium to light gray, textures ranges from granititic to serate. The age dates indicate that this rock unit is comagmatic with the tonalite.		K-Ar age ranges on biotite of 65 m.y. K- Ar ages on muscovite 67.2 m.y.	ТК002	310	Talkeetna Mountains	Ign	1655	ТКд
TKgr	Granititic rocks undivided	Cretaceous and (or) Tertiary	Rocks of uncertain age occur in four smaller epizonal plutons of granodiorite and tonalite. Color is medium to dark gray, grain size is medium, texture is granititic. Mafic minerals are hornblende and biotite.			ТК002	300	Talkeetna Mountains	Ign	1660	TKm
TKlg	Leucogabbro	Cretaceous and (or) Tertiary	Small poorly exposed intrusive or uncertain age essentially consisting of plagioclase and pale-green hornblende. Medium to light gray, coarse to medium grained, with a granitic to seriate texture.			ТК002	320	Talkeetna Mountains	Ign	1670	TKgb
Kar	Arkose Ridge Fm	Cretaceous (Eocene/Paleocene probably)	Arkosic sandstone, conglomerate, graywacke, siltstone, and shale. Clasts consist chiefly of granitic and metamorphic rock frags, quartz, feldspar, and biotite. Plant fragments indicate a terrestial origin. The formation rests unconformably on Jurassic granitic and metamorphic rocks and is as much as 700 m thick.		K-Ar on biotite yields an age of 67.5 m.y.	ТК002	511	Talkeetna Mountains	Sed	890	Tar
Km	Matanuska Fm	Cretaceous	Well-indurated shale, siltstone, sandstone, graywacke, with subordinate conglomerate interbeds; total thickness in excess of 1200 m. Generally dark gray and thinly bedded, mostly marine depositional environment of moderate to shallow depths. May correlate to the Kennicott, Shulze, Chititna, and the MacCall Ridge fms of the southern Wrangell Mountains.	Plant frags		ТК002	500	Talkeetna Mountains	Sed	2010	Km
Ĵп	Naknek Fm	Late Jurassic	Shallow marine, thin to thick bedded, intercalated strata of fossiliferous gray siltstone, shale, sandstone, and conglomerate; over 1400 m thick. Correlates with the Root Glacier Fm of the southern Wrangell Mountains.			ТК002	421	Talkeetna Mountains	Sed	3010	Jn

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
lct	Chinitna Fm and Tuxedni Group (Middle Jurassic) undivided	Late Jurassic	The Chinitna is shallow marine, intercalated sequence of dark-gray shale, siltstone, and subordinate graywacke; contains numerous large limestone concretions; it is as much as 600 m thick. The Tuxedni Group is shallow marine, well-indurated, thinly to thickly bedded graywacke, sandstone, and massive conglomerate in it lower part. The upper part consists of thinly to thickly bedded dark siltstone and shale; thickness is 300-400 m. This unit is partly correlative with the Nizina Mountain Fm of the southern Wrangell Mountains.			ТК002	431	Talkeetna	Sed	3140	ltxc
1+4	Talkeetna Fm	Farly lurassic	Andesitic flows, flow breccia, tuff, and agglomerate; subordinate interbeds of sandstone, siltstone, and limestone. A dominately shallow marine sequence about 1000 to 2000 m thick			TK002	411	Talkeetna	Ian	3250	lTetk
JIs	Limestone	Early Jurassic	Light to dark-gray, fine- to medium-grained unfossiliferous limestone; near granitic rocks recrystallized to marble. Forms lenticular bodies, as much as 30 m thick, within the Talkeetna Fm.			TK002	410	Talkeetna Mountains	Sed	4031	JTrlm
Jtr	Trondhjemite	Late Jurassic	Forms discordant, NE trending epizonal pluton. Large portions have been sheared and saussuritized. Light gray, medium to coarse grained with granitic texture. A faint flow foliation is lovally developed. Major minerals include plagioclase, quartz, k-spar, biotite, with some muscovitre and opaques.		K-Ar ages on biotite range from 99.4 to 148.5; on muscovite they range from 129 to 146 m.y. One biotite age of 67.8 m.y. was probably reset by a more recent event	ТК002	400	Talkeetna Mountains	Ign	3380	Jtr
Jgd	Granodiorite	Middle to Late Jurassic	Dominately granodiorite but includes minor amounts of tonalite and quartz diorite. Medium to dark gray, medium grained, and in undeFromed rocks have granitic texture. Mafics includes biotite and hornblende. Ne- trending secondary foliation is present in cataclasically deformed rock.		K-Ar ages on biotite range from 144 to 174; on hornblende range from 154 to 167. A zircon age of 125 was also determined using fission track.	ТК002	401	Talkeetna Mountains	Ign	3402	Jgd
Jgdm	Migmatite border zone of Granodiorite	Middle to Late Jurassic	Forms a terrane of poorly exposed, intricately intermixed contact schist, amphibole, and small dikes and veinlets of granodiorite.			ТК002	470	Talkeetna Mountains	Meta	3621	PPast
Jmrb	Marble	Middle to Late Jurassic metamorphic age	Contact metamorphosed marble bed more than 40 m thick within migmatitic border zone. The rock is white, coarse to medium grained with prophyroblastic cystals of garnet and diopside.			ТК002	480	Talkeetna Mountains	Meta	5955	PPaskm
Jad	Ouartz diorite	Middle to Early Jurassic	Dominately quartz diorite but also includes diorite and tonalite. Large portions have been intensively sheared and altered. Fresh rock is medium to dark greenish gray, medium to coarse grained, and has granitic texture. Where altered, the quartz diorite consists of mineral aggregates of epidote, chlorite, and sericite.			ТКОО2	420	Talkeetna Mountains	Ign	3403	Jad

				1			1				
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	Source	Class code	Quadrangle	Rock class	NSA class	label
Jam	amphibolite	Middle to Early Jurassic	Dominately amphibolite but includes subordinate amounts of greenschist and fgoliated diorite. Amphibolite is generally dark greenish gray, medium to coarse grained, but fine-grained varieties also occur.		K-Ar age on hornblende of 176.6	ткоо2	441	Talkeetna Mountains	Meta	5550	PPast
lmh	marble	Middle to Early Jurassic	White, medium- to coarse grained, massive interbeds within the amphibolite terrane of Jam. Contains subordinate amounts of garnet			ткоо2	450	Talkeetna	Moto	EDEE	PBackm
Jas	areenstone	Middle to Early Jurassic metamorphic age	Dark greenish gray, fine-grained, generally structurless rock. Oringinal minerologiy was pyroxene, amphibole, and plagioclase which altered to chlorite, epidote, serpentine, calcite. and minor sericite and quartz.			TK002	450	Talkeetna Mountains	Meta	5641	PPast
Jpmu	Plutonic and metamorphic rocks, undifferentiated	Middle to Early Jurassic metamorphic age	Intermixed mosaic of most of the previously discussed Jurassic metamorphic and plutonic rocks (Jtr, Jgd, Jgdm, Jqd, Jgs, and Jps). Two rock types, amphibolite and sheared quartz diorite, dominate the terrane.			ТК002	440	Talkeetna Mountains	Meta	3600	PPast
Trv	Basaltic metavolcanic rocks	Late Triassic	Shallow water marine unit consists of amygdaloidal metabasalt flows with very subordinate amounts of thin interbeds of metachert, argillite, metavolcaniclastic rocks, and marble. Minimum thickness of the unit is 800 m. Metabasaltic flows are as much as 10 m thick and display columnar jointing and pillow structures			ТК002	360	Talkeetna Mountains	Meta	4430	Trn
Pzv	Basaltic to andesitic metavolcanic rocks	Pennsylvanian (?) and Early Permian)	Rocks of this unit form an interlayered heterogeneous, dominately marine sequence over 5000 m thick. Primarily consists of metamorphosed flows and tuffs of basaltic and andesitic compositions. Mudstone, bioclastic marble, and dark-gray to black phyllite are subordinate.			ТК002	100	Talkeetna Mountains	Meta	5630	PPasc
Pls	Marble	Pennsylvanian (?) and Early Permian ?)	Forms lenticular interbeds, as much as a few tens of meters thick, within basaltic to andesitic late Paleozoic metavolcanogenic sequence (Pzv). Rock is light gray to white, medium to coarse grained, thick-bedded to massive marble.	Poorly preserved and generally unidentified crinoid columnals, brachipods, bryozoans, and rarely corals.		ТК002	101	Talkeetna Mountains	Meta	5955	PPaskm
15	Sedimentary and volcanic rocks, undivided	Late Jurassic	These rocks comprise a section of intercalated argillite and graywacke, pebble conglomerate, and flows and dikes of andesite to latitic feldspar porphyry. The argillite and fine- grained graywacke are thinly to moderately thickly bedded and generally are dark gray. The conglomerates are massive, and the well- rounded to sub-rounded pebbles consist chiefly of unmetamorphosed andesite, latite, and subordinate amounts of dacite. Unit not shown on compilation, lump in K1f.	well-preserved fossils of Buchia rugosa from argilite indicating a late lurassic ane	1	ТКОО2	460	Talkeetna	Sed	2850	K1f

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
Kan	Argillite and lithic	Farly Cretaceous	These rocks occur in a monotous, intensely deformed flyschlike turbidite sequence, probably several thousand meters thick. The rocks are highly indurated, and many are sheared and pervasively cleaved. Most cleavage is axial plane cleavage. The argillite is dark gray to black with detrital mica as much as 1 mm in diameter. Graywacke is dark to medium gray, fine to medium grained, and occurs intercalated with the argillite	poorly preserved fossils of Incoceramus sp.; a block of Buchia- bearing limestone was found in float		TK002	510	Talkeetna	Sed	5210	Mznca
кау	graywacke			Touriu III Hoat.		TKUUZ	510	Mountains	Seu	5210	пігрса
Trvs	Metabasalt and slate	Late Triassic	Shallow marine, interbedded sequence of amygdaloidal metabasalt flows and slate. Sequence is tightly folded along with Kag and slightly metamorphosed and unv\evenly sheared. The metabasalt is dark greenish gray, aphanitic, with numerous amygdules. The slate is dark gray to black.	Monotis subcircularis and Heterorstridium sp. in argillite beds		ТК002	351	Talkeetna Mountains	Meta	4450	Trnm
			This unit is poorly known. The component								
DSga	Graywacke, argillite, and	Silurian ? to Middle	rocks identifed are medium to dark gray, sheared and tightly folded with vertical dips, and occur intercalated in beds as much as 1 m thick	1		тк002	600	Talkeetna	Sed	2192	Kmar
DOga	Share	Devolian				11002	000	Fibulitaria	Jeu	2172	Kindi
Jta	Crystal tuff, agillite, chert, graywacke and limestone	Jurassic	tightly folded and interally faulted, at least several thousand meters thick. Tuff is light to dark gray, locally with a greenish tint and weathers to brown. It is massive with obscure rhythmic laminations and thin bedding. Argilllite and chert are gray to black; graywacke is medium to dark gray; and limestone is medium gray.			ТК002	451	Talkeetna Mountains	Ign	3850	JTrct
Ksu	Sedimentary rocks, Undivided	Early Cretaceous	Shallow marine sequence of thinly bedded calcareous sandstone, siltstone, claystone, minor conglomerate, and thick-bedded to massive clastic limestone: over 100m thick			ТК002	501	Talkeetna Mountains	Sed	2100	Knl
	Ultramafic and mafic	Cambrian and/or	Serpentinite and greenstone intruded by								
CZum	rocks	Precambrian	gabbro and diorite			LG002	899	Livengood	Ign	8250	CZum
C7wa	Wickersham unit Maroon and green arcillite	Early Cambrian and Late	Maroon and green arguitte, phylitte, quartzite, graywacke, slitte, and phylitte. Unit is characterized by the relative lack of grit except in the far western part of the nuadranole			1 6002	902	Livengood	Meta	8310	CZwa
	Wickersham unit Maroon and green	Early Cambrian and Late	Maroon and green argillite, grit, quartzite, siltite, graywacke and phylliteAs mapped includes thin beds of dark limestone, which are probably equivalent to unit CZwl, as mapped in other areas, but which are areally restricted and are not mapped separately in								02.10
CZwa	argillite	Proterozoic	this area			LG002	902	Livengood	Meta	8310	CZwa
CZw	Wickersham unitGrit	Early Cambrian and Late Proterozoic	Grit, quartzite, phyllite, and slate. Differs from other grit units in that it contains chert. Includes limestone interbeds (I) that lithologically resemble subunit CZwl Livengood Area			LG002	903	Livengood	Meta	8300	CZw
C7!	Wickersham unit	Early Cambrian and Late				1 0000	001	Livene	Cod	2000	CTurl
CZWI	Wickersham unitDark	Proterozoic Early Cambrian and Late	Dark-gray arenaceous limestone			LG002	901	Livengood	Sed	8000	CZWI
CZwl	limestone	Proterozoic	Sparsely or non-arenaceous limestone			LG002	901	Livengood	Sed	8000	CZwl
Dc	Cascaden Ridge unit	Middle Devonian	Shale, siltstone, sandstone, conglomerate,			1 6002	847	Livengood	Sed	6940	Dch
50	1 cascaach nage unit	L' maare Devorinun		1	1	120002	1017	Litengoou	1000	00.00	200

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
			Conglomerate, phyllite, calc-phyllite, siltstone,								
Dq	Quail unit	Late Devonian?	and sandstone			LG002	844	Livengood	Sed	6920	Dq
DSI	Lost Creek unit	Devonian and Silurian	Limestone and varied sedimentary rocks			LG002	850	Livengood	Sed	6955	Dlc
	Schwatka unit										
Dsl	Limestone	Middle and Early Devonian	Limestone			LG002	842	Livengood	Sed	6945	Ds
		Middle Devonian to Early?									
DSt	Tolovana Limestone	Silurian	Limestone and rare dolomite			LG002	849	Livengood	Sed	6965	DSt
-	Schwatka unitMafic		Mafic volcanic rocks and minor clastic						-	7010	
Dsv	volcanic rocks	Middle and Early Devonian	sedimentary rocks			LG002	841	Livengood	Ign	/010	Dsv
Ка	Alaskite	Late Cretaceous	Exposed at Raven Creek Hill			LG002	410	Livengood	Ign	2450	Kg
IC d	Dilyan	Creteseeus2	Bodies ranging in composition from granite to			1 C002	100	Livengeed	Tan	2400	K a
Ku	Dikes	Lata Cratagonia	Dodro Domo and realize in its visinity			LGUUZ	400	Livengood	Ign	2400	Kg
Kg	Granite		Pedro Dome and rocks in its vicinity			LGUUZ	430	Livengood	Ign	2475	Kg
куа	Granoulorite		Pedro Dome and rocks in its vicinity			LGUUZ	435	Livengood	Ign	2480	ĸġ
		Farly Cretaceous and/or	flysch thought by Tom Dutro to be equivalent								
K1v	Vrain unit	lurassic	to upper part of Glenn Shale.			1 G002	495	Livengood	Sed	2860	Klvr
101		Farly Cretaceous and/or				20002	155	Livengood	564	2000	1011
K]w	Wolverine unit	Jurassic	Quartzite and interbedded shale and siltstone			LG002	491	Livengood	Sed	2815	K]W
			Siltstone, mudstone, graywacke, guartzose				-	<b></b>			-
			sandstone, and plant-fragment-bearing								
Km	Minto unit	Late Cretaceous?	siltstone			LG002	405	Livengood	Sed	1980	Kms
	Quartz monzonite,		Comprises Sawtooth, Wolverine, Elephant								
Kmo	monzonite, and syenite	Late Cretaceous	Mountains, and Huron Creek plutons			LG002	401	Livengood	Ign	2470	Kg
Ks	Syenite	Late Cretaceous	Roy Creek stock			LG002	420	Livengood	Ign	2465	Kg
	Wilber Creek flysch unit,		Polymictic conglomerate, conglomeratic								
Kwcc	coarse-grained	Early Cretaceous; Albian	graywacke, and shale			LG002	480	Livengood	Sed	2115	Kwcf
	Wilber Creek flysch unit,									2445	
KWCS	fine-grained	Early Cretaceous; Albian	Shale, slitstone, and graywacke			LGUUZ	480	Livengood	Sea	2115	KWCT
	Phyllita amphibalita										
MzPzn	greenstone and diorite	Mesozoic or Paleozoic	Phyllite amphibolite greenstone and diorite			1 G002	795	Livengood	Mota	5216	Klyr2
1.121 ZP	greenstone, and donte	110302010 01 1 81002010	Metasedimentary gneiss mica schist nbyllite			20002	/ 55	Livengood	neta	5210	1011:
MzPzr	Raven Creek Hill unit	Mesozoic or Paleozoic	and hornfels			1 G002	791	Livengood	Meta	5208	TPza
	Fossil Creek Volcanics		Shale, chert, and limestone intruded by								
Ofs	Shale	Ordovician	gabbro			LG002	860	Livengood	Sed	7610	Ofc
	Fossil Creek Volcanics		Alkali basalt, agglomerate, and volcanoclastic					5			
Ofv	Alkali basalt	Ordovician	conglomerate.			LG002	860	Livengood	Ign	7610	Ofc
			Chert, siliceous slate with rare greenstone and								
Old	Livengood Dome Chert	Late Ordovician	limestone			LG002	871	Livengood	Meta	7710	Och
	Metamorphic and		Black and greenish-gray siliceous slate, chert,								
PDms	sedimentary rocks	Permian to Devonian?	siltstone, debris flows, and greenstone			LG002	801	Livengood	Meta	5615	PDms
	Creaniah annu ailian aug										
	slate quartzite chort										
PMc	and greenstone	Permian to Mississinnian				1 G002	805	Livengood	Mota	5600	PDmc
1115			Argillite, siltstone, sandstone, and minor			20002	0000	Livengood	i ieta	5000	1 01113
Ps	Sedimentary rocks	Permian	conglomerate			LG002	750	Livengood	Sed	5740	Ps
			Allochthonous, garnet-bearing guartz-biotite-								
			muscovite schist, and quartzite. Primarily								
			epidote-amphibolite facies rocks, but also								
Pzc	Chatanika unit	Paleozoic	includes eclogitic rocks			LG002	890	Livengood	Meta	5510	Pze
		Paleozoic and/or Late									
PzZm	Mafic igneous rocks	Proterozoic	Includes minor interlayered sedimentary rocks			LG002	912	Livengood	Ign	8450	MzZum
Qa	Alluvium	Holocene				LG002	105	Livengood	Unconsol	100	Qs
	Abandoned or inactive		Includes natural levees on streams in the								
Qab	flood plain deposits	Holocene	Minto Flats			LG002	111	Livengood	Unconsol	100	Qs
Qaf	Alluvial fan deposits	Holocene				LG002	100	Livengood	Unconsol	100	Qs
Qd	Sand dune deposits	Holocene				LG002	120	Livengood	Unconsol	100	Qs
										1	
0-	Reworked creek gravels	11-1				1 6002	100	1 to compare and		100	0
29	in placer mining areas	nuiucene	1	1	1	LGUU2	1100	Livengood	UNCONSOL	100	l Qpm

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
		Helesene	Techudea miner unland alluvium	103311	Radiometric age		100	Quadrangle	LINGER CIASS	100	
QIC	Loess and colluvium	Holocene	Includes minor upland alluvium			LGUUZ	100	Livengood	Unconsol	100	QS
Qs	Swamp deposits	Holocene				LG002	113	Livengood	Unconsol	100	Qs
	Reworked silt,								1	'	
	undifferentiated, and								1	1	
Qsu	organic deposits	Holocene	Includes swamp deposits			LG002	113	Livengood	Unconsol	100	Qs
0To	Gravel sand and silt	Holocene to Pliocene	Poorly consolidated deposits			1 G002	285	Livengood	Sed	100	05
219	Graver, Sana, and Site	holdeene to hideene	Siliceous dolomite, chert, and basaltic			20002	205	Livengood	Jocu	100	Q3
		Cilurian 2 to Late	Siliceous dolorince, cherc, and basalic						1	1	
67-	A mark Consellation it	Silurian? to Late	greensione, minor imesione, shale and			1 0000	0.1.1	Charlen and a state	0.1	6600	67-
SZa	Amy Creek unit	Proterozoic	siltstone			LG002	911	Livengood	Sea	6680	SZa
Tb	Olivine basalt	Tertiary				LG002	230	Livengood	Ign	1004	Tb
Tgp	Peraluminous granite	Paleocene	Cache Mountain pluton			LG002	240	Livengood	Ign	1320	Tpgr
51		Tertiary and/or	Small intrusive bodies in the upper Wilber					<u> </u>			1.5
TKa	Felsic granitic rocks	Cretaceous	Creek area			1 G002	201	Livengood	Ian	1655	TKa
ing	Telsic granicic rocks	Tertien ( and (an				10002	2.51	Livengoou	ign	1055	ing
		Tertiary and/or							-	1.055	
TKg	Felsic granitic rocks	Cretaceous	Vault pluton			LG002	291	Livengood	Ign	1655	IKg
		Tertiary and/or							1		
TKm	Monzonite	Cretaceous	Cascaden Ridge pluton			LG002	295	Livengood	Ign	1660	TKm
	Monzonite(?) or							-			
Tm	Monzodiorite(2	Paleocene?	Northeast of Tolovana Hot Springs pluton			1 G002	255	Livengood	Ian	1350	Thad
T		Palaaaaa	Talauraa Uat Caria aa alutaa			10002	255	Livengood	Tan	1330	Tingu
Iqm	Quartz monzonite	Paleocene	Tolovana Hot Springs pluton			LGUUZ	251	Livengood	Ign	1320	ipgr
Trc	Black shale and chert	Triassic				LG002	601	Livengood	Sed	4110	Trcs
Trm	Mafic igneous rocks	Triassic?	Gabbro and diabase sills and dikes.			LG002	610	Livengood	Ian	4210	Trn
	Rampart Group		Argillite chert graywacke shale and								
TrMrc	Sodimontary rocks	Triassic to Mississippian	limostono			1 C002	602	Livengood	Sod	5020	TrMtc
111115	Sedimental y Tocks		limestone			LGUUZ	092	Livengoou	Jeu	5020	TIPILS
									1	1	
	Rampart GroupIgneous		Intrusive and extrusive mafic igneous rocks,						1		
TrMrv	rocks	Triassic to Mississippian	and a few intermixed sedimentary rocks			LG002	691	Livengood	Ign	5130	JTrtmu
	Calcareous phosphatic		Includes minor calcareous sandstone and							1	
Trs	shale and limestone	Triassic	granule conglomerate			1 G002	605	Livengood	Sed	4080	Tral
	Volcanic and	11100010	granale congranalace			20002	000	Livengeeu			
									1		
_	sedimentary rocks,										_
lvs	undivided	Oligocene and Eocene	Conglomerate, sandstone, shale, and basalt			LG002	209	Livengood	Sed	795	Ivs
									1		
	Fairbanks schist unit		Greenschist facies muscovite-chlorite schist,						1		
Zf	undivided	Late Proterozoic	quartzite, and phyllite. Locally, divided into:			LG002	930	Livengood	Meta	9320	PzZvas
			Facies characterized by white felsic schist					<b>J</b> = = =			7 1-
	Fairbanks schist unit		micaceous quartzite, chloritic or actinolitic						1		
760	Cleans subunit	Lata Duatavanaia	aneanashist areanatana and markle			1 0000	040	Livengeed	Mata	0221	D=7uss
ZIC		Late Proterozoic	greenschist, greenstone, and marble			LGUUZ	940	Livengoou	Meta	9321	PZZYYS
			Bimodal quartzite, gray and olive-gray						1		
			greenschist-facies argillite. Unit age is						1		
Zwg	Grit	Late Proterozoic	considered to be Hadrynian			LG002	925	Livengood	Meta	8410	Zwg
										1	
			Gravel, sand, silt; grav or buff, uncolsolidated.	.					1	1 '	
			well-stratified: manned only in valleys of	1					1	1 '	
			major streams Includes gravel sand and sill	-					1	1 '	
0.5	Allensiume	Quataman	of low terms and	-		80000	100	Dia Delta	Unconcol	100	0.0
Qa	Alluvium	Quaternary	of low terraces			BD002	100	ыў реца	Unconsol	100	QS
									1		
			Boulders, gravel, sand, silt, and angular rock						1		
			fragments. In large river valleys contains						1		
Qac	Alluvium and colluvium	Quaternary	much perennially frozen organic silt and peat.			BD002	101	Big Delta	Unconsol	100	Qs
•			Silt, eolian: light brown to brownish gray.					2			`
			unconsolidated well-sorted massive to poorly						1		
			attractified, leadly mattled by iron stains. In						1		
			stratineu, lotally mottleu by non stallis. In						1	1 '	
		-	places contains venefacts. Thickness ranges						l	1	-
QI	Loess	Quaternary	from 1 to 50 m.			BD002	110	Big Delta	Unconsol	100	Qs
									1		
			Sand, eolian; yellowish brown to grayish	1					1	1 '	
			orange, light gray and olive gray,						1	1 '	
			unconsolidated, forms dunes as much as 21 m	d .					1	1 '	
			high and dune fields 1 or more square						1	1 '	
			kilomotors in area. Sand is commonly	1					1	1 '	
0-	Cand	0	Kilometers in area. Sanu is commonly	1		00000		Die Dell	luman 1	1100	0-
Qs	Sand	Quaternary	joveriain by as much as 1 m of loess.			BD002	111	ыg Delta	Unconsol	100	I US

						Source			1	1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ROCK UTIL		Age	Description	105511	Radiometric age	coue			KUCK CId55	INSA Class	Laber
			Organic cilt deposited in swamps, black or								
			mottled gray and brown Mostly poronnially								
			frozon Only the large areas of this unit in the								
0.00	Cilt and neat	Quataman	visibility of the Tenane valley are manned	:		BD000	120	Dia Delte	Unconcol	100	0.0
Qsp	Slit and peat	Quaternary	vicinity of the Tanana valley are mapped			BD002	120	Big Deita	Unconsol	100	Qs
			University design of the second symbolic second								
			Unconsolidated silt, sand, pebbles, and								
			cobbles, in well-stratified layers and lenses.								
			Light to dark gray and buff to brown; includes								
	Abandoned floodplain		much organic material and grades into swamp	1							
Qab	alluvium	Quaternary	deposits in poorly drained ares.			BD002	121	Big Delta	Unconsol	100	Qs
			Sand, gravel, and cobbles, in fairly well-								
			stratified layers and lenses. Primarily distal								
			segments of undifferientiated glacial outwash								
Of	Fan deposits	Quaternary	fans, mantled with loess.			BD002	130	Big Delta	Unconsol	100	Os
	·	(	Boulders, gravel, sand, and silty sand, in								
			terminal moraine lateral moraine moraine in								
			cirgues and ground moraine of soveral								
0	Mausina denesita	Quataman	different ice advances			BD000	1.21	Dia Dalka	Unconcol	100	0.0
Qm	Moraine deposits	Quaternary	different ice advances.			BDUUZ	131	ыў рена	Unconsol	100	QS
			Gravel and sandy gravel, light yellowish-								
			brown to gray, moderately to well-rounded, in	1							
	Outwash of Donnelly		unconsolidated well-stratified layers and								
Qdo	glaciation	Quaternary	lenses			BD002	140	Big Delta	Unconsol	100	Qs
			Till, sandy, yellowish-gray to light reddish-								
			brown, unconsolidated, unstratified. Gravel is								
	Morainal deposits of		angular to well-rounded, 2 cm to 24 cm in								
Odlm	Delta glaciation	Quaternary	diameter			BD002	141	Big Delta	Unconsol	100	Os
<b>~</b>		Q	Gravel silty or sandy, with lenses of well-								
			sorted sand: light vellowish -brown Gravel								
			well-rounded poorly to moderately well-								
	Outwach of Dolta		corted in unconcolidated mederately well-								
o 11	Outwash of Delta		sorted in unconsolidated moderately well-				1 50	D: D !!		100	
Qalo	glaciation	Quaternary	stratified layers			BD002	150	Big Deita	Unconsol	100	Qs
			Congiomerate and minor amounts of								
			sandstone; yellowish-gray to reddish-brown,								
			poorly consolidated, well-sorted.								
			Conglomerate particles, mostly well-rounded,								
			up to 8 cm in diameter, characteristically iron-	-							
Tn	Nenana gravel	Tertiary	stained.			BD002	200	Big Delta	Sed	570	Tn
			Sandstone, siltstone, claystone, and								
			conglomerate, light-yellowish-gray to light-								
			reddish-brown, poorly consolidated, easily								
			eroded. Conglomerate particles mostly well-								
			rounded quartz and chert as much as 4 cm in								
			diameter Lignitic coal layers as much as 30								
			cm thick are rare. Limenitic candstone								
Tab	Cool bearing formation	Tention	concretions common			BD000	201	Dia Delte	Cad	C 4 0	Tab
TCD	Coal-bearing formation	Tertiary	Light gray, poorly consolidated, poorly			BDUUZ	201	ыў рена	Seu	040	TCD
			Light gray, poorly consolidated, poorly								
			bedded. Congiomerate clasts are well-								
			rounded to fairly angular and extremely								
			variable in size ranging from granules to 1 m								
			boulders of several types of granitic rock,								
			gneiss, white quartz, and rarely schist.								
	Conglomerate,		Sandstone is coarse- to fine-grained, olive-								
	Sandstone, Siltstone,		gray, brown, or orange-brown. Siltstone is								
Tcs	Shale	Tertiary	olive-grav.			BD002	210	Big Delta	Sed	500	Tsu
			Quartz monzonite to granite: medium to								
1			coarse grained: equigranular to porphyritic:	1	1					1	
1		1	massive without linear or planar fabric or	1	1					1	
		1	microfabric: commonly weathered and							1	
		1	crumbly Only plutone with Tertiony K Ar							1	
		1	deter are included in this with Distance in the							1	
1			uales are included in this unit. Plutons that	1	1					1	
1_			may be rertiary but are undated are included	1	1						L
Ig	Granitic rocks	lertiary	in TKg.	1	1	BD002	211	Big Delta	lgn	1320	I pgr

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ite cit unit				1.00011	i la diometrica dige	loue		Quuunungie			2000
			Lava, shallow, intrusives and dikes and sills.								
			Lava in eastern part of quad, gray with								
			smokey quartz, sanidine, plagioclase, biotite,								
			and hornblende phenocrysts. Phenocrysts								
			may be as long as 2 - 5 mm. Some are 10								
			mm long. Rock generally fractured and								
			crumbly. Locally glass matrix; glass has								
Tf	Felsic igneous rocks	Tertiary	perlitic dehydration cracks.			BD002	220	Big Delta	Ign	1011	Thf
			Medium grained; equigranular to porphyritic;								
			massive without linear or planar fabric. The								
			rocks contain biotite, hornblende, muscovite,								
			with biotite the most common mafic mineral.								
	Granodiorite to Quartz		The rocks in this unit are not radiometrically								
TKg	Monzonite	Tertiary and Cretaceous	dated			BD002	221	Big Delta	Ign	1655	TKg
			Medium to coarse grained; mostly								
			equigranular; massive without linear or planar	•							
			fabric. The rocks contain biotite is the most								
	Granodiorite to Quartz		common mafic mineral; hornblende is less		K-Ar ages are						
Kg	Monzonite	Cretaceous	common.		Cretaceous	BD002	300	Big Delta	Ign	2480	Kg
			Diorite medium gray, medium grained;								
			dominately pyroxene, biotite and plagioclase;								
			amphibole may be absent; in places quartz								
			diorite; locally may be gabbro; generally								
			massive. Unit also includes undated dike and								
			lenslike mass of dark-greenish gray, medium-								
			to coarse-grained gabbro ; consists of green								
			hornblende with minor biotite, pyroxene, and								
Kd	Diorite and Gabbro	Cretaceous	plagioclase.			BD002	301	Big Delta	Ign	2440	Kmum
			Pink to tan weathering. Quartz and Carlsbad-								
			twinned orthoclase occur as large as 1 cm;								
	Quartz-Orthoclase		euhedral phenocrysts in aphanitic to fine-		K-Ar on potassium						
Кр	Porphyry	Cretaceous	grained groundmass; sericitzed.		feldspar	BD002	310	Big Delta	Ign	2450	Kg
			Greenstone is light to dark green or greenish								
			gray, greenish red, or greenish black; fine to								
			coarse grained; mostly massive with weakly								
			developed foliation in places. Chert is green,								
			light, and dark gray, red, and mottled green								
-			and gray; massive, closely fractured, and	Radiolarians and							
Рдс	Greenstone and Chert	Permian	commonly sugary texture.	conodonts in red cher	t	BD002	400	Big Delta	Sed	5830	JPzsgs
			Dark green to black; weathers a reddish								
			orange brown; massive. Diabase and diorite								
			inclusions, commonly meters in diameter. A								
			zone of quartz and magnesite, with some								
			dolomite, 1 to 50 m thick. The silica-								
-	Periodotite, partly		carbonate rock is bright orange, orange								
Pu	serpentinized	Paleozoic	brown, or cream with local green stains.			BD002	401	Big Delta	Ign	5980	JPsu
1			Quartzite and lesser phyllite, micaceous								
1			quartzite, marble, and calcareous quartz								
1			scnist. Quartzite is tan, red, maroon to								
1			purple, and black and commonly finely								
1			banded. Mostly fine-grained and in places								
1	Quartzite with some		closely folded. Locally has abundant, fine,								
	Phyllite, Micaceous		disseminated sulfides. Age unknown but								
1_	Quartzite, Marble, and		considered Permian because of association				1	L	L		
Pq	Calc. Qtz. Schist	Permian	with unit Pgc.	1		BD002	410	Big Delta	Meta	5960	JPzsgs

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
Pzc	Cataclastic rocks	Paleozoic	Mostly mylonite schist and mylonite gneis gray, light green and tan; fine to coarse grained; dense and hard to soft and crur fluxion structure common; neomineraliza and crystalization evident. Rocks mostly quartzitic and feldspathic with minor amo of mica, amphiboles, and epidote group minerals. Augen gneiss with perthitic microcline augen common	nbly; tion unts		BD002	411	Big Delta	Meta	5605	MDtm
	Semischist, greenschist, quartzite, phyllite,		Semischist or sheared grit; greenish gray gray and fine to coarse grained; very quartzitic to very feldspathic; clear, gray, bluish-gray quartz graine 1 to 5 mm in diameter characteristic; interlayered with quartz-chlorite mica schist and others combinations of greenschist rocks, tan quartzite, gray and tan phyllite, marble, i greenstone. Possibly equivalent to the Totatlinika Schist in the northern Alaska	or and						5005	
Pzsg	marble, and greenstone	Paleozoic	Range.			BD002	420	Big Delta	Meta	6510	MDt
Pzq	Quartzite, Meta-Argillite, Phyllite, Slate, and Marble	Paleozoic	Quartzite commonly black but varies wide color. Locally, color changes due to conti- metamorphism. Interlayered with black dark-gray meta-argillite. Phyllite, marble quartzite more commonly occur in the up part of the formation but may be absent to faulting or unconformity. Light to medium gray, fine to medium grained, thin layered and well foliated, commonly crumbly. Characteristically cu- bunder backback	ely in act or a, and per due		BD002	421	Big Delta	Meta	5660	Pzk
Pzm	Calcareous Phyllite, Marble and Phyllite	Paleozoic	abundant carbonate-quartz veins and veinlets; locally forms low tors. Age unknown, but stratigraphic relationships suggest early Paleozoic protoliths			BD002	430	Big Delta	Meta	5662	Pzkcp
Pzs	Schist	Paleozoic	Quartz-mica schist with marble and quart calcareous diopside schist, quartz-feldspa rock; and amphibole. Sillimanite is locall abundant near the Salcha River and stau andalusite and kyanite also occur.	zite, ar y rolite,		BD002	431	Big Delta	Meta	8630	PzZysa
Pzg	Gneiss	Paleozoic	Gray and weathers tan; locally orange br where altered; mostly medium grained equigranular; respresentative mineralogy strained quartz, plagioclase, potassium feldspar, red-brown biotite and sillimanite garnet, tourmaline, zircon, and apatite ar common accessory minerals. Age unkno	own 'is 2; re wn.		BD002	440	Big Delta	Meta	5670	PzZyg
Pzu	Ultramafic rocks	Paleozoic	Light green, greenish gray, or black and l commonly tan, brown, or yellow green; Occurs as small foliated masses infolded amphibolite facies gneiss and schist. Ori- rock was peridotite which has been region metamorphosed to amphibole, chlorite, a magnetite. Age unknown Modium gray to modium dark gray. Finch	ess with jinal nd		BD002	441	Big Delta	Meta	5690	MzZum
Pzd	Diorite	Paleozoic	medium gray to medium dark gray, fine t medium grained; dark-green to pale-brow hornblende, red-brown biotite abundant i some localities; foliation well-developed locally.	vn n		BD002	450	Big Delta	Ign	5440	MzPzi

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
PzpCsq	Schist and Quartzite	Paleozoic or Precambrian	Quartz-muscovite-biotite schist, quartz- muscovite schist, quartzite, and amphibole schist; locally garnetiferous. Upper greenschist to lower amphibolite facies. Age unknown. Unit subdivided on published OFR98-133 into PzZysa and PzZysq. Quartzite, feldspathic quartzite and quartz- mica schist, medium light gray to medium gray. Quartzite, some shows original bedding dominates the section. Quartz-biotie schist is commonly; most of the unit is garnetiferous; Upper greenschist to lower amphibolite facies. Age unknown			BD002	451	Big Delta	Meta	9327	PzZyqs
12003						00002	400	Dig Delta	Inclu	5527	122943
PzpCa	Augen Gneiss	Paleozoic or Precambrian	Augen most commonly of white potassium feldspar, range in size from 1 to 10 cm long, most about 4 cm long. Biotite is scarce to abundant. Foliation layers containing biotite bend around augen. Age unknown.			BD002	461	Big Delta	Meta	6521	MDyao
PzpCg	Gneiss and Quartzite	Paleozoic or Precambrian	Coarse to fine grained gneiss and quartzite; well foliated and banded to massive without banding; locally cataclastic; ranges from peltic with abundant sillimanite to gneisses of probable igneous origin. All rocks are well foliated, and dominant foliation is folded. Protoliths may inclide both Paleozoic and preCambrian sedimentary and igneous rocks.			BD002	470	Big Delta	Meta	8802	PzZypg
Oa	Flood-plain alluvium	Ouaternary	Well-stratified layers and lenses of unconsolidated gray silt, sand, pebbles, cobbles, and boulders; occurs in two facies 1) gravelly facies 2) silt and sand facies. Both occur on the Tanana River east of the mouth of the Chena and on other streams in the Alaska Range.			FB002	100	Fairbanks	Unconsol	100	Os
	·····	<b>Q</b> ======,									
Qs	Swamp deposits	Quaternary	Dark-brown to black peat and silt more than 5 feet thick in some areas. Perenially frozen and contain lenses and veinlets of clear ice. Chaotic masses of angular fragments of shale,			FB002	101	Fairbanks	Unconsol	100	Qs
QI	Landslide debris	Quaternary	gravel, and schist embedded in a matrix of silt, clay, and gravel.			FB002	102	Fairbanks	Unconsol	100	Qs
Oa	Reworked creek gravel	Quaternary	Placer-mine dredge tailings derived from			FB002	103	Fairbanks	Linconsol	100	05
Qbc	Basaltic cinders	Quaternary	Cinder cone from late Pleistocene or Recent eruption at north base of mountain southwest of Buzzard Creek. Unconsolidated poorly sorted aggregate of irregular to subrounded fragments of scoriaceous to dense basalt.			FB002	104	Fairbanks	Unconsol	320	Qcs
Cab	Abandoned flood-plain	Quaternary	Well-stratifed layers and lenses of unconsolidated gray silt, sand, pebbles, cobbles, and boulders. Occurs in two facies: 1) coarse gravelly alluvium and 2) silty alluvium containing 05% cit and 5% coord			FB002	105	Fairbanks	Unconsol	100	05
Jan			Well-stratified layers and lenses of gray to			1 0002	100	I UII DAIINS		100	43
Qaf	Alluvial fan deposits	Quaternary	brown coarse and and pebble, cobble, and boulder gravel.			FB002	106	Fairbanks	Unconsol	100	Qs

-						Sourco		1			
Bock unit	Unit hama	1.00	Description	Faccil	Radiomotric ago	source	Class code	Quadranglo	Back class		Label
ROCK UNIL		Age	Organic silty sand underlying undrained	FUSSII	Radiometric age	coue	Class code	Quaurangie	ROCK CIASS	INSA Class	Label
			depressions and old lake or pend bade								
			depressions and old lake or pollu beds;								
			derived from near by sand dunes. Permafrost								
			and considerable ground ice probably present								
Qdr	Dune Sand, reworked	Quaternary	at shallow depths.			FB002	107	Fairbanks	Unconsol	100	Qs
			Unsorted and unstratified glacial till with silt								
			cover 1/2 foot thick. Silt, sand, and gravel								
			containing boulders more than 3 feet in								
			diameter. Coarse fragments angular to								
	Morainal deposits of		rounded. Permafrost present, ice content low								
Qrm	Riley Creek Glaciation	Quaternary	to moderate.			FB002	108	Fairbanks	Unconsol	100	Qs
~			Well-stratified well-sorted porous and very								- C-
			permeable gray to pale vellowish brown sandy	,							
	Outwash of Riley Creek		gravel containing lenses of coarse well-sorted								
0.50	Clasiation	Quaternany	graver containing lenses of coarse weir sorted			FROOD	100	Fairbanko	Unconcol	100	00
QIU	Giaciation	Quaternary	sanu.			FBUUZ	109	FailDallkS	UTICOTISOI	100	QS
			Take for a subal sale bla such a shift a success								
			Interfingering cobbie and pebble gravel,								
			mudflow deposits, and minor amounts of silt								
			and sand, bordering the foothills. Average								
Qtf	Torrential fan deposits	Quaternary	coarseness decreases away from foothills.			FB002	110	Fairbanks	Unconsol	100	Qs
			Massive, homogeneous eolian silt on upper								
			slopes and hilltops. Well sorted, less than 10								
			% clay: grains angular, consist mostly of								
			quartz, feldspar, and mica. Locally cemented								
			by iron oxide locally calcaroous. Thickness								
			by non oxide, locally calcaleous. Thickness								
			ranges form 3 to 200 feet. Color bull to								
			tannish-gray when dry, brown when wet.								
			Locally mottled by iron staining and								
Qf	Fairbanks loess	Quaternary	carbonaceous material.			FB002	111	Fairbanks	Unconsol	100	Qs
			Massive, homogeneous unconsolidated, well-								
			sorted silt of eolian origin containg less than								
			10% clay locally rich in organic silt and larger								
			organic fragments Inorganic components are								
			organic riaginents. Inorganic components are								
			angular grains of quartz, reluspar, and mica,								
			locally cemented by iron oxides. It is buff to	Large quantites of							
	Perennially frozen silt,		brown or gray, locally mottled. Organic silt is	plant and animal							
Qsu	undifferentiated	Quaternary	brown to grayish black	remains		FB002	112	Fairbanks	Unconsol	100	Qs
			Well-sorted angular to round, moderate								
			vellowish-brown eolian sand consisting of								
			vellowish-white, clear to opaque quartz grains								
			(65 to 85%) but including some dark-gray to								
Dd	Dune sand	Quaternary	black rock fragments			FB002	113	Fairbanks	Unconsol	100	0.0
Qu	Durie Sand	Quaternary	black fock fragments.			10002	115	Turburks	Onconsor	100	Q3
1			Unstratified glasial till with silt sover 1/2 fact		1						
1	1	1	to 3 feet thick. Cills and and ground with	1	1						
			to 3 feet thick. Silt, sand, and gravel with								
	Morainal deposits of	-	boulders more than 3 feet in diameter.								-
Qhm	Healy Glaciation	Quaternary	Coarse fragments angular to rounded.			FB002	114	Fairbanks	Unconsol	100	Qs
			Coarse, clean, well-sorted, well-stratified gray								
			to yellowish-brown porous and very								
	Outwash of the Healy		permeable gravel with layers and lenses of								
Oho	Glaciation	Quaternary	coarse clean sand			FB002	115	Fairbanks	Unconsol	100	05
Q.10	Cidelation	Quaternary						- un burnto	0110011001	100	45
			On the Dry Creek fan these deposits consist of	-							
			well-stratified gray to brown nebble cobble								
			and houlder gravel with lavers and lenses of								
			and bounder graver with layers and lenses of								
			coarse sand, and range from fine clean gravel								
1			with pebbles 1/2 inch to 3 inches in diameter		1		1				
1			at the north end of fan east of Blair Lakes to		1		1				
1			gravel with cobbles 8 to 12 inches in diameter		1						
1	1	1	south of Blair Lakes. Boulders, cobbles, and	1	1						
1	Alluvial fan deposits	1	pebbles composed of gray granitic rocks	1	1						
1	contemporaneous with	1	condomerate schist gneiss diorite and	1	1						
Oha	Hoaly Glaciation	Quatornary	auartz		1	FB002	116	Fairbanks	Unconcol	100	0
Qua	Incary GlacidUUI	L Qualernary	1 yuui tz.	1	1	11 0002	1110	n an Dariks	0110011501	1100	29

						Source				, n , n	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
reserve anne				1.00011	Induction age			Quaarangie			2000.
			Mapped from aerial photos based on							!	
			topographic expression Probably similar to							!	
	Morainal denosits of Dry		morainal denosits of Healy Glaciation but							!	
Odm	Crock Claciation	Quatornary	somewhat more weathered and ereded			FB002	117	Fairbanks	Unconcol	100	06
Quin		Quaternary	Somewhat more weathered and eroded.			FBUUZ	11/	Fail Daliks	Unconsor	100	QS
			Similar to outwash or heavy Glaciation on							!	
			same stream but more weathered and eroded	*						!	
	Outwash of Dry Creek		and overlain by thicker deposit of windblown							100	
Qdo	Glaciation	Quaternary	silt.			FB002	118	Fairbanks	Unconsol	100	Qs
			Similar to alluvial fan deposits of Healy							!	
	Alluvial fan deposits		Glaciation on same stream but more							!	
	contemporaneous with		weathered and eroded, and overlain by							!	
Qda	Dry Creek Glaciation	Quaternary	thicker deposit of windblown silt.			FB002	119	Fairbanks	Unconsol	100	Qs
			Coarse sand and gravel, with abundant blocks							!	
			of granite, gabbro, and conglomerate several							!	
			feet on a side. Small areas at an altitude of							!	
			2200 feet west of Windy Creek and 5000 feet							!	
			southeast of Gold King Creek consist Jargely							!	
			of boulders and blocks. Includes erratics							!	
			(Obe) - isolated angular blocks and groups of							!	
			(QDE) isolated angular blocks and groups of							!	
	Marging, dependence		2 20 feet in diameter, resting on present							!	
Ob	Morainal deposists of	O	5-50 feet in diameter, resting on present			50000	120	En luis e a lue	11	100	0-
Qbm	Browne Glaciation	Quaternary	topography .			FB002	120	Fairbanks	Unconsol	100	Qs
										!	
			Buff to reddish-brown poorly consolidated							!	
			pebble to boulder conglomerate and coarse							!	
			sandstone, with interbedded mudflow							!	
			deposits, thin claystone layers and local thin							!	
Tn	Nenana Gravel	Tertiary	lignite beds. Maximum thickness is 2000 feet.			FB002	200	Fairbanks	Sed	570	Tn
		, ,									
			Poorly consolidated, readily eroded pebbly							!	
			sandstone, claystone, and subituminous coal.							!	
			in synclinal basins in the footbills of the							!	
			Alaska Range between Nenana River and Dry							!	
			Crock Dinchos out porthward and is							!	
			Creek. Pinches out northward and is							!	
		Tautiana Misana 2 ta	overlapped unconformably by Nehana Gravel.							!	
L		Tertiary, Miocene? to	Is subdivided into 5 units, see unit description								L
Icb	Coal-bearing formation	Eocene?	on Map 1-455.			FB002	210	Fairbanks	Sed	640	Icb
										!	
			Predominately quartz-microcline-sericite schist							!	
			and augen gneiss, gray in color, consisting of							!	
			a coarse facies having large deformed							!	
			phenocrysts of microcline, quartz and rare							!	
			albite 0.1-1 inch in diameter; interbedded							!	
			with a fine facies consisting of angular grains							!	
1			of feldspar and guartz 0.01-1 inch in							'	
			diameter, in a dark-gray to vellowish-gray							!	
			schistose aroundmass of sericite and chlorite							!	
M+	Totatlanika Schict	Mississippian	Part of unit coded NSACLASS = 5666	Svringopora		FROOD	300	Fairbanks	Mota	6510	MD+
ric.		riississippian	Thick-bodded to massive fine-crystalline to	Synngopora		10002	500	Turburks		0310	MDC
			lithe graphic medium dark bluich gray							!	
1			limestere of unknown thickness . Months							'	
			limestone of unknown thickness. weathers							!	
1			butt to yellowish-brown. Chert rare or absent.							'	
		Middle Silurian to Middle	Correlated on basis of lithology and							!	
DSt	Tolovana (?) Limestone	or early Late Devonian	geographic trend.			FB002	400	Fairbanks	Sed	6965	DSt
1			Chert is hard, thin bedded to blocky, locally							'	
1			cut by shear planes, medium light gray or							'	
1			rarely nearly white or black with thin color							'	
1			lavering: commonly stained vellow or red by							'	
1			iron oxide from weathering: forms reddish	correlated to Mertie's						'	
1		Uncertain but believe to	soil Interbedded siliceous shale is bard thin	(1937) unit B on basis						'	
1	Nilkoka Group- Chort	be Precambrian or party	bedded medium light gray weathering to light	of fossile (Cambrian						'	
nc	and cilicoous shalo	Paloozoic	vollowich gray	or Ordovican)		FROOD	500	Fairbanks	Sod	7710	Och
IIC	and Sinceous Slidle	F aleUZUIC	jyenowish yray.		1	II DUUZ	1000	LI AII DAI IKS	Jeu	1/10	

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ng	Nilkoka Group- Grit, argiilite, quartzite, and limestone	Uncertain but believe to be Precambrian or early Paleozoic	Interbedded grit and varigated clay slate, quartzite, and phyllite, with rare siltstone beds and a few fine-grained lenticular limestone beds as much as 5 feet thick. Color of fine- grained rocks predominately green but mottled by red through pale olive green, dusky yellow, and light yellowish gray areas produced by leaching and oxidation along joints, on exposed surfaces and in more porous parts. Fine-grained rocks range from argillite to phyllite. Correlated to Mertie's (1937) unit C (pre-Ordovican) and part of his unit D (Late Precambrian).	5		FB002	501	Fairbanks	Meta	8310	CZwa
bc	Birch Creek Schist	Uncertain but believe to be early Paleozoic or Precambrian	Light- to dark-gray, reddish-brown to tan- weathering schists, predominately quartz- sericite schist and micaeous quartzite. Includes mu-bio schist, garnet-mica schist, calcite-and dolomite-bearing schist, chloritic and graphitic schist, amphibolite, impure marble, and gneiss. Southern most part assigned to NSACLASS = 9322, part out in flats assigned to NSACLASS = 6511 Dikes and stocks of granite, granodiorite,		120 m.y. to 1,170 m.y.	FB002	600	Fairbanks	Meta	9327	PzZyqs
Mzi	Intrusive rocks	Probably Mesozoic but may be early Tertiary	dacite, and granite porhyry, intruded into schist formations of the Yukon-Tanana uplands and the Alaska Range. Unconformably overlain by the coal-bearing formation (unit Tcb).			FB002	700	Fairbanks	Ign	1655	TKg
Dmu	Mafic and Ultramafic rocks	Devonian (?)	Ophitic diorite and serpentinized periodotite make up the Wood River Buttes. Ore minerals constitute about 5% of the diorite. Wood RIver Buttes are on a projection with mafic and ultramafic rocks in the Big Delta quad. There is an intense linear positive aeromagnetic anomaly across the alluviated plain between them indicating that they may be a single belt.	5		FB002	800	Fairbanks	Ign	5980	JPsu
ТЬ	Basalt		Dark-gray and black or brownish oline basalt, closely jointed and deeply weathered with local pillow or columnar structure; on lower slope of hills near Fort Wainwright.			FB002	900	Fairbanks	Ign	1004	Tb
Qt4	Till, Cirque glaciation	Quaternary?	Unsorted boulder to clay-size particles. Moraine forms locally present, restricted to cirques Unsorted boulder to clay-size particles,			TN002	130	Tanana	Unconsol	100	Qs
Ot3	тш	Quaternary	includes long low lateral moraine on Halu			TN002	136	Tanana	Unconsol	100	05
Qt2	тіш	Quaternary	Unsorted boulder to clay-size particles, lowest moraine on Halu Creek			TN002	137	Tanana	Unconsol	100	Qs
Qt1	тіш	Quaternary?	Unsorted boulder to clay-size particles, farthest down valley moraine on lower Halu Creek.			TN002	138	Tanana	Unconsol	100	Qs
Qt	Till, undifferentiated	Quaternary	Unsorted boulder to clay-size particles, no clear morainic forms.			TN002	135	Tanana	Unconsol	100	Qs
Qal	Recent alluvium	Holocene	Sandy gravel and sandy silt, forms flood plain of modern rivers and streams.			TN002	105	Tanana	Unconsol	100	Qs
Qaf	Alluvial fan deposits	Quaternary	Gravel, silt, and sand, commonly occur at mouth of small side canyons. Includes some colluvial deposits.	F		TN002	106	Tanana	Unconsol	100	Qs
Qbg	of Minook Creek	Quaternary	Minook and Hunter Creeks			TN002	109	Tanana	Unconsol	100	Qs

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ittoeit unit			Gravel, silt, and sand near mouth of	1.00011	i daloineene age		Clubb Couc	Quuurungie		110/1 01000	2000.
Otr	Terrace deposits	Ouaternary	Fleshlanana Creek			TN002	110	Tanana	Unconsol	100	Os
		<u></u>					-				<b>.</b>
			Coarse, silty sand and fine gravel; generally								
			forms terrace sloping up and away from								
Qags	Older alluvium	Quaternary	floodplains of streams and rivers			TN002	111	Tanana	Unconsol	100	Qs
		late Tertiary or early	Well packed gravel, caps hills in vicinity of								-
QTg	High-level gravel	Quaternary	Rampart			TN002	285	Tanana	Unconsol	100	Qs
		~ <i>i</i>									
	Colluvium and alluvium,										
Qcal	undifferentiated	Quaternary	Silt and sand mantling broad, flat valleys			TN002	100	Tanana	Unconsol	100	Qs
	Recent slide and slump		Very fresh, unmodified slumps and earthflows								-
Qrs	deposits	Holocene	(Occurred about 1940).			TN002	158	Tanana	Unconsol	100	Qs
	•										
Ols	Older landslide deposits	Ouaternary	Slumps and earth and rock slides			TN002	108	Tanana	Unconsol	100	Os
	Colluvium,	<b>C</b> ,	Predominantly silt, with some sand and								
Oc	undifferentiated	Ouaternary	gravel.			TN002	107	Tanana	Unconsol	100	Os
Ota	Talus	Quaternary	Angular boulder rubble in cirgue.			TN002	159	Tanana	Unconsol	100	0s
0I	Loess	Quaternary	Well-sorted silt			TN002	121	Tanana	Unconsol	100	05
· .	20000	Quaternary	Well-sorted sand, commonly in subdued dune					ranana	0.1001001	100	40
Oess	Sand and silt	Quaternary	forms			TN002	120	Tanana	Unconsol	100	05
QC33		Quaternary				111002	120	Tununu	onconsor	100	25
	Rock-defended terraces		Frosional benches along east side Minook								
Ob	on Minook Creek	Quaternary	Creek			TN002	160	Tanana	Unknown	100	Os
		<b>Q</b> =====;	Elat even surface formed on bedrock hilltons								
Oat	Altiplanation terrace	Quaternary	generally above 600 m			TN002	161	Tanana	Unknown	100	05
Que		Late Tertiary or early	Light to very ligry-gray vesicular lava.					ranana	<u>o</u>	100	40
OTa	Andesitic Java	Quaternary	Removed from final man			TN002	451	Tanana	Ian	451	OTa
Qiù		Quaternary	Rhyolitic lava and breccia. Tuff and welded			111002	151	Tununu	1911	131	210
	Rhyolitic volcanic and		tuff common. Cherty rocks minor, thin-								
Tvs	sedimentary rocks	Tertiary?	bedded or in nodules.			TN002	1001	Tanana	Ian	1001	Trs
		Tertion y :					1001	ranana	-9	1001	
			Interbedded polymictic pebble-cobble-boulder								
			conglomerate, grit, and sandstone, with								
Ts	Sedimentary rocks	early Tertiary and Miocene	siltstone, shale, and lignite.			TN002	640	Tanana	Sed	640	Tch
		Late Cretaceous and Early									
TKV	Volcanic rocks	Tertiary	Dacite flows, may include tuff and andesite.			TN002	1604	Tanana	Ian	1604	TKvd
									- 5		
			Gravwacke sandstone, quartzitic sandstone,								
	Clastic sedimentary	Late Jurassic and	quartzite, siltstone, shale, slate, slaty argillite,								
KJcs	rocks	Cretaceous	and polymictic conglomerate.			TN002	2815	Tanana	Sed	2105	Kvam
	Mafic and sedimentary		Rampart Group volcanic and sedimentary rock								
JMms	rocks	Jurassic? to Mississippian	sequence			TN002	5131	Tanana	Ian	5131	TrMtsu
			Moderately well-indurated, medium- to dark-								
			gray shale, commonly weakly foliated to slaty,								
	Slaty shale, siltstone,		and in part phyllitic. Well indurated, medium-								
	graywacke, and		to medium-drak-gray siltstone, in part								
Ps	conglomerate	Permian	argillite.			TN002	5740	Tanana	Sed	5012	TrPs
			Thin-bedded siltstone, slate, and phyllite,								
			thick-bedded argillite, and minor laminated								
		Permian or Middle to Late	sandstone. Metamorphosed to low grade.								
Pzar	Argillaceous rocks	Devonian	Not on published OFR98-133			TN002	5615	Tanana	Sed	5615	PDms
1			Medium-gray siltstone and very fine-grained							1	
		early Paleozoic, possibly	sandstone, largely calcareous and generally								
Pzc	Calcareous clastic rocks	Devonian	schistose. Not on OFR98-133			TN002	6921	Tanana	Meta	6921	Dq?
			Poorly sorted sandstone, granule								
		early Paleozoic, possibly	conglomerate, siltstone, and semischist. Not								
Pzw	Quartz wacke	Devonian	on OFR98-133			TN002	6922	Tanana	Meta	6922	Dq2?
			Chiefly white, light- to medium-gray, silvery								
			gray, and brownish gray, fine- to coarse-								
			grained quartz-mica-grarnet schist. Unit								
			apparently conformable with unit Pzl, but								
Pzsr	Schistose rocks	middle Paleozoic?	contact is poorly exposed.	1		TN002	5208	Tanana	Meta	5208	TPza

						Source					1
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
	Limestone, greenstone,	Ordovician(?), Silurian,	Dominantly light- to light-medium-gray partly dolomitic limestone and dolomite. Basaltic greenstone and partly calcareous chloritic schist are associated sequentially or								
Pzl	and schist	and Devonian	interbedded with the carbonate rocks			TN002	6966	Tanana	Meta	6966	DSt?
Pzvs	Volcanic and sedimentary rocks	Ordovician or Silurian	Partly altered mafic lava and tuff, slate, slaty shale, phyllite, tuffaceous limestone, cherty schist, and chert. Not on OFR98-133			TN002	6910	Tanana	Meta	6910	Dtr
Pəl	Limestone, dolomite,	Silurian or Devonian	Limestone, dolomitic limestone, partly silicified dolomite, basaltic greenstone, and chloritic schist. Similar to unit Pzl south of Yukon Biver			TN002	6956	Tanana	Meta	6956	DSIc2
00	Chert	Late(?) Ordovician	Light- to medium-gray chert.			TN002	7710	Tanana	Meta	7710	Och
Cal	Argillite, slate, quartzite and grit	probably Cambrian, possibly in part preCambrian	Medium- to dark-red or marcon, light- to medium-green and grayish-green, and medium-gray argillite and slate. Light yellow- brown to light-gray quartzite and grit. Not on OFR98-133			TN002	8410	Tanana	Meta	8310	CZwa
PzpCsq	Schist, quartzite, phyllite, and slate	early Paleozoic(?) and preCambrian(?)	Light- to medium-gray and silvery gray quartz mica schist, light- to medium-gray quartzite, light- to dark-gray slate and phyllite. Not on OFR98-133	-		TN002	8630	Tanana	Meta	8630	PzZysa
Та	Granite	early Tertiary	Springs		K-Δr(2) 62 Ma	TN002	2470	Tanana	Ian	1320	Tpar
TKq	Quartz monzonite	Early Tertiary-Late Cretaceous	Light- to vey light-gray quartz monzonite, may range to granite		K-Ar(?) 61.8 Ma	TN002	1655	Tanana	Ign	1655	TKg
Kg	Granitic rocks	Late Cretaceous	Quartz monzonite, granite, monzonite, and possibly granodiorite		K-Ar(?) 92, and 90 Ma; 104 Ma	TN002	2470	Tanana	Ign	2470	Kg
Km	Mafic rocks	Cretaceous?	Gabbro, diorite? Not on published OFR98-133			TN002	2440	Tanana	Ign	2440	Kmum
Ksp	Serpentinite and mafic rocks	Late Cretaceous?	Serpentinite, diabase-gabbro and some metadiorite. Not on published OFR98-133			TN002	2510	Tanana	Ign	2510	Kmum
Mg	Globe unit	Mississippian	Light-gray quartzite. Massive or thinly interbedded quartzite and medium- to dark- gray slate, phyllite, and minor laminated claystone. Age fro date of Trm intrusive and lithologic and stratigraphic similarities to Keno Hill Quartzite in Yukon.			LG002	830	Livengood	Meta	6530	Mgq
Dcg	Beaver Bend unit	Devonian?	Polymictic light- to medium-gray chert pebble conglomerate, graywacke, siltstone, and slate	Unidentifiable plant fragments		LG002	843	Livengood	Sed	6940	Dcb
bu	bedrock of unknown type or age	unknown	Rubble of metasiltstone and chert, believed to be older than TKf. Also includes an outcrop of white, very fine grained quartz sandstone			кноо2	99	Kantishna River		99	bu
Da	Augen gneiss	Devonian	Biotite-bearing felsic augen gneiss		U/Pb age 387 +/- 43 Ma, protolith(?) age	CI002	702	Circle	Ign	6521	MDyao
Kg	Granitic rocks	Cretaceous	Not on OF98-133			KH003	2410	Kantishna River	Ign	2410	Kg
Km	Gabbro and diorite	Cretaceous	Not on OF98-133			КН003	2440	Kantishna River	Ign	2440	Kmum
Ksp	Serpentinite with some diabase, gabbro and mafic volcaniclastic rocks	Cretaceous	Serpentinite with some diabase, gabbro and mafic volcaniclastic rocks. Not on OF98-133			кнооз	2445	Kantishna River	Ign	2445	Kmum

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
				Radiolarians from				1			1
				chert of							
		Tripagia and Donn an	Diabasic gabbro, basalt, diorite, ultramatic	Pennsylvanian,							
Mapac	Circle Volcanics	Mississippian	Probably correlative with Pampart Group	Triaccic ago		C1002	502	Circlo	Ian	5130	1Trtmu
MZFZC			Green, olive-green, or greenish-brown.	Thassic age.		C1002	502	Circle	ign	5150	Jirtinu
			medium- to very coarse-grained, porphyritic								
MzPzd	Diorite	Mesozoic and/or Paleozoic	diorite.			CI002	503	Circle	Ign	5175	MzPzi
			Gray, green, and greenish-gray to greenish-								
_			black, fine- to coarse-grained serpentinized						L		
Pzp	Serpentinized periodotite	Paleozoic	peridotite.			C1002	608	Circle	Ign	5980	JPsu
	Ultramafic and mafic		Mostly greenish-black serpentinized peridotite								
Pzug	rocks and greenstone	Paleozoic	and tuff.			C1002	600	Circle	Ian	8250	CZum
1 Zug	Focks and greenstone	Quaternary and/or				01002	000	Kantishna	ign	0230	CZum
QTa	Andesitic lava	Tertiary				кнооз	451	River	Ign	451	QTa
								Kantishna			
Tg	Granite	Tertiary				KH003	1203	River	Ign	1320	Tpgr
			Andesite and trachyandesite are medium to								
			light green and grayish green and weather to								
			fine-grained prophyritic and								
		Tertiary and/ or	alomeroporphyritic, abundant plagioclase					Kantishna			
ТКа	Andesitic rocks	Cretaceous	phenocrysts 5-6 mm.			KH002	1605	River	Ign	1605	TKvi
		Tertiary and/or	Light-gray weather, gray ot tan fine- to coarse	-							
TKf	Felsic igneous rocks	Cretaceous	grained quartz porphyry. Hypabyssal(?)			CI002	301	Circle	Ign	1602	ТКдр
			Very light to light gray, yellow and pink to								
			stained. Bhyolitic and andositic rocks are yon								
			fine-grained to aphanitic, porphyritic in part:								
	Felsic extrusive rocks	Tertiary and/ or	tuff resembles rhvolitic rocks may be welded					Kantishna			
TKf	and tuff	Cretaceous	in places			KH002	1600	River	Ign	1603	TKvr
					A number of K-Ar						
					mineral ages (see						
					Wilson and Snew,						
		Tortiany and/or	Mostly light- to modium-gray, hypidiomorphic		1981), Virtually all						
ТКа	Granite	Cretaceous	granular to porphyritic granite		65 Ma	C1002	300	Circle	Ian	1655	тка
			Monzonite, guartz monzonite, syenite, diorite,						- 5.		
			and quartz diorite; generally light to medium								
		Tertiary and/ or	dark gray and weather to various shades of					Kantishna	_		
TKg	Granite	Cretaceous	brown and gray			KH002	1655	River	Ign	1655	ТКд
			Rhyolite porphyry is light to very light gray,								
			vellow and reddish brown: very fine-grained								
		Tertiary and/ or	small phenocrysts of smoky quartz and					Kantishna			
TKr	Rhyolitic volcanic rocks	Cretaceous	kaolinized feldspar			KH002	1603	River	Ign	1603	TKvr
	,	Tertiary and/or	·					Kantishna			
ΤKv	Felsic volcanic rocks	Cretaceous				KH003	1600	River	Ign	1603	TKvr
			Light- to medium-green and weathered to								
			brown, and brown diabase and baselt								
			Diabase is medium to coarse grained in part								
			porphyritic, very hard and breaks into angular								
			blocks; basalt is very fine grained to								
			aphanitic, not as hard as diabase and finely					Kantishna			
Trm	Diabase and basalt	Triassic (?)	fractured	1		KH002	4210	River	Ian	4210	Trn

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
noen unie				1.00011	induction dige			Quaarangie			20001
			Dark-greenish- or bluish-gray, medium-fine-								
			grained calcareous basalt, having locally well-								
			developed pillows. Thin limestone layers at								
			the base of the basalt. Unper units in basalt								
			amyadaloidal overlain by greenish-brown								
			broccia of calcaroous basalt baying an opaling								
			matrix Black moderately coarcely crystalline								
			limentene everline begeltig nertion of unit								
			Overheing limestene is ten and brown								
			Overlying infestorie is tan and brown								
			dolomite, and dolomite containing gray chert								
			fragments inturn overlain by gray shale, gray								
			recrystallized chert, and calcareous basalt.								
			Dolomite and limestone contact may be a						l_		
PzpCb	Basalt and limestone	Paleozoic	fault.			CI002	1200	Circle	Ign	6680	SZa
	Foliated basaltic lava,										
	tuff, slaty shale, phyllite										
	and some limestone and							Kantishna			
Pzvs	chert	Early Paleozoic	Not on OFR98-133			KH003	5410	River	Ign	5410	Pzvs
	Basaltic and diabasic										
	rocks, tuff, chert,		Extrusive and intrusive basaltic and diabasic								
	argillite, slate, and rarely		rocks, tuff, chert, argillite, slate, and rarely					Kantishna			
TrPv	clastic limestone	Triassic and/or Permian	clastic limestone. Not on OFR98-133			KH003	5140	River	Ign	5140	JMab
	Rhyolitic lava and										
	breccia, tuff, chert and							Kantishna			
Trvs	shale	Triassic	Unit deleted in going to TN003			KH003	4205	River	Ign	4205	Trvs
			Maroon and green argillite and slate with					Kantishna			
Cal	Argillite and slate	Cambrian	quartzite, grit, and some phyllite			KH003	8410	River	Meta	8300	CZw
			Range from light to dark gray ; quartzite is								
			very fine-grained and grades to metasiltstone;								
			blocky, irregular fractures, schistose in part:								
	Quartzite, metasiltstone,		Slate and phyllite are medium gray: banded					Kantishna			
Cas	slate and grit	Cambrian	with thin silty or sandy layers in part.			кноо2	8420	River	Meta	8300	CZW
	5-2-2-2 J2 J2		Light and medium gray to silvery gray								
			phyllite.slate, silicious siltstone and argillite:								
			alters to hornfels near granitic contacts.								
	Phyllite slate, silicious		Includes some thin limestone and calcareous					Kantishna			
Dns	siltstone and argillite	Late Devonian	siltstone			KH002	7210	River	Meta	6902	Dn
595	Sitestorie, and arginice					10002	/ 210	Kantishna		0502	59
Kh	Hornfels and oneiss	Cretaceous	Unit removed on DOG man			кнооз	2640	River	Meta	2640	Kha
	Hormels and grielss					10005	2010	River		2010	Ring
			Dark-gray to black, locally guartzitic argillite.								
			mudstone, and siltstone. Calcareous in a few								
			places, has local gray and black chert. Unit								
			includes a gray very fine-grained limestone at	-							
			one locality Dark greenish-gray mafic layas	-							
			including amyadaloidal basalt and basalt	Conodonts in							
			braccia appear interlayored with the	limostono rango in							
			codimentary recks. Unit deleted on publiched	and from Ordivision to							
MaDasa	Angillite and supertrite	Magazaia and/ar Dalagzaia	sedimentary rocks. Onit deleted on published			CTODO	501	Cinala	Mata	5311	MaDana
MZPZay	Arginite and quartzite	Mesozoic anu/or Paleozoic	Medium groop, medium grained, massive to	TTIdSSIC		C1002	501	CITCIE	meta	5211	MZPZay
			feliated acalegita Occurs as mafic layers								
			within unit ProCoc (NSACLASS - EE10)								
			arnot muccovito schiet within which it is								
Dee	Felezite	Palaazaia	gamet-muscovite-schist, within which it is			CTODO	C10	Cinala	Mata	E 4 7 E	Dee
Pze	Eclogite	Paleozoic	lumped on published map.			C1002	010	Circle	Meta	5475	Pze
1			Mostly coarse diabasic gabbros Small							1	
1			individual outcrop areas of a variety of							1	
1			texturally and mineralogically different rocks								
1			Unit removed from published (OFR98-133)								
1			man and from various versions of Foster and							1	
Pza	Greenstone	Paleozoic	others man. To be reinstated			C1002	609	Circle	Meta	5640	1Pzsas
· - 9	0.00.0000	1. 0.002010	To be remotived.	1	1	01002	1000	0		3010	5.2595

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
reserver unit			Gray phyllite containing thin stringers of	1.00011	i dalometrie age			Quuunungie			2000.
			crumbly impure marble and black or gray								
	Phyllite, calcareous		quartzitic phyllite. May includes rocks of unit								
Pzm	phyllite and marble	Paleozoic	$P_{ZQ}$ (NSACLASS = 5500).			CI002	607	Circle	Meta	5662	Pzkcp
	P.1,		Gray, maroon, and green slaty argillite								
			interlayered with gray and greenish-gray grit								
	Argillite, grit, and	Paleozoic and/or	and quartzite. Minor limestone in southern								
PznCa	quartzite	Precambrian	part of exposure.			CI002	1000	Circle	Meta	8300	CZW
. 20 00	quantizite	1 recambridit				01002	1000			0000	02.1
			Mostly gray or greenish-gray, but may be tan,								
			brown, or dark-gray grit and guartzite.								
			Ranges from fine- to coarse-grained, rarely								
			conglomeratic, and equigranular to bimodal.								
			Weakly metamorphosed. Grav to black, or	Trace fossil Oldhamia							
			greenish-gray, olive-gray, tan or brown	suggests a Cambrian							
	Grit, quartzite and	Paleozoic and/or	argillite. Bare thin layers of gray and dark-	or possibly Hadrynian							
PznCaa	argillite	Precambrian	gray limestone.	(late nC age).		CI002	1100	Circle	Sed	8410	Zwa
. 20099		1 recambridit	gruy milesconel	(late pe age):		01002	1100		000	0.120	2.1.9
			Tan or gray grit and guartzite. Lower								
		Paleozoic and/or	metamorphic grade and more calcareous than								
PznCar	Grit and quartzite	Precambrian	unit PzpCgg, but thought may be correlative.			CI002	1800	Circle	Meta	6511	MDt?
. 2p og.		CCCC	Green, chlorite-quartz-carbonate schist.			01002	1000		liccu	0011	
		Paleozoic and/or	associated with amphibolitic schist and mionr								
PznCm	Mafic schist	Precambrian	marble, quartzite, and pelitic schist.			C1002	1700	Circle	Meta	8660	P ₇ 7ms
. 20 0		Paleozoic and/or	Medium- to coarse-grained muscovite-garnet-			01002	1,00			0000	1.22.110
PznCms	Garnet-muscovite schist	Precambrian	quartz-plagioclase schist.			C1002	1400	Circle	Meta	5510	Pze
1200113						01002	1100	Circic	Tieta	5510	120
			Light green to greenish-gray calc-silicate								
			containing thin interlayers of crumbly.								
			greenish-gray marble, light-green calcareous								
			quartzite, gray and greenish-gray phyllite, and								
			fine-grained quartzitic schist subunit of unit								
			PzpCg, consisiting of gray or greenish-gray								
			quartzite and quartzitic schists are dominant								
	Quartzite and quartzitic		rock types. Minor pelitic schist, calc-silicate.								
	schists, calc-silicate and	Paleozoic and/or	mafic schist, and rare marble are interlayered								
PznCa	marble subunit	Precambrian	with quartzite and quartzitic schists.			CI002	1600?	Circle	Meta	9324	PzZvas
. 2009		CCCC	Mostly medium- to coarse-grained pelitic			01002	1000.		liccu	552.	122790
			schist and gneiss, having minor interlayered								
			quartzite and quartzitic schists and								
		Paleozoic and/or	subordinate white and cream-colored, coarse								
PznCs	Pelitic schist	Precambrian	grained marble.			CI002	1300	Circle	Meta	8630	PzZvsa
p ===			5								
			Black, dark-gray, or gray. Quartzite is								
			medium-grained, thinly layered to massive.								
			Meta-argillite may be slaty. Unit cut by								
			abundant white quartz veins.								
	Ouartzite, meta-argillite		Stratigraphically overlies calcareous phyllite								
Pza	and phyllite	Paleozoic	and marble unit (Pzm, NSACLASS = $5545$ )			CI002	606	Circle	Meta	5660	Pzk
			Schist and phyllite are light to medium green								
			and light to medium gray; chlorite and mica								
			common, partly calcareous intensely folded,								
			interbedded with limestone. Limestone is light								
	Schist, phyllite,		and medium gray, largely recrystallized;								
	limestone, and		greenstone is basaltic, light to medium green					Kantishna			
Pzsl	greenstone	Early Paleozoic	gradational to greenschist.			KH002	5665	River	Meta	6956	DSIs?
	Quartz -mica-garnet										
1	schist, with some									1	
	quartzite schist,										
	calcareous schist, marble							Kantishna		1	
Pzsr	and phyllite	Paleozoic	Not on OFR98-133			KH003	5208	River	Meta	5208	TPza

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
KJqa	Quartzite, argilllite, conglomerate, and hornfels	Cretaceous and/or Jurassic	Mostly gray, fine- to medium-grained quartzite, interlayered with mostly gray, greenish-gray, reddish-gray, and tan argillite			CI002	400	Circle	Meta	2815	KJw
MzPzat	Argillite, tuff, quartzite and conglomerate	Mesozoic and/or Paleozoic	Two parts. One include rocks around VABM Vrain, composed mostly of argillite and minor quartzite and slaty argillite. Second shown by ttt symbol is characterized by tuffaceous rock associated with black or dark-gray argillite and conglomerate. VRAIN equivalent, see M2Pztu also for tuffaceous part of unit. Part of unit separated and assigned to Dcb, combined Cascaden Ridge Beaver Bend unit, per Florence Weber's revisions.	y s f		CI002	400	Circle	Meta	2860	KJvr
DI	Limestone	Devonian	Medium-gray, generally massive, locally recrystallized limestone. Correlative with Tolovana limestone?	Stromatoporoids, corals, and condonts, result in earliest Early Devonian age. Another part of unit(?), has corals restricting age to late Early Devonian.		CI002	701	Circle	Sed	6944	DSI
DIs	Limestone and siltstone	Devonian	Chiefly limestone, medium to dark gray; dolomitic in part; Siltstone is medium gray, shaly to phyllitic	Phillipsastrea or Pachyphyllum sp. (massive rugose coral) and Thamnopora sp. and Disphyllum? sp.		КН002	6945	Kantishna River	Sed	6944	DSI
DSd	Delemite and areillite	Devenian and/or Silurian	Mostly yellow-gray dolomite and mosity gray and dark-gray to black argillite, shale, and siltstone. Interlayered with light- and dark- gray chert, yellow-gray dolomite, gray marble, and gray, fine-grained quartrite			C1002	700	Circle	Sod	6691	\$7.22
DSI	Limestone, dolomite, and	Devonian and/or Silurian	Medium-light- to dark-gray, fine- to medium- grained limestone. Locally limstone contains interlayered minor dolomite and dark-gray shale. Correlates with Tolovana Limestone of Livengood quadrangle.			C1002	703	Circle	Sed	6945	Ds
50.						01002	100	Kantishna	000	0010	55
DSt	Sandstone, quartzite, conglomerate, siltstone,	Devonian and/or Silurian Cretaceous and/or				KH003	6965	River Kantishna	Sed	6965	DSt
KJcs	and slaty shale	Jurassic and/or	Sandstone siltstone and shale medium gray	,		KH003	2820	River Kantishna	Sed	2115	Kwcf
KJgs	Graywacke and shale	Cretaceous	generally thin bedded	<b>'</b>		KH002	2116	River	Sed	2115	Kwcf
Oc	Chert and slate	Ordovician	Medium to medium dark gray and weathers to light yellow, tan and orange	D		кноо2	7550	Kantishna River	Sed	7710	Och
0.	Chert and some slaty	Oudeusisie a				1411000	7510	Kantishna	Cod	7710	O.I.
OCsl	Siltstone. limestone, phyllite and chert	Ordovician Ordovician and/or Cambrian	Mostly light-medium to dark gray and weathe yellow, brown and gray; thin bedded; chert rare	r		KH003 KH002	7580	Kiver Kantishna River	Sed	7580	SCpl
Old	Livengood Dome (?)	Ordovician	Dark-gray and black chert, gray argillite and shale and slate, gray dolomite, and minor greenish-gray, dirty and dark-gray			C1002	900	Circle	Sed	7710	Och
510	- on or c	La adviciari	The second and second	• 1	1	101002	1200	andic	1000	11110	1961

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
	Slaty shale, siltstone,										
	graywacke, and							Kantishna			
Ps	conglomerate	Permian	Not on OFR98-133			KH003	5740	River	Sed	5740	Ps
Pzcc	Chert, conglomerate and limestone	Paleozoic	Chert and chert-pebble conglmerate most characteristic. Chert is dominantly gray or black, locally massive, commonly brecciated.	Interlayered limestone contained late Late Devonian conodonts		CI002	603	Circle	Sed	6940	Dcb
Pzcg	Chert pebble conglomerate	Paleozoic	Mostly gray chert pebble conglomerate. Conglomerate clasts dominantly chert but include minor quartz, quartzite and rare argiilite and siltstone fragments	Poorly preserved radiolarins (Spumellariina) of indeterminate age.		CI002	602	Circle	Sed	6940	Dcb
Pzl	Limestone and chert	Paleozoic	Two separate(?) units. Eastern unit is light- gray to medium-dark-gray at top, mostly fine- grained, partly recrystallized, blocky fracturing limestone. Possible algal structures. Western unit ranges from light- to dark-gray limestone apparently interlayered with black, gray, and mottled chert, tan and gray argillite, amygdaloidal basalt, and gabbro.			CI002	605	Circle	Sed	5330	Pzlc
								Kantishna			
Pzw	Quartz wacke	Paleozoic				KH003	6922	River	Sed	6922	Dq2?
Tcs	Conglomerate and sandstone	Tertiary	Mostly gray or tan, but locally pink or orange- brown conglomerate. Ranges in grainsize from coarse to fine, grades into sandstone. Sandstone is gray, tan, iron-oxide stained, commonly with "salt and pepper" appearance, fine to coarse-grained and locally slightly argillaceous. Locally chunks of lignite and coal(?) are found in float associated with unit.			CI002	200	Circle	Sed	500	Tsu
SOs	Siltstone, dolomite, chert, and mafic igneous rocks	Silurian and/or Ordovician	Gray, black, or olive-gray siltstone and argillite and mudstone. Tan dolomite, gray to dark-gray fine-grained limestone, gray or dark gray chert. Mafic igneous rocks are dikes, sills, and small lense-like bodies of dark- greenish-black gabbro and basalt. Two areas of exposure, northern contains chert, southerr mafic igneous rocks; as assigned an NSAclass, this corresponds to northern area of exposure.			CI002	800	Circle	Ign	7010	Dsv
РаМс	Chert, argillite, and quartzite	Penn. and/or Mississippian	Mostly black, gray, and dark-gray chert, also includes light-gray, green and white banded chert. Rare gray, dark-gray, and black argiilite, shale, slate, and siltstone and gray quartzite. Unit form east trending belt in east Crazy Mountains. Maybe be part of Circle Volcanics, or in contact (conformable, unconformable or fault) Gray, black, and banded chert interlayered with gray, green, olive, black, gray, and tan argiilite, rare gray marble, white quartzite,	Radiolarian, Albaillella sp., and Paronaella impella Ormiston and Lane of Late Mississippian age. Also Spongodiscaceid gen. nov. (tetrahedral) of latest Late Mississippian or Early Pennsylvanian age. Poorly preserved radiolaria,		C1002	601	Circle	Meta	5020	TrMts
Pzc	Chert and argillite	Paleozoic	intruded by drak-greenish-gray to black diorite and gabbro.	possibly of Mississippian age.		CI002	604	Circle	Meta	6910	Dtr

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
	Calcareous schistose										
	siltstone and sandstone,							Kantishna			
Pzc	and some phyllite	Paleozoic	Not on OFR98-133			KH003	5542	River	Meta	5542	TrMtqp
	Siltstone, slate, phyllite,							Kantishna			
Pzcs	and argillite	Paleozoic	Siltstone, slate, phyllite, and argillite			KH003	7210	River	Meta	8300	CZw
	Limestone, dolomite,		Limestone, dolomite, basaltic greenstone and								
L	basaltic greenstone and		chloritic schist; some argillite, phyllite and					Kantishna			
Pzl	chloritic schist	Early Paleozoic	quartz-mica schist			кнооз	6956	River	Sed	8601	Pz∠rqs
			Construction and managing delengible and								
			Gray to cream-colored massive dolornite, gray								
		Palaazaic and/or	of greenish-gray marble interlayered in								
PzpCd	Dolomite and marble	Precambrian	and phyllite and greenish-gray calc-silicate			C1002	1500	Circle	Mota	8615	Pzydm
1 2pcu			and prymite and greeman gray cale aneate.			01002	1300	Circle	neta	0015	i zyum
			Gravel sand and silt grav buff or brown								
Oa	Alluvium	Quaternary	Unconsolidated, well-sorted, well-stratified,			C1002	100	Circle	Unconsol	100	05
20		Quaternary	Grav to brown gravel, granule to boulder size.			01002	100	0.1.0.0	0110011001	100	45
			well-sorted, well-stratified, covered with as								
	Abandoned flood plain		much as 8 m of silt and organice material.								
Qab	alluvium	Quaternary	Perennially frozen.			CI002	101	Circle	Unconsol	100	Qs
			Boulders, gravel, sand, silt, and angular rock				-				
			fragments, mostly poorly sorted and poorly								
Qac	Alluvium and colluvium	Quaternary	stratified.			CI002	102	Circle	Unconsol	100	Qs
			Gray, tan, and brown sandy pebble-cobble								
			gravel and pebble-cobble-boulder gravel								
			having lenses and layers of sand, silt, and								
Qaf	Alluvial fan deposits	Quaternary	organic material.			CI002	103	Circle	Unconsol	100	Qs
			Gravel, silt and sand, coarse clastics					Kantishna			
Qaf	Fan deposits	Quaternary	subangular to subrounded			KH002	100	River	Unconsol	100	Qs
								Kantishna			
Qaf	Alluvial Fan deposits	Quaternary				KH003	100	River	Unconsol	100	Qs
								Kantishna			
Qags	Older alluvium	Quaternary				KH003	100	River	Unconsol	100	Qs
			Sandy gravel and sandy silt; coarse clastics					Kantishna			
Qal	Alluvium	Quaternary	subrounded to well rounded			KH002	100	River	Unconsol	100	Qs
		_						Kantishna			_
Qal	Recent Alluvium	Quaternary				KH003	100	River	Unconsol	100	Qs
			Flat, even surface, cut on bedrock in high								
Oat	Altiplopotion townso	Quataman	areas; generally less than 2 nectares in area;			1411002	1.61	Kantishna	Unconcol	100	0.0
Qat	Altiplanation terrace	Quaternary	thin mantie of coarse, angular rock fragments			KHUUZ	161	River	Unconsol	100	Qs
Oat	Altiplopotion townso	Quataman				1/1002	1.61	Kantishna	Unconcol	100	0.0
Qat	Altiplanation terrace	Quaternary				кпооз	101	River	Unconsol	100	QS
	Back defended terraces							Kantichna			
Ob	on Minook Crook	Quatornary				KHUU3	160	Rancisina	Unconcol	100	06
QD	Low-level bench gravel	Quaternary				KIIOOS	100	Kantichna	onconsor	100	Q3
Oba	of Minook Creek	Quaternary				KHOO3	100	Rivor	Unconsol	100	05
QUG	Colluvium	Quaternary	Predominately silt with some larger			KIIOOS	100	Kantichna	onconsor	100	Q3
00	undifferentiated	Quaternary	fragments commonly poorly sorted			KH002	107	River	Unconsol	100	05
QC	Colluvium	Quaternary				111002	107	Kantishna	onconsor	100	Q.3
Oc	undifferentiated	Quaternary				кнооз	107	River	Unconsol	100	05
20		2									~
	Colluvium and alluvium.							Kantishna			
Qcal	undifferentiated	Quaternary				кнооз	100	River	Unconsol	100	Qs
								Kantishna			, ·
Qess	Sand and silt	Quaternary	Elongate dunes			KH002	120	River	Unconsol	100	Qs
								Kantishna			
Qess	Sand and silt	Quaternary				KH003	120	River	Unconsol	100	Qs
			Light-gray to light-yellowish-brown, pebble to								
			boulder size, containing thin layers of sand								
			and silt. Probably was at one time large								
Qg	Gravel	Quaternary	alluvial fan of Yukon River.		1	CI002	106	Circle	Unconsol	100	Qs

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
									[	1	
			Silt and sandy silt, eolian, yellowish-gray to						1		
			light-gray. Well-sorted, homogeneous,						1		
QI	Loess	Quaternary	unconsolidated, generally perennially frozen.			CI002	107	Circle	Unconsol	100	Qs
								Kantishna	1		
QI	Loess	Quaternary				KH003	121	River	Unconsol	100	Qs
	Clay, silt, sand and							Kantishna	[		
Qlc	gravel	Quaternary	Well-bedded lake deposits; at least 60 m thick			KH002	112	River	Unconsol	100	Qs
-	-							Kantishna			-
Qls	Older landslide deposits	Quaternary				KH003	108	River	Unconsol	100	Qs
	·	,									
	Morainal deposits,		Boulders, gravel, sand, silty sand in terminal,						1		
Qm	undifferentiated	Quaternary	lateral, cirgue and ground moraine.			CI002	108	Circle	Unconsol	100	Qs
· ·			Sandy gravel and sandy silt: represents old					Kantishna			<u> </u>
Ooa	Older alluvium	Quaternary	floodplains			кноо2	100	River	Unconsol	100	Os
	Recent slide and slump	<b>C C C C C C C C C C</b>						Kantishna			
Ors	deposits	Quaternary				кнооз	100	River	Unconsol	100	Os
			Organic silt deposited in swamps. Black, dark-						1		
			gray, mottled dark-gray and brown. Mostly						1		
05	Silt and neat	Quaternary	perennially frozen			C1002	104	Circle	Unconsol	100	05
Q3		Quaternary	Probably includes both loess and solifluction			01002	101	circic		100	25
			mantle Lakes are common Units senarated						1		
			by low elongated hills which are probably					Kantishna	1		
00	Silt	Quaternary	dunes			KH002	122	Rivor	Unconsol	100	0.5
Q3	Sile	Quaternary	Silt some sand and a small amount of			KI1002	122	Kantichna	onconsor	100	Q3
Ocf	Colifluction months	Quaterpart	bodrock fragmonte				170	Divor	Unconcol	100	00
QSI	Somuction manue	Quaternary	Cray dark gray dark brown or black cilt			KHUUZ	120	Rivei	UTICOTISOI	100	QS
			organic silt and neat containing local candy						1		
			longaric sit, and peak, containing local salidy						1		
	Cilt undifferentiated and		achieve and layers. Locally highly organic,						1		
0611	Sill, unumerentiated and	Quaternany	thick			CTODO	105	Circle	Unconcol	100	00
Qsu		Quaternary	LINCK.			C1002	105	Kantishna	UTICOTISOI	100	QS
01	Till and iffer a state of	Queterra				1/11002	105	Ranusnina		100	0-
Qt	Till, undifferentiated	Quaternary				KH003	125	Kiver	Unconsol	100	Qs
0. (1)								Kantishna	l	100	
Qt (1)	1111	Quaternary				кнооз	138	River	Unconsol	100	Qs
								Kantishna			
Qt (2)	1111	Quaternary				кнооз	137	River	Unconsol	100	Qs
		_						Kantishna			-
Qt (3)	Till	Quaternary				KH003	136	River	Unconsol	100	Qs
								Kantishna	1		
Qt (4)	Till, cirque glaciation	Quaternary				KH003	130	River	Unconsol	100	Qs
								Kantishna	1		
Qta	Talus	Quaternary				KH003	107	River	Unconsol	100	Qs
								Kantishna			
QTg	High-level gravel	Quaternary				KH003	285	River	Unconsol	100	Qs
								Kantishna			
Qtr	Terrace deposits	Quaternary				KH003	110	River	Unconsol	100	Qs
Qal	Active stream alluvium	Quaternary	Active stream alluvium			SM002	105	Sleetmute	Unconsol	100	Qs
	Ground and medial		Ground and medial moraines interpreted from						[		-
Qq3	moraine	Pleistocene	aerial photographs			SM002	136	Sleetmute	Unconsol	100	Qs
	Ground and medial		Ground and medial moraines interpreted from							1	
Oq2	moraine	Pleistocene	aerial photographs			SM002	137	Sleetmute	Unconsol	100	Os
29-	Ground and medial		Ground and medial moraines interpreted from			011002	107	biccunate	1	100	45
Oa1	moraine	Pleistocene	aerial photographs			SM002	138	Sleetmute	Unconsol	100	Os
			la la priocographio								
001	Glacial outwash denosite	Pleistocene	Glacial outwash deposits			SMUUS	140	Sleetmute	Unconsol	100	05
200	Undifferentiated diacial					511002	1 10	Siccunute		100	
00	doposite	Plaistocopo	Undifferentiated glacial denosite			SMOOD	135	Slootmute	Unconcol	100	
29	Updifforentiated alluvial	FICIALULEIIE				311002	133	Sieetinute	UNCONSOL	100	425
1	colluvial and collian		Undifferentiated alluvial calluvial and a line						ł.		
<b>.</b>		Quataman	denesite			CMOOD	100	Cleatmoute	Ilmannaal	100	
Qu	ueposits	Qualernary	Clause a baselt sum and 0 million in f			511002	100	Sieetmute	UNCONSOL	100	QS .
ть	Columnan har-it	Tentien	Courinar basait, exposed 9 mi northeast of		K-AF WHOIE-FOCK,	CMOOR	1004	Cleanstra	Tan	1004	
1D	Columnar basalt	rentiary	portyseven creek landing strip.		J0.2 Ma	J2M002	1004	Sieetmute	Ign	1004	ID

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Small stacks, shiefly quartz monzonita								
Та	Small stocks	Tertiary	exposed in southeast corner of guadrangle.		K-Ar biotite 41.7 Ma	SM002	1300	Sleetmute	Ian	1300	Tear
5					Six K-Ar biotite and				1		
					whole-rock ages						
TKr	Sheets, dikes, and sills	Cretaceous	Sheets, dikes, and sills of peraluminous biotite	2	ranging from 61.5 to	SMUUS	1603	Sleetmute	Ian	1603	TKyr
	or myonee	Cretaceous	Dikes and thin sills of felsic to mafic		70.5 Hu	511002	1005	Sieetinate	ign	1005	
			composition mostly altered to carbonate,								
			quartz, sericite, and clay. Age based on								
		early Tertiary Late	Cretaceous sedimentary rocks (unit Kk								
TKd	Dikes and sills	Cretaceous?	Kuskokwim Group).			SM002	1601	Sleetmute	Ign	1601	TKd
			Felsic volcanic rocks associated with volcano-								
			plutonic complexes, primarily composed of								
			Getmuna Rhyolite of Cady and others (1955)								
		early Tertiary, Late	and Holokuk Basalt of Reifenstuhl and others		K-Ar whole-rock of						
TKvf	Felsic volcanic rocks	Cretaceous?	(1984)		43.8 Ma	SM002	1625	Sleetmute	Ign	1625	TKvr
			Mafic volcanic rocks associated with volcano-								
			plutonic complexes; lower unit of TKvf/TKv								
			group. Composed of flows and lesser tuff,								
			agglomerate, and minor lahar units of		Seven K-Ar ages on						
		early Tertiary, Late	and felsic rocks also present. Named Holokuk		whole rocks range						
ΤKv	Mafic volcanic rocks	Cretaceous	Basalt by Cady and others (1955).		from 64.3 to 74.5 Ma	SM002	1630	Sleetmute	Ign	1630	TKiv
					Chu K An and an						
			plutonic rocks associated with voicano-		SIX K-Ar ages on						
		early Tertiary, Late	monzonite, granodiorite, and granite stocks		hornblende range						
TKg	Plutonic rocks	Cretaceous	and minor dikes of mafic to felsic composition		from 63.8 to 68.9 Ma	SM002	1650	Sleetmute	Ign	1650	TKi
			Interbedded sandstone, siltstone, shale, and	Dava fassila constrin							
Кk	Kuskokwim Group	late Cretaceous	and turbidite association.	ade.		SM002	1970	Sleetmute	Sed	1970	KK
				Early Cretaceous and		0.1002	1370	biodetinate	000	1570	
			Chiefly siltstone, interbedded with lesser	Cretaceous fossils							
			amounts of chert and volcanic rock (including	Triassic found to							
KTrg	Gemuk Group	Cretaceous to Triassic	breccia.	southwest.		SM002	4710	Sleetmute	Sed	4710	MzPzgs
	•										
				Stromatopora sp							
				Favosites sp.,							
				Monotrypa sp.,							
				Spirifer							
			Limostopo in partly delomitized chiefly	(Emmanuella?) sp.,							
			massive but thinner bedded in upper zones.	Productella sp.,							
		Middle Cambrian to early	Contains small reef-like deposits and local	Proetus sp., trilobites,	,						
Pzl	Holitna Group	Middle Devonian	intraformational conglomerate and breccia.	Cyathophylloid corals		SM002	6960	Sleetmute	Sed	6960	DSwc
			Two parts, tuffaceous part of unit, see KJvr								
			also for main part of unit. One includes rocks								
			around VABM Vrain, composed mostly of								
			Arguine and minor quartzite and slaty argillite Second shown by ttt symbol is characterized	•							
			by tuffaceous rocks associated with black or								
			dark-gray argillite and conglomerate. Unit								
MzPzat	Argillite, tuff, quartzite	Mesozic and/or Paloozoic	Iumped and polygons removed on published			CIOD2	550	Circle	Meta	2875	Klyt
I'IZFZat		Intesozie anu/or raieozoie		1	1	101002	1330	CILLE	Intela	120/0	INJVL
						Source					
-----------	--------------------------------------------------------------------	---------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------	-----------------	--------	------------	--------------------	------------	-----------	--------
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
MzPzag	Argillite and guartzite	Mesozoic and/or Paleozoic	Vitreous quartzite part of unit, mapped separately. Light-gray, dense quartzite having a vitreous luster. Dark-gray to black, locally quartzitic argillite, mudstone, and siltstone. Calcareous in a few places, has local gray and black chert. Unit includes a gray, very fine-grained limestone at one locality. Dark greenish-gray mafic lavas, including amygdaloidal basalt and basalt breccia appear interlayered with the sedimentary rocks.	Conodonts in limestone range in age from Ordivician to Triassic		CI002	5000	Circle	Meta	6530	Mgg
PzpCq	Quartzite and quartzitic schists, quartzite subunit	Paleozoic and/or Precambrian	Light- to medium-gray, fine- to medium- grained relatively pure quartzite of unit PzpCq, which consists of gray or greenish-gray quartzite and quartzitic schists are dominant rock types. Minor pelitic schist, calc-silicate, mafic schist, and rare marble are interlayered with quartzite and quartzitic schists.			CI002	1610	Circle	Meta	9323	PzZyqs
PzpCq	Quartzite and quartzitic schists, greenschist subunit	Paleozoic and/or Precambrian	Green or greenish-gray, medium-grained, and massive to foliated greenschist subunit(?) of unit PzpCq, consisting of gray or greenish- gray quartzite and quartzitic schists are dominant rock types. Minor pelitic schist, calc silicate, mafic schist, and rare marble are interlayered with quartzite and quartzitic schists. Unit not located on source map.	-		CI002	none	Circle	Meta	9326	PzZyqs
PzpCqm	Quartzite and quartzitic schists, magnetic chlorite schist subunit	Paleozoic and/or Precambrian	Magnetic chlorite schist subunit of unit PzpCq, consisting of gray or greenish-gray quartzite and quartzitic schists are dominant rock types. Minor pelitic schist, calc-silicate, mafic schist, and rare marble are interlayered with quartzite and quartzitic schists. Similar lithologically to Cleary sequence of Bundtzen (1982)			CI002	1650	Circle	Meta	9321	PzZyqs
PzpCs	Pelitic schist, quartzite subunit	Paleozoic and/or Precambrian	Mostly medium- to coarse-grained pelitic schist and gneiss, having minor interlayered quartzite and quartzitic schists and subordinate white and cream-colored, coarse- grained marble.			CI002	1320	Circle	Meta	8802	PzZypg
PzpCs	Pelitic schist, sillimanite gneiss subunit	Paleozoic and/or Precambrian	Mostly medium- to coarse-grained pelitic schist and gneiss, having minor interlayered quartzite and quartzitic schists and subordinate white and cream-colored, coarse- grained marble.			CI002	1310	Circle	Meta	8632	PzZpg
unk	Limestone	Paleozoic and or	Various limestone symbol shown on Circle map in a variety of rock units. No further description in text. Includes on northern polygops of unit			C1002	1900	Circle	Sed	8000	CZWI
unk	Chert	Paleozoic and or	Various chert symbols shown on Circle map in a variety of rock units. No further description in text. Assigned to Cascaden on the basis of location			C1002	1910	Circle	Sed	6940	Dch
unk		precambrian				C1002	1910	Kantishna	Jeu	0540	
Qal	Alluvium	Quaternary				KH004	100	River	Unconsol	100	Qs
Qc	Colluvium	Quaternary				KH004	101	River	Unconsol	100	Qs
Qs	Silt	Quaternary				кноо4	102	Kantishna River	Unconsol	100	Qs

						Source					
Rock unit	Linit hame	Age	Description	Fossil	Radiometric age	code		Quadrangle	Rock class	NSA class	Label
ROCK UTIL	onenane	Age	Both medium- and fine-grained sand dunes	103311	Radiometric age	coue	Class coue	Quadrangie	TROCK Clubs	INSA Cluss	Label
			massive silt deposits particularly on windward					1			
			slopes and relatively thin veneers of silt. The					1			
			linear dunes trend SW are commonly several					1			
			km long and 8 to 20 m high and have					Kantishna			
Odl	Dune sand and losss	Quaternary	rounded tons			KHOOA	103	Rivor	Unconsol	100	0.5
Qui	Durie Sund und 10035	Quaternary					105	Kantishna		100	43
0	Lacustrino donosito	Quatorpany				KHOOA	104	Runcisinia	Unconcol	100	06
Qi	Lacusti ne deposits	Quaternary				K11004	104	Kivei	Unconsor	100	Q3
Tn	Nonana gravel	Tortion				VU004	570	Divor	Unconcol	570	Tn
111		Tertiary				КП004	570	Kivei	UTICOTISOI	570	111
TV	Constitution and an	Tautian				1/11/00/1	201	Ranusnina	T	1055	TV-
ткд	Granitic rocks	Tertiary				KH004	201	River	Ign	1655	ткд
TK		Tentien				1/1004	202	Ranusina	Tan	1602	TIZ
IKV	VOICANIC FOCKS	Tertiary				KH004	202	River	Ign	1603	IKVr
		- ·						Kantishna			201
DI	Limestone	Devonian				KH004	300	River	Sea	6944	DSI
								Kantishna			
DSt	Tolovana limestone	Devonian				KH004	301	River	Sed	6965	DSt
								Kantishna			
DOc	Chert	Devonian/Ordovican				KH004	302	River	Sed	7710	Och
								Kantishna			
DOs	Shaly rocks	Devonian/Ordovican	Shaly rocks			KH004	303	River	Sed	6902	Dp
			Impure limestone, dolomite, greenish-gray								
			phyllite, and silty shale, all of very low					Kantishna			
pOlp	Limestone and phyllite	pre-Ordovican	metamorphic grade.			KH004	400	River	Sed	7580	SCpl
								Kantishna			
bu	Bedrock undifferentiated	pre-Ordovican				KH004	99	River		99	bu
	Younger flood-plain	-									
Ofv	deposits	Ouaternary				NL003	100	Nulato	Unconsol	100	Os
~ /	Older flood-plain	( )									
Ofo	deposits	Ouaternary				NL003	101	Nulato	Unconsol	100	Os
	High-terraces and slope	,									
Ohs	deposits	Quaternary				NL003	102	Nulato	Unconsol	100	Os
<b>~</b>							-				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Та	Andesite and basalt flows	Focene and Paleocene				NI 003	200	Nulato	Ian	1000	TVU
	Rhyolite and dacite flows								- 5		
	and shallow intrusive							1			
Tr	bodies	Focene and Paleocene				NI 003	201	Nulato	Ian	1000	TVU
	boules					112000	201	litaraco	-9	1000	
	Small intrusive bodies of							1			
	silicic and intermediate	Farly Tertiary and Late						1			
TKh	composition	Cretaceous				NI 003	1655	Nulato	Ian	1655	тка
Kar	Biotito granito	Crotaceous				NL 003	2410	Nulato	Ign	2530	Ka
Kgi	biotite granite	Cretaceous				NLOUS	2410	Nulaco	Ign	2330	ку
1	Small intrusivo bodios		Small intrusive bodies and thormally altored					ĺ			
	and thermally altored	Farly Tertiary and Late	sedimentary rocks of the Yukon-Koyokuk					Í			
Tithe	and thermany altered		begin belonging to units Ke and Kg			NI 002	202	Nulata	Tan	16552	TVa
TKIIS	seu. rx	Cretaceous	Dasin belonging to units KS and Kg			INLUUS	203	INUIALO	Ign	10225	тку
	Lin difference timber d		Sanusione, snale, and congiomerate marine					1			
14-11	undimerentiated	Late and Fault C. 1	and nonmarine deitaic deposits in northwest			NU 000	1040	NULTE	C . d	2021	14
Ksu	sedimentary rocks	Late and Early Cretaceous	part of quadrangle			NL003	1940	Nulato	Sed	2021	кте
	Marine sedimentary		Sandstone, siltstone, and shale fossiliferous					L			
кт	rocks	Early Cretaceous	marine deltaic deposits			NL003	2101	Nulato	Sea	2101	Ksse
	Marine sedimentary		Calcareous sandstone, siltstone, and shale					L			
KCS	rocks	Early Cretaceous	prodelta deposits			NL003	303	Nulato	Sed	2152	Km
								[			
Kg	Turbidite deposits	Early Cretaceous	Graywacke and mudstone turbidite deposits			NL003	2105	Nulato	Sed	2180	Kvm
								1			
Kv	Andesite volcanic rocks	Early Cretaceous				NL003	2220	Nulato	Ign	2330	Kve
	Cumulate ultramafic							1			
Jcu	rocks	Middle and Late Jurassic				NL003	402	Nulato	Ign	3496	Jtu
								1			
Jht	Harzburgite tectonite	Middle and Late Jurassic				NL003	401	Nulato	Ign	3497	Jtu
	Ultramafic rocks,							1			
Juu	undivided	Middle and Late Jurassic				NL003	301	Nulato	Ign	3498	Jtu

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
TrMb	Basalt, gabbro, diabase, tuff, and chert	Mississippian to Triassic				NL003	5133	Nulato	Ign	5130	JTrtmu
TrMq	Quartzite, phyllite, limestone	Mississippian to Triassic				NL003	5542	Nulato	Meta	5542	TrMtqp
PzpCs	Schist and quartzite	Paleozoic and Proterozoic?				NL003	8650	Nulato	Meta	8650	PzZrmc
PzpCc	Carbonate rocks	Paleozoic and Proterozoic?				NL003	8610	Nulato	Sed	8620	Pzrm
PzpCm	Metabasites	Paleozoic and Proterozoic?				NL003	8450	Nulato	Meta	8450	MzZum
ls	Landslide deposits	Quaternary?				NL003	100	Nulato	Unconsol	100	Qs
Kgs	Graywacke sandstone and mudstone volcanic conglomerate	Early(?) Cretaceous	Massive volcanic conglomerate mapped within unit or poorly sorted, muddy sandstone (graywacke) interbedded with mudstone. Conglomerate appears gradational with coars breccias and agglomerates of andesitic volcanic rocks (unit KJy, KT guad.)	Associated and gradational(?) with e units containing Buchia of earliest Cretaceous age.		КТ002	202	Kateel River	Sed	2181	Kvm
TKv	Extrusive rocks	Cretaceous or Tertiary	Basaltic, andesitic, and rhyolitic flows, tuffs, and breccias, and a few dacite flows; interbedded sandstone and shale. Flows commonly porphyritic and gently dipping. Probably greater than 500 feet thick. (Description from RB002, should match on this map.)			RB003	202	Ruby	Ign	1603	TKvr
Qu	Alluvium	Quaternary	Silt, sand, and gravel of stream beds, flood plains, and terraces			RB003□	100	Ruby	Unconsol	100	Qs
1Pb	Basalt and diabase of	Jurassic to Pormian	Bacalt and diabace of Pampart Group			PB003	5140	Ruby	Ian	5140	1Mab
Pg	Graywacke	Permian	Unit probably correlative with similar clastic rocks of the Permian(?) Rampart Group. Unit has three parts; a) fine- to medium-grained, medium-gray to dark-greenish-gray graywacke, calcareous in part and containing some dark-gray shale fragments, b) grit to small-pebble graywacke conglomerate with clasts of andesitic and basaltic rock, shale, chert, quartzite, and a few schistose rocks in sand and mud matrix; and c) greenish-gray t medium-dark gray mudstone and shale.	Nodosinellids a (Tetrataxis), bryozoan o and echinoderm debris.		RB003	104	Ruby	Sed	5021	TrMis
MDc	Chert and argillite	Late(?) Mississippian and very latest Devonian	Medium-dark to dark-gray, thin-banded, bedded, radiolarian-bearing chert containing thin interbeds of slaty argillite. (See unit 6080 in MD quadrangle, correlated in part.). Mapped as Kca by Cass (1959)	Radiolarians		RB003	303	Ruby	Sed	6390	TrMica
Pzc	Carbonate rocks	Early Paleozoic	see unit 7520 Od in Ruby or unit 5340, Ophir quadrangle. Did not appear on final map.			RB003	5340	Ruby	Sed	5340	Pzrm
PzpCm	Metamorphic rocks	Paleozoic and preCambrian?	Not described			RB003	8600	Ruby	Sed	9325	PzZrqs
Kku	Kuskokwim Group	Middle to Late Cretaceous	Chiefly marine basin and fan deposits			LH003	1970	Lime Hills	Sed	1970	Kk
JKw	Feldspathic wacke	Jurassic or Cretaceous	Red-weathering, locally calcareous, felspathic wacke contiaining siltstone interbeds. Not on OFR98-133 as published.			LH003	2825	Lime Hills	Sed	2825	KJfm
Trb	Pillow basalt	Triassic?	Pillow basalt interbedded with minor argillite and chert. See LH004 for revised unit.	Radiolaria suggest Triassic age		LH003	4210	Lime Hills	Ign	4215	JTrtv
Mzv	Metabasalt and andesite	pre-Cretaceous	Metabasalt and metaandesite volcanic rocks			LH003	4910	Lime Hills	Meta	5220	JPzk

						Sourco					
Pock unit	Unit hamo	4.00	Description	Fossil	Padiomotric ago	codo	Class codo	Quadranglo	Pock class		Labol
ROCK UTIL		Age	Description	10351	Radiometric age	coue		Quadrangle	RUCK Class	INSA Class	Label
	Undifferentiated										
	metavolcanic and		Undifferentiated metavolcanic and								
Mau	motacodimontany rocks	pro-Crotacoous	motacedimentary rocks			1 4003	1020	Limo Hille	Mota	5220	10-1/
mzu	Inecasedimentary focks		Altered diabase andesite breccia and			LIIUUS	4920	LINETIIIS	Meta	5220	JFZK
			andesite bieccia, and								
Madai	Altorod diabase	pro Tortion/2	unknown, thought to be pro Tortiony			1 4002	E120	Limo Hillo	Ian	E100	Madai
MZPZI	Calcaroous mudstone	pre-rentiary?	unknown, thought to be pre-reitiary			LHUUS	5120		Ign	5160	MZPZI
	Calcareous mudstone		Calephone mudetone and limestane algel usef								
DCab	and imestone aigar reer	Devenien Cilvaien	Calcareous mudsione and innestone algar reel			111003	6060	Lima Llilla	Cad	6060	DCure
DSab	complex	Devonian - Silurian	This hadded linesters and maximum half			LIUUS	0900		Seu	0900	DSWC
			I nick-bedded limestone, open marine shelf								
			Parentine Deservations 2 (Unit delated in								
	This is the state of the state of a	Benerice Benerice 2	Permian, Pennsylvanian? (Unit deleted in				5241	Care a LUU-	Carl	5241	DDI
PPI	I NICK Dedded IImestone	Permian, Pennsylvanian?	Bundtzen compliation[LHUU4])			LHUU3	5341	Lime Hills	Sea	5341	PPI
			Thick-bedded limestone, open marine shelf								
			enviroment. Age not reported, could be Late				6000			6004	
UDI	Thick bedded limestone	Late Devonian?	(Upper) Devonian?			LH003	6932	Lime Hills	Sed	6931	DSml
	Laminated limestone,		Laminated limestone, micaceous sandstone,								
DSIs	sandstone, and siltstone	Devonian - Silurian	and siltstone. Slope environment.			LH003	6957	Lime Hills	Sed	6957	DSIs
			Dark-gray to black argillite with(?) chert,								
Sa	Argillite	Silurian	siltstone, and shale			LH003	6630	Lime Hills	Sed	6630	Sa
	Micaceous calc-		Micaceous calc-sandstone with minor								
Ss	sandstone	Silurian	limestone			LH003	6640	Lime Hills	Sed	6640	Ss
			Argillaceous limestone, calc-sandstone, and								
			graptoloitic shale. Slope to basinal deposits.								
	Argillaceous limestone,		Unit removed, replaced largely by unit SCpl								
SOIs	sandstone, and shale	Silurian - Ordovician	from Bundtzen (1997)	Graptolites		LH003	6951	Lime Hills	Sed	7580	SCpl
	,		Medium- to coarse-grained, seriate,	•							
			hypidiomorphic- granular biotite granite.								
			Similar to and likely apothesis of Tired Pup								
Tbr	Big River pluton	Early Tertiary?	pluton			LH002	104	Lime Hills	Ian	1320	Tpar
							_				
			Peralkaline granite in two distinct phases, an								
			alkali feldspar granite and granite. Overlaps								
			into McGrath guadrangle. Anomalous U and		K-Ar biotite 29.0 to						
Twf	Windy Fork pluton	middle Tertiary	Th near northern margin of pluton		31.1 Ma	LH002	105	Lime Hills	Ian	1270	Toar
	Northern Intermediate		Biotite-amphibole granite to guartz						- 5		
TKa	nlutons	Tertiary or Cretaceous	monzonite: diorite also present			1 H002	109	l ime Hills	Ian	1655	ТКа
ing	platons				K-ar biotite 35.6 to	LIIOOZ	105	Line mis	Ign	1055	ing
					40.0 Ma 40/39						
			Flongate pluton that is chiefly highlite- or		biotite 40.0 to 42.2						
Tmp	Morrill Pace pluton	middle Tertiany	biotito-bornblondo granito		Ma	1 4002	110	Limo Hille	Ian	1200	Toogr
mp			biotite-normbiende granite.		110	LIIUUZ	110	LINETIIIS	Ign	1290	Tuegi
			Highly variable intrusions spatially associated								
			with Morrill Dace pluton Danges from quartz								
			diarita ta granita, nartharn annalas tunicallu								
	Marrill Daga intermediate		diorite to granite, northern samples typically								
<b>T</b>	Merriii Pass intermediate	and date. To obtain 20	granoulorite and granite. Larger plutonic				1.1.2	Care a LUU-	T	1202	<b>T</b>
Tmpg	pnases	middle Tertiary?	boales exposed in south.			LHUUZ	113	Lime Hills	Ign	1292	Toem
			Medium- to coarse-grained , seriate, biotite-								
			nornbiende granodiorite naving a								
			hypidiomorphic-granular texture. Originally		K-Ar discordant						
			mapped as part of Merrill Pass pluton,		biotite (31.9 Ma) and						
_			separated because of higher color index and		hornblende (36.3						_
Itg	l elequana Pass pluton	middle Tertiary	presence of hornblende.		Ma), same sample.	LH002	114	Lime Hills	Ign	1292	Toem
1										1	
1			Several small stocks consisting of fine- to								
1			medium-grained, seriate to subporphyritic,							1	
Tsf	South Fork stocks	middle Tertiary?	hypidiomorphic-granular biotite granite.			LH002	116	Lime Hills	Ign	1290	Toegr
			Small intrusion of fine- to medium-grained to								
			fine- to coarse-grained, seriate,								
1			hypidiomorphic granular gabbro. Intruded by							1	
			and completely surrounded by Merrill Pass							1	
TKm	Goldpan Peak Gabbro	Tertiary or Cretaceous	pluton.			LH002	117	Lime Hills	Ign	1670	TKgb

						Course					
Bock unit	Unit hame	4.50	Description	Fossil	Radiamatric ago	Source	Class code	Quadrangla	Bock class		Labol
ROCK UTIL		Age	Description	FUSSII	Kaulonietric age	coue	Class code	Quadrangle	KUCK CIASS	INSA CIASS	Labei
			Chiefly fine- to coarse-grained histite- or		Ma) and bornblondo						
			biotite-bornblende granite or granodiorite		(61 3 Ma)						
Tcn	Chilligan Porphyry	Farly Tertiary	containing alkali feldenar phenocrysts		concordant	1 H002	118	Limo Hills	Ian	1320	Tnar
тер	Chiligan Forphyry		Dark-colored hornblende and pyroxene-		concordant	LIIUUZ	110	Line mis	ign	1520	ipgi
			bornblende fine- to medium-grained gabbro								
			Two varieties one foliated (cumulate?) and a								
Tal	A-2 Gabbro	Farly Tertiary	non-foliated variety		40/39 biotite 61 4 Ma	1 H002	119	l ime Hills	Ian	1380	Tal
igi			Medium- to coarse-grained seriate		40/33 biotite 01.4 Ma	LIIUUZ	115	Line mis	Ign	1500	igi
			hypidiomorphic granular quartz diorite								
Teo	Unnamed pluton	Tertiary	granodiorite and granite		K-Ar biotite 57 5 Ma	1 H002	121	Limo Hills	Ian	1350	Thad
130		rendery	Fine-grained egigranular or fine- to medium-		R Al Diotice 57.5 Ha	LIIUUZ	121	Line mis	Ign	1550	ingu
TKtn	Tex Peak Mafic intrusion	Tertiary or Cretaceous	grained seriate gabbro			1 H002	124	Limo Hills	Ian	1670	TKab
пкер	Tex Teak Hane Inclusion		Small greenstone body consisting of dark			211002	124	Line mis	Ign	1070	TRgb
			greenish-black massive fine-grained								
			equigranular greenstone May correlate with								
			Chilikadrotna Greenstone, which has vielded								
		Mesozoic or Paleozoic	Late Triassic fossils from interhedded								
MzPza	Greenstone	(Late Triassic?)	limestone			1 H002	125	l ime Hills	Meta	4425	Trc
Tkia	Igitha granodiorite	Tertiary or Cretaceous				1 H002	127	Lime Hills	Ian	1660	TKm
TKIY	Igitila granodionte		Fine- modium-grained, seriate to perphyritic		K-Ar bornblondo 79 1	LIIUUZ	127	LINETIIIS	ign	1000	TKIII
Ki	Uppamod stocks	Crotacoous	quartz monzodiorito		Ma	1 4002	128	Limo Hille	Ian	2470	Ka
NI		Cretaceous			K-Ar biotito (33 5	LHUUZ	120		Ign	2470	ĸġ
					Ma) and bornblondod						
			Final to modium-grained coriate histita-		(35.2 Ma)						
Tec	Snowcan Contral	middle Tertiany	horphlanda granita to granodiorita		(33.2 Ma),	1 4002	130	Limo Hille	Ian	1200	Toogr
150	Showcap Central		nomblende granite to granoulonte.		concordant	LIIUUZ	150	LITTLE THINS	Ign	1290	Tuegi
			Pluton ranging from gabbro to granito		K-Ar biotito 41 5 and						
			incomposition, with the more mafic		50 1 Ma thought						
			compositions tonding to be in the southern		rocot: 40/39 biotito						
Teo	Snowcan East pluton	Tertiary	part of the exposure		64.8 Ma	1 H002	131	Limo Hills	Ian	1320	Tnar
130			Series of 4 elongate plutons individually		04.0 110	LIIUUZ	151	Line mis	Ign	1520	ipgi
			ranging from quartz monzonite and quartz								
			monzodiorite to granite. In general are fine-		K-Ar biotite 64 1 Ma						
			to medium-grained seriate intrusions chiefly		and 40/39 biotite						
Th	Hartman Plutons	Tertiary	granodiorite		65 1 Ma	1 H002	132	l ime Hills	Ian	1320	Tnar
			Leucocratic biotite granite part of McKipley		03.1110	LIIOOZ	152	Line mis	ign	1520	ipgi
	limmy Lake stock	Farly Tertiary	sequence?		40/39 biotite 65.0 Ma	1 H002	133	Lime Hills	Ian	1320	Tpar
	Sinniy Earle Stock	zany renary				2.1002	100	Linte mile	19.1	1020	
			Two phases, slightly older and finer grained								
			northern pluton consisting of medium-grained								
			hypidiomorphic-granular biotite- and								
			hornblende-bearing granodiorite containing								
			tourmaline as a characteristic accessory								
			mineral. It is largely esposed in the Tyonek								
			and Talkeetna guadrangles to the north. The								
			second phase is a slightly younger, coarser-								
1			grained southern pluton consisting of medium	-						1	
1			to coarse-grained, seriate, hypidiomorphic-							1	
1			granular granodiorite. It is well exposed in		K-Ar biotite and					1	
1			the Lime Hills guadrangle and also in the		hornblende ranging					1	
Tme	Mount Estelle pluton	Early Tertiary	Tyonek guadrangle		from 62.0 to 64.2 Ma	LH002	134	Lime Hills	Ian	1350	Thad
			Very fine- to fine-grained, sub-equiganular						- 5		
TKma	Mount Estelle Gabbro	Tertiary or Cretaceous	nabbro.			1 H002	135	Lime Hills	Ian	1670	TKab
			300000		K-Ar hornblende 76.0	2.1002		2	-9"		
1			Elongate fine- to coarse-grained, seriate		Ma and 40/39 biotite					1	
1			pluton consisting chiefly of monzonite and		70.1 Ma and					1	
1			monzodiorite. Locally well-developed		hornblende 73.5 to					1	
Ksn	Sled Pass pluton	Cretaceous	cataclastic foliation		75 6 Ma	1 H002	137	l ime Hills	Ian	2470	Ka
		0.000000	Fine- to medium-grained, seriate granodiorite			2/1002		2.1110 1 1113	-9"	- 17 0	
1			to tonalite. Presumably intrudes stock of							1	
1			McKinley sequence granite. Contains							1	
1			subordinate phase is fine- to medium-grained							1	
Tmr	Mount Rich pluton	Tertiary	granite.		40/39 biotite 38.6 Ma	LH002	138	Lime Hills	Ian	1292	Toem
				1			1 2 2		1 211		

						Sourco					
Rock unit	Linit hamo	100	Description	Fossil	Padiomotric ago	source	Class codo	Quadranglo	Pock class		Labol
ROCK UTIL		Age	Pornhyritic hynahyssal intrusive rock	FUSSI	Radiometric age	coue	Class coue	Quadrangle	KUCK CIASS	INSA Class	Label
			containing 40-50 percent phenocrysts								
			Phenocrysts are cheifly plagioclase feldspar								
			and subordinate biotite and quartz Anhanitic								
Tcni	Crowded Pornbyry	Tertiary	silicieous groundmass			1 H002	139	Limo Hills	Ian	1290	Toear
тері						LIIUUZ	139	LINETIIIS	ign	1290	Tuegi
			Chiefly fine- to medium-grained seriate to								
			subporphyritic quartz monzodiorito: loss								
			common is a porphyritic quartz monzonite								
Tic	Johnson Crook pluton	Tortiany	phase. Here inclides? Camp pluten		40/39 biotito 38 6 Ma	1 4002	141	Limo Hille	Ian	1202	Toom
цс	Johnson Creek platon	reitiary			40/33 Diotite 38.0 Ma	LIIUUZ	141	LITTLE THINS	ign	1292	TUEIII
					K-Ar biotito 60.0 to						
					62.0 Ma and						
					bornblondo 57 5 to						
			Large pluten of texturally variable, histite 1/		EQ Q Ma K Ar biotita						
Tee	Createl Creat plutan	Fault Tautian (	Large plucon or texturally variable, blottle +/-		59.9 Md. K-Al Diotite	111002	142	Lima Llilla	Tan	1220	Tnen
100	Crystal Creek pluton	Early Tertiary	Fine to medium argined equipto quarte		or 52.6 thought reset	LHUUZ	142	Lime Hills	ign	1320	rpgr
TILIUM		Tertian ( en Creta es eus	Fine- to medium-grained senate quartz			111002	144	Lima Llilla	Tan	1655	TKa
тккш	monzonice plucon	Tertiary of Cretaceous	Final ta mandium analizadi assista			LHUUZ	144		Ign	1022	тку
			Fine- to medium-grained, seriate,		10/20 histite 25 C						
-	C. D. I. I.		nypidiomorphic granular granodiorite to		40/39 Diotite 35.6		4.45			1000	-
ISF	Stony River granodiorite	middle Tertiary	quartz monzodiorite.		and 35.9 Ma	LHUUZ	145	Lime Hills	Ign	1292	Toem
			Fine- to coarse-grained, seriate,								
			hypidiomorphic granular granodiorite.								
			Outcrop area surrounded by Tired Pup pluton,								
		earliest Tertiary or	thought to be older that fired Pup. Is this								
	Swift River granodiorite	Cretaceous?	body mapped separately?			LHOOZ	146	Lime Hills	Ign		
			Fine- to medium-grained, seriate, peralkaline								
TKqc	Quartz Crystal pluton	middle Tertiary?	granite to alkali feldspar granite.			LH002	14/	Lime Hills	Ign	1270	logr
			Predominantly crystal and crystal-lithic ash-		40/39 biotite 36.5						
			flow tuff and lesser interbedded lava flows and	1	and 41.0 Ma; 40/39				_		
Tv3	Seabee volcanic rocks	Tertiary	local volcaniclastic sedimentary rocks.		sanidene 37.6 Ma	LH002	150	Lime Hills	Ign	1070	Tvr
			Chiefly crystal-lithic tuff and lesser								
			volcaniclastic rocks, lava flows, and								
Tv5	A-2 volcanic rocks	Tertiary?	lahar/debris flows			LH002	153	Lime Hills	Ign	1070	Tvr
			Chiefly crystal-lithic ash-flow tuff and lesser								
			interbedded lava flows and local volcaniclastic		40/39 hornblende						
Tv4	Snowcap volcanic rocks	Tertiary	sedimentary rocks.		33.6 Ma	LH002	155	Lime Hills	Ign	1070	Tvr
			Chiefly crystal-rich ash-flow tuff and lesser								
			lithic-crystal ash-flow tuff and lava flows. Two								
			lahar deposits have been included in unit as								
			well as a small hypabyssal porphyritic								
			intrusion. Lithic fragments in tuff are								
			graywacke and argillite derived from Kahiltna								
Tv1	North volcanic center	Tertiary?	terrane.			LH002	157	Lime Hills	Ign	1070	Tvr
			Chiefly crystal-lithic ash-flow tuff and								
			subordinate lava flows and local volcaniclastic								
			rocks south of Jimmy Lake Pass. Lithic								
1			fragments in tuff are chiefly volcanic and								
1			sedimentary rock fragments. Sedimentary								
1			rock fragments are graywacke and siltstone								
Tv2	Styx River Volcanics	Tertiary?	derived from Kahiltna terrane.			LH002	158	Lime Hills	Ign	1070	Tvr
		Cretaceous and/or									
JKs	Kahiltna terrane	Jurassic	Graywacke and argillite			LH002	160	Lime Hills	Meta	2850	KJf
			Unit supposed to continue into Lake Clark								
1			quadrangle, however no similar unit described								
1	Sandstone and		in Lake Clark. Unit assigned to Kakhonak								
MzPzs	graywacke	Mesozoic or Paleozoic	Complex by default	1		LH002	162	Lime Hills	Meta	5220	JPzk

						Source	1				
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
			Small stocks scattered throughout eastern part of Lime Hills quadrangle. Composition varies from biotite granite to hornblende- pyroxene quartz diorite. Texture varies from								
TKiu	Intrusive rocks	Tertiary or Cretaceous	grained seriate.			LH002	170	Lime Hills	Ign	1650	ТКі
Pzu	Sedimentary rocks (limey)	Paleozoic	Sedimentary rocks. Undifferentiated shale, siltstone, argillite, and limestone. Fossils, chiefly grapotlites, collected from these rocks are Late Cambrian(?), Ordovician, Silurian, and Devonian in age. Tentatively correlated with Dilinger sequence of sedimentary rocks. Unit description from LH003			LH002	190	Lime Hills	Sed	5310	DCd
TKgs	Gneiss	Tertiary or Cretaceous	Gneiss, possibly Mesozoic (Mzg)?			LHUUZ	195	Lime Hills	Meta	1720	ткдд
Impb	Merrill Pass breccia	Tertiary				LH002	199	Lime Hills	Ign	1290	Toegr
Qa	Quaternary surficial deposits	Quaternary				LH002	200	Lime Hills	Unconsol	100	Qs
Qal	Alluvium	Quaternary	Alluvium			LH002	202	Lime Hills	Unconsol	100	Qs
Qc	Colluvium	Quaternary	Colluvium			LH002	203	Lime Hills	Unconsol	100	Qs
Qg	Moraine?	Quaternary				LH002	204	Lime Hills	Unconsol	100	Qs
Qao	Outwash?	Quaternary				LH002	206	Lime Hills	Unconsol	100	Qs
Qr	Rock glaciers?	Quaternary	Assigned to Quat, undivided by default			LH002	207	Lime Hills	Unconsol	100	Qs
QI	Lacustrine deposits?	Quaternary	Assigned to Quat, undivided by default			LH002	208	Lime Hills	Unconsol	100	Qs
Ttp	Tired Pup pluton	Farly Tertiary	Large granite pluton, part of McKinley sequence. Chiefly medium- to coarse-grained hypidiomorphic granular biotite- or biotte- bornblende granite.		K-Ar biotite ranging from 40.1 to 59.2 Ma, most credence given to 56.7 to 59.2 Ma ages	1 H002	901	Lime Hills	Ian	1320	Tpgr
									- 5.		
Tnep	Northeast Prong, Tired Pup pluton	middle Tertiary	Large fine- to coarse-grained seriate, biotite or biotite-amphibole granite pluton.		K-Ar biotite ranging from 25.4 to 26.7 Ma	LH002	902	Lime Hills	Ign	1270	Togr
Ttp1	Tired Pup leucogranite	Early Tertiary	granite. Gradational contact with main phase of Tired Pup pluton.			LH002	1012	Lime Hills	Ign	1320	Tpgr
ТКрд	Sled Pass Gabbro	Tertiary or Cretaceous	Small dark-colored , fine- to medium-grained, seriate, hypidiomorphic-granular gabbro intrusion. Uncertain relationship with Tired Pup pluton			LH002	1121	Lime Hills	Ign	1670	TKgb
Tiu	Unnamed granitic stocks	middle Tertiary?	Fine- to medium-grained, seriate biotite- hornblende granite intruding 61 Ma gabbro.			LH002	1193	Lime Hills	Ign	1300	Tegr
Tt	Tlikakila pluton	Tertiary	Small pluton having two phases, quartz diorite and granodiorite. Quartz diorite is fine- to medium-grained, seriate. Granodiorite is fine- to medium-grained, subequigranular.		K-Ar biotite 44.6 Ma	LH002	1195	Lime Hills	Ign	1292	Toem
	Unnamed McKinley		Leucocratic biotite granite stocks and dike								
Tms	sequence intrusions	Early Tertiary	swarms			LH002	1335	Lime Hills	Ign	1320	Tpgr
			Large multiphase pluton consisting of medium to coarse-grained, seriate, hypidiomorphic granular granite to granodiorite and lesser	-							
Tgd	Necons River pluton	middle Tertiary	gabbro.		40/39 biotite 35.6 Ma	LH002	1364	Lime Hills	Ign	1290	Toegr
Tgdn	Unnamed plutons	Tertiary or Cretaceous	Gabbro to granite multi-phase bodies		K-Ar biotite on granite 64.0 Ma	LH002	1366	Lime Hills	Ign	1650	ТКі
Tuc	Uppamod stack	Tortion	silicic(?), biotite and hornblende-bearing				1400	Limo Hillo	Ico	1200	Toogr
TUS	Uninaitieu SLOCK	reruary	porpriyry.	1	1	LHUUZ	11400		Indu	17230	ruegr

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Lahel
ROCK UTIL	onenane	Age	Description	10331	Radiometric age	coue		Quadrangie	INDER CIU33	NOA Clubb	Laber
			Sedimentary rocks Undifferentiated shale					1	1		
			ciltatono argillito and limostono. Eossila					'	1		
			shiefly grapetlites, collected from these rocks					1	1		
			are Late Combridge (2) Ordevision Silurian					1	1		
	Calling and any started		are Late Camprian(?), Oruovician, Silunan,					1	1		
-	Sedimentary rocks		and Devonian in age. Tentatively correlated				1.00			534.0	201
Pzu	(limey)	Paleozoic	with Dilinger sequence of sedimentary rocks.			LH003	190	Lime Hills	Sed	5310	DCa
								Mount	1		
bu	Bedrock, unknown		Unknown bedrock units			MM002	99	McKinley		99	bu
	Recent flood-plain							Mount	1		
Qrf	deposits	Quaternary	Recent flood-plain deposits			MM002	105	McKinley	Unconsol	100	Qs
	Colluvium and older							Mount			
Qca	alluvium	Quaternary	Colluvium and other alluvium			MM002	107	McKinley	Unconsol	100	Qs
								Mount			-
Osm	Superglacial moraine	Quaternary	Superglacial moraine			MM002	126	McKinley	1	100	Os
· · ·								Mount			<u> </u>
Orm	Recent moraine	Quaternary	Recent moraine			MM002	130	McKinley	1	100	05
Qiini		Quaternary				1111002	150	Mount		100	45
Oom	Oldor moraina	Quaterpark	Older merzine			ммоор	125	McKiplov	1	100	00
QUIII		Quaternary				14114002	135	Mount	<u> </u>	100	QS
<u> </u>		<b>a</b> .						Mount	1	100	
Qw	Glacial outwash deposits	Quaternary	Glacial outwash deposits			MM002	140	McKinley	L	100	Qs
_								Mount	1		
Tn	Nenana Gravel	Tertiary				MM002	570	McKinley	Sed	570	Tn
								Mount	1		
Tn?	Nenana Gravel	Tertiary				MM002	571	McKinley	Sed	571	Tn?
	Cantwell Formation,							[]			
	sedimentary rocks							Mount	1		
Tcs	subunit	Tertiary				MM002	920	McKinley	1	1920	Kcs
	Felsic subvolcanic	,						Mount			
Tvif	intrusive rocks	Tertiary				MM002	1011	McKinley	Ian	1011	Thf
	Mafic subvolcanic	,						Mount	- 5		
Tvim	intrusive rocks	Tertiary				MM002	1012	McKinley	Ian	1012	Thm
		Tertion y	See Gilbert W.G. 1979 A geologic guide to			1111002	1012	Tiercinicy	Ign	1012	
			Mount McKinlov National Park: Alacka Natural		Ago of 38 Ma			Mount	1		
Tura	Mount Colon Volconico	Tortion	History Accesiation		Age of 50 Ma	ммоор	1000	McKiplov	Ian	1001	Tub
ivy	Mount Galen voicanics	Tertiary			reported	14114002	1000	Mount	Ign	1001	IVD
-	<u>.</u>						1005	Mount	-	1000	-
Igr	Tertiary granitic rocks	Tertiary	McGonagali pluton			MM002	1305	McKinley	Ign	1292	Toem
_								Mount	Í		_
Igr	Tertiary granitic rocks	Tertiary	McGonagall pluton			MM002	1307	McKinley	Ign	1292	Toem
								Mount	1		
Tgr	Tertiary granitic rocks	Tertiary	Eielson pluton			MM002	1308	McKinley	Ign	1292	Toem
								Mount			
Tgr	Tertiary granitic rocks	Tertiary	Wyoming Hills pluton			MM002	1309	McKinley	Ign	1292	Toem
		•	Biotite and hornblende granodiorite, Foraker					Mount			
Tar	Tertiary granitic rocks	Tertiary	pluton			MM002	1306	McKinley	Ian	1292	Toem
. 5.	· · · · · · · / 5· · · · · · · · · · · ·	,	Biotite and biotite-muscovite granite. McKinley					Mount	- 5.1		
Tar	Tertiary granitic rocks	Tertiary	sequence McKinley pluton			ммооз	1335	McKinley	Ian	1320	Tnar
rgi	Tertiary granitic rocks	Tertiary	Biotite and biotite-muscovite granite. McKinlov			1111002	1555	Mount	Ign	1520	ipgi
Tar	Tortiony grapitic rocks	Tortion	converse. Buth pluter			MMOOD	1226	McKiplov	Tan	1220	Thar
igi	Tertiary granitic TOCKS	Tertiary	sequence, Ruth pluton			1111002	1550	Mount	ign	1520	ipgi
T1/		Tautiana and Casta as an					1 6 0 7	Mount		1 6 0 2	T1/
IKV	VOICATIIC FOCKS	Tertiary and Cretaceous	reisic to intermediate voicanic rocks			MMUUZ	1607	McKinley	ign	1603	TKVF
								l '	1		
	Granitic rocks of Tertiary	Tertiary and (or)						Mount	l_		
TKgr	and (or) Cretaceous age	Cretaceous	Granitic rocks			MM002	1655	McKinley	Ign	1655	IKg
	Granitic rocks of							l '	1		
1	uncertain composition	Unknown, probable	Granitic rocks of uncertian composition and					Mount	1-		I
gr	and age	Tertiary or Cretaceous	age			MM002	1599	McKinley	Ign	1650	1 Ki
								Mount	1		
KJf	Flyschlike rocks	Jurassic or Cretaceous	Flyschlike rocks			MM002	2850	McKinley	Sed	2850	KJf
	Calcareous sedimentary							Mount	[		
Trcs	rocks	Triassic	Calcareous rocks			MM002	4033	McKinley	Sed	4033	Trcs
	Basalt, diabase, and	-			1			-,	-		
	subordinate sedimentary		Basalt, diabase, and subordinate sedimentary					Mount	1		
Trbd	rocks	Triassic	rocks			MM002	4025	McKinley	Ian	4423	Trn?
			I S S S						<u> </u>		

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
	Flyschlike sedimentary							Mount			
Trps	rocks	Triassic and Paleozoic	Flyschlike sedimentary rocks			MM002	5040	McKinley	Sed	5040	TrPas
	Red and brown		i i i i i i i i i i i i i i i i i i i								
	sedimentary rocks and							Mount			
JTrrs	basalt	Jurassic and Triassic	Red and brown sedimentary rocks and basalt			MM002	4060	McKinley	Sed	4060	Trr
	Limestone and basalt							Mount			
Trlb	sequence	Triassic	Limestone and basalt sequence			MM002	4021	McKinley	Sed	4021	Trlb
	Reefy limestone and							Mount			
DSI	dolomite	Devonian and Silurian	Reefy limestone and dolomite			MM002	6960	McKinley	Sed	6960	DSwc
D0-	Chart and slats		Chart and slate			1414000	7550	Mount	Carl	7710	O - h
DUC	Chert and slate	Devonian and Ordovician				MM002	7550	Mount	Sea	//10	Ucn
Dire	Chart and phyllita	Palaazaic	Chart and phyllita			ммоор	EEEO	McKiplov	Ead	E210	DCd
FZC		Mississippian and				1414002	5050	Mount	Jeu	5510	DCu
MDt	Totatlanika Schist	Devonian	Totatlanika Schist			ммооз	6510	McKinley	Mota	6510	MDt
MDC		Devolian				1111002	0310	Mount	neta	0510	ind.
Pzk	Keevy Peak Formation	Paleozoic	Keevy Peak Formation			MM002	5660	McKinley	Sed	5660	Pzk
. 20			Spruce Creek sequence of Kantishna Hills				5000	Mount	000	5000	
Pzsc	Spruce Creek sequence	Paleozoic	from Bundtzen thesis			MM002	5666	McKinley	Sed	5666	Pzsc
								Mount			
Pzc?	Chert and phyllite	Paleozoic	Chert and phyllite			MM002	5651	McKinley	Sed	5370	JCmd
			Undifferentiated sedimentary rocks, same as								
	Sedimentary rocks,		unit Dmf, Dmb, Dms of Csejtey (1992,					Mount			
DSu	undifferentiated	Devonian	HE002)			MM002	7290	McKinley	Meta	7290	Pzsc
			Undifferentiated sedimentary rocks, same as								
	Sedimentary rocks,		unit Dmf, Dmb, Dms of Csejtey (1992,					Mount		7004	
DSu?	undifferentiated	Devonian	HE002)			MM002	7291	McKinley	Meta	7291	Pzsc?
D.0-	C dimension					1414000	6070	Mount	Carl	5270	10
DOS	Sedimentary sequence	Devoniari and Ordoviciari				MM002	6970	Mount	Seu	5370	JCITIQ
DOc2	Sodimontany soquence	Dovonian and Ordovician	Sodimontany socuence			ммоор	6072	McKiplov	Sod	5370	1Cmd
DOS:	Sedimentary sequence		Sedimentary sequence			1111002	0972	MCKINEy	Jeu	5570	Jenna
	Sedimentary sequence.		Sedimentary sequence, massive limestone					Mount			
DOIs	limestone interbeds	Devonian and Ordovician	interbeds			MM002	6971	McKinley	Sed	6615	DSmdI
	Serpentinite, basalt,							Mount			
DSb	chert, and gabbro	Devonian	Serpentinite, basalt, chert, and gabbro			MM002	7325	McKinley	Meta	7325	Dmgs
	Pelitic and guartzose	Paleozoic and						Mount			
PzpCp	schist sequence	preCambrian?	Pelitic and quartzose schist sequence			MM002	8630	McKinley	Meta	9322	PzZaqs
	Pelitic and quartzose	Paleozoic and						Mount			
PzpCp?	schist sequence	preCambrian?	Pelitic and quartzose schist sequence			MM002	8633	McKinley	Meta	8633	PzZaqs
	Sheared grit, quartzite,	Paleozoic and						Mount			
PzpCs	and quartz-mica schist	preCambrian?	Sheared grit, quartzite, and quartz-mica schis			MM002	8641	McKinley	Meta	8300	CZw
DanCa	Quartzite, grit, and	Paleozoic and	Quarterite and annillite			MMOOD	9640	Mount	Mata	0200	67
PZPCq	arginite	precambrian?	Quartzite, grit, and arginite			141141002	8640	McKinley	Meta	8300	CZW
			and mafic (southern area) or felsic (porthorn								
тка	Dike swarm	Tertiary or Cretaceous	area) dikes			1 H002	219	Lime Hills	Ian	1602	TKan
Titta	Dire Swarm					LITOOL	215	Linie milo	ign	1002	ingp
Os	Surficial deposits	Holocene and Pleistocene	Surficial deposits			TY002	100	Tvonek	Unconsol	100	Os
40			Includes alluvium, talus, rock glaciers, and				100	. yonen		100	20
			various morainal deposits. Bedrock outcrops								
			are present in ravines and along cut banks of								
Qs	Surficial deposits	Quaternary	rivers			TY003	100	Tyonek	Unconsol	100	Qs
1		Quaternary (with mixed	Lava, breccia, and associated pyroclastics.								
Qv	Volcanic rocks	Tertiary?)	May include Tertiary volcanic rocks			TY002	103	Tyonek	Ign	300	Qv
		Tertiary (with mixed	Basaltic lava, tuff, and breccia. May include								
Tv	Volcanic rocks	Quaternary?)	Quaternary volcanic rocks			TY002	105	Tyonek	Ign	450	QTv
Tkb	Beluga Formation	Miocene	Sandstone, siltstone, and coal			TY002	108	Tyonek	Sed	545	Tkb
Tk	Kenai Group	Tertiary	Sandstone, conglomerate, clay, and coal			TY004	163	Tyonek	Sed	560	Tk
						-	1.00			600	
TKt	I yonek Formation	Miocene and Oligocene	Sanstone, siltstone, coal, and conglomerate			11002	106	Tyonek	Sed	600	Ity
T6	West Faultand Fault	E	Congiomerate, sandstone, and siltstone;			TV002	107	Transla	Carl	055	T6
TWT	west Foreland Formation	Eocene and Paleocene	Imostly turraceous			111002	110/	туопек	Sed	855	IWf

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Τv	Volcanic rocks	Tertiary	Undifferentiated volcanic mafic and felsic flows, tuff flow breccias			TY003	144	Tyonek	Ign	1000	Tvu
Tsxr	Styx River Batholith	Tertiary	Biotite granite and quartz monzonite. Weathers light brown to dark yellowish orange. Intrudes the Mount Estelle intrusive and granodiorite of the Nagshlamina River			ТҮ003	142	Tyonek	Ign	1270	Togr
Τα	Granite and granodiorite	Late Paleocene to Early Eocene	Granite, granodiorite, diorite, and minor guartz monzonite		55 and 61 Ma	TY004	160	Tvonek	Ian	1300	Tear
Tg	Granitic rocks	Tertiary	Granite, quartz monzonite, and syenite		K-Ar data: Five dates from Biotite: 59.0+2.4 m.y.; 58.3+1.7 m.y.; 56.5+1.6 m.y.; 57.0+1.7 m.y.; and 58.2 m.y. One date from Hornblende: 58.7+1.8 m.y.	TY002	110	Tyonek	Ign	1320	Tpgr
			Medium-grained porphyritic biotite-hornblende								1
Тс	Chilligan River Pluton	Tertiary	Phenocrysts of K-feldspar		K An datas. One data	TY003	145	Tyonek	Ign	1320	Tpgr
					from Biotite: 60.8+1.8 m.y. One date from Hornblende:						
Tgd	Granodioritic rocks	Tertiary	Granodiorite and quartz diorite		61.9+1.8 m.y.	TY002	109	Tyonek	Ign	1350	Thgd
Tme	Mount Estelle Pluton	Tertiary	granodiorite and quartz monzonite			TY003	140	Tyonek	Ign	1350	Thgd
Tn	Nagishlamina River	Tertiary	granodiorite			TY003	143	Tyonek	Ign	1350	Thad
TKft	Felsic Tuff	Early Tertiary or Cretaceous	Crystaline tuff and lapilli tuff			TY004	164	Tyonek	Ign	1615	TKv
<b>T</b> 1/:	Unassigned intrusive	Cratagoous on Tortion.	Undifferentiated felsic and mafic intrusive			TV002	120	Tuesel	Tan	1650	TV:
TKi1	Unassigned intrusive rocks	Cretaceous or Tertiary Cretaceous or Tertiary	Chiefly granite and quartz monzonite. Rocks east of Skwenta River and south of Merrill Pass may be equivalent to Styx River batholith			TY003	141	Tyonek	Ign	1655	TKg
TKad	Granodioritic rocks	Tertiary and Cretaceous	Granodiorite quartz digrite and digrite		K-Ar data: Three dates from Biotite: 62.9+1.8 m.y.; 70.9 m.y.; 62.6+1.8 m.y. Four dates from Hornblende: 72.0 m.y.; 68.6+2.1 m.y.; 72.1 m.y.; 64.8+1.9 m y	TY002	113	Tyonek	Ian	1660	TKm
Ingu			Sandstone, siltstone, conglomerate, cherty			11002	115	Tyonek	ign	1000	
Ks		Early and Late Cretaceous	argillite, and limestone Dark green and gray aphanitic basalt with			TY004	161	Tyonek	Sed	1800	Ksu
Kb	Cretaceous basalt	Cretaceous	local pillow forms			TY004	162	Tyonek	Ign	2230	Kve
Kg	Granitic rocks	Cretaceous	Quartz monzonite and syenite		K-Ar data: One date from Hornblende: 107+3.2 m.y.	TY002	116	Tyonek	Ign	2530	Kg
Kw	Metasedimentary rocks	Cretaceous (?)	Feldspathic wacke with interbeds of siltstone. Locally calcareous. Weathers reddish brown			TY003	135	Tyonek	Meta	2825	KJfm
KJu	Metasedimentary rocks (undivided)	Cretaceous and (or) Jurassic	Weakly metamorphosed slate and graywacke; locally includes volcanic and intrusive rocks, undivided			TY002	115	Tyonek	Sed	2850	KJf

						Source			1		
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
			Undifferentiated metasedimentary rocks.					<b>Q</b> j			
			Slate, graywacke, siltstone, argillite and								
			phyllite, and alusite schist near contact with								
			Hartman River intrusives. Medium to dark								
			gray. Locally red weathering feldspathic								
Km	Metasedimentary rocks	Cretaceous (?)	wacke (Kw)			TY003	136	Tyonek	Meta	2850	KJf
			Volcanic breccia, tuff, agglomerate, and								
			aphanitic lava flows; as mapped, locally								
Jtk	Talkeetna Formation	Early Jurassic	includes Kamishak Formation in Ilianna Quad			TY002	151	Tyonek	Ign	3250	JTrtk
			Predominantly metavolcanic rocks of pre-								
			Cretaceous age. Chiefly metabasaits and								
	Motavolcanic and		Talkootaa Formation Locally includes								
Max	Metacodimontany rocks	Macazaia	cuberdinate metacodimentary rocks			TV002	1 5 1	Tyonok	Moto	2250	1Tetle
1*12.V	Metaseuimentary Tocks	Mesozoic	Limostopo, grov to black chart, and			11005	151	Туопек	Intera	3230	JIILK
Trk	Kamishak Formation	Late Triassic	porcellanite			TV002	4020	Tyonek	Sod	4020	Trk
	Limostopo and fino-		porcenance			11002	4020	TYONER	Jeu	4020	
Tel	arained tuff	Late Triassic	l imestone and fine-grained tuff			TV002	4025	Tyonek	Sed	4025	Trict
	Chert and some					11002	1025	Tyonek		1025	11150
Trc	greenstone	Late Triassic	Chert and some greenstone			TY002	4035	Tyonek	Sed	4035	Trca
	Unassigned intrusive		Chiefly sphene-bearing guartz diorite and			1.002	1.000				
Mzi	rocks	Mesozoic	diorite			TY003	154	Tvonek	Ian	4800	Mzi
			Chiefly diorite and olivine and/or hornblende					.,	- 5		
			gabbro. Occurs as inclusions in Tertiary								
			intrusive rocks. Locally may be								
Mzm	Unassigned mafic rocks	Mesozoic	metamorphosed equivalent of unit Mzi			TY003	153	Tyonek	Ign	4880	Mzm
	-		Predominently metasedimentary rocks of pre-								
			Cretaceous age. Locally includes subordinate								
			metavolcanic rocks. Locally includes								
	Metavolcanic and		metasedimentary rocks (Km) of Cretaceous								
Mzs	Metasedimentary rocks	Mesozoic	age			TY003	152	Tyonek	Meta	4905	JPzk
			Undifferentiated metavolcanic and								
	Material and a second		metasedimentary rocks of pre-Cretaceous								
Maria	Metavolcanic and	Magazaia	age. Locally may include metasedimentary			TVOOR	150	Tuenel	Mata	4020	10-1
I™IZU	Metaseumentary rocks	Mesozoic	Tocks (KIII) of Cretaceous age			11005	150	Туопек	Meta	4920	JPZK
	Surficial matorials		torrace gravel colian deposite and glacial								
0	undivided	Quatornary	deposits			TNOO3	100	Tanana	Unconcol	100	06
Q	ununueu	Quaternary	deposits			1110005	100	Tanana		100	Q3
			Interbedded polymictic pebble-cobble-boulder								
	Sedimentary rocks		conglomerate, grit, and sandstone, with								
Ts	undivided	Tertiary, Eocene	siltstone, shale, and lignite.			TN003	640	Tanana	Sed	640	Tcb
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Bimodal assemblage of rhyolite and banded								
			rhyolite flow rocks, rhyolitic breccia,								
1			tuffaceous sedimentary rocks, and								
Τv	Volcanic rocks, undivided	Paleocene to Eocene	amygdaloidal basalt flow rocks.			TN003	1001	Tanana	Ign	1001	Trs
		Late Cretaceous to Early									
TKv	Volcanic rocks	Tertiary	See unit TKV, TN002			TN003	1604	Tanana	Ign	1604	TKvd
		Late Cretaceous to Early	Light- to vey light-gray quartz monzonite,								
TKg	Granitic rocks, undivided	Tertiary	may range to granite.		K-Ar(?) 61.8 Ma	TN003	1655	Tanana	Ign	1655	TKg
			Interlayered siltstone, shale, snadstone, and								
1			congiomerate. Impure graywacke rich in								
	Willhow Creak whith of		volcanic detritus is locally characteristic and								
Kwc	Woher and others (1002)	Farly Crotacoous	of the Charley Piver quadrangle	-		TNOO3	2115	Tanana	Sod	2115	Kwcf
KWC	Weber and others (1992)		Bay Mountains pluton and part of another			111003	2115	Tanana	Seu	2115	KWCI
1			large pluton at north central edge of								
			quadrangle. Quartz monzonite, granite								
Κα	Granitic rocks, undivided	Cretaceous?	monzonite, and possibly granodiorite.			TN003	2470	Tanana	Ian	2410	Ка
			grander and a second se	1	1		1		- <u></u>		
			Part of Melozitna pluton. Ouartz monzonite.								
Kg	Granitic rocks, undivided	Cretaceous?	granite, monzonite, and possibly granodiorite.			TN003	2471	Tanana	Ign	2530	Kg

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			Granitic rocks of uncertain composition,								
TVa	Cuppitio voeko	Crotosocia en Tertieni	texture, and age; may be equivalent to KG			TNOOR	2490	Tanana	Tan	2460	Ka
тку	Granitic rocks					11003	2480	Tanana	Ign	2460	ĸġ
	Wolverine quartzite unit		Light-gray guartzite and dark-gray, cleaved,								
	of Weber and others	Early Cretaceous and or	subphyllitic argillite and shale, part of unit								
KJw	(1992), undivided	Jurassic	KJcs of Chapman and others.			TN003	2815	Tanana	Sed	2815	KJw
			Light grow to top, white weathering, massive								
			bedded, moderately well-sorted, subrounded								
			fine- to medium-grained guartzarenite.								
			Correlative with Keenan Quartzite of Charley								
			River quadrangle according to Dover but I								
	Wolverine quartzite unit	Fault Casta and an	wonder if this is the wrong unit and it should								
Klwa	(1992) quartzito	Larly Cretaceous and or	De the Wilder Creek quartzite correlated. (Not			TNOO3	2816	Tanana	Sod	2816	1111
KJWY	Wolverine guartzite unit	Julassic				110005	2010	Tanana	Jeu	2010	NOW I
	of Weber and others		Dominantly gray o black argillaceous rocks								
	(1992), sandstone and	Early Cretaceous and or	containing interbeds of Wolverine-type								
KJwa	shale	Jurassic	quartzarenite.			TN003	2817	Tanana	Sed	2817	KJw
100	Serpentinite and or	lumoniel	Serpentinite, diabase-gabbro and some			TNOOR	2405	Tanana	Tan	E100	Mazzuma
JSC	Rampart Group and	Jurassic	metadionte and magnetite-rich			11003	3495	Tanana	Ign	2190	MZZUM
	associated mafic										
	intrusive rocks,		Rampart Group volcanic and sedimentary rock								
JMr	undivided	Mississippian to Jurassic	sequence			TN003	5020	Tanana	Ign	5020	TrMts
			Dominantly basalt, altered basalt, and								
			cataclastic assemblage of generally dark gray								
			chert and silicieous argillite. Also subordinate								
			volcaniclastic rocks and minor Mississippian								
JMbc	Basalt and chert	Mississippian to Jurassic?	limestone			TN003	5140	Tanana	Ign	5140	JMab
			Metamorphosed matic igneous rocks, ranging								
			areenstone amphibolite and garnet								
			amphibolite. (Shown on source map								
Pzm	Mafic rocks	Paleozoic?	compilation as unit Pzg)			TN003	5141	Tanana	Meta	5285	Pzrmi
	M-Go and other second		Massive and layered gabbro, leucogabbro,								
1Mu		Jurassic?	peridotite and dunite			TNOO3	5150	Tanana	Ian	5150	laum
Jinu			Polymetamorphic staurolite-garnet-schist			11005	5150	ranana	ign	5150	Jaam
	Schist of Ruby and		containing subordinate quartzite, and								
Pzsr	Garnet Creeks area	Paleozoic?	hornblede amphibolite			TN003	5208	Tanana	Meta	5208	TPza
D_1	Metalimestone and	De la cencia 2	Matelline actions and marship			TNOOD	FFAF	<b>T</b>		5525	Dur
P21	marbie	Paleozoic?				11003	5525	Tanana	Meta	5525	Dm
			Dominantly dark-gray, typically phyllitic,								
			silicieous to carbonaceous argillite and shale,								
			having subordinate but characteristic clast-								
			supported chert-rich conglomerate, greenish-								
			vellowish- to reddish-brown highly calcareous								
1			argillite or limestone, and minor mafic								
1			intrusive rocks. May include older (Devonian?								
	Sedimentary rocks,		or Mississippian?) or younger (Cretaceous)			-		-		5015	-
TrPs	undivided	Permian to Triassic	rocks locally.			1N003	5/40	Tanana	Sed	5012	IrPs
1			structurally isolated thrust slice. Not on OFR98								
мі	Limestone	Mississippian	133			TN003	6330	Tanana	Sed	6944	DSI

						Source					
Rock unit	Linit hame	A.0.9	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ROCK unit	onenane	Age	Description	103311	Radiometric age	coue	Class coue	Quadrangie		INDA Clubb	Label
			Augen most commonly of white potassium								
			foldenar, range in size from 1 to 10 cm long								
			most about 4 cm long Biotito is scarco to								
			abundant Foliation lawors containing biotite								
Dee	Augon orthognoise	Devenian	abundant. Foliation layers containing biotite			TNOOR	6520	Tanana	Mata	6522	MD
Dau	Augen orthogneiss	Devolian				11003	0320	Tallalla	Meta	0322	MDIau
			Vitropus quartzite accessiated with gabbre sills								
			Vitieous qualizite associated with gabbio sins								
			and dikes. Light-gray quartzite. Massive or								
			thinly interbedded quartzite and medium- to								
			dark-gray slate, phyllite, and minor laminated								
			claystone. Age from date of 1rm intrusive and								
			lithologic and stratigraphic similarities to Keno					_			
Mq	Globe quartzite	Mississippian	Hill Quartzite in Yukon.			1N003	6530	Tanana	Meta	6530	Mgq
			White, massive, locally laminated,								
			unfossiliferous cherty dolostone characterized								
			by replacement silica boxwork locally and gray	*							
			limestone at top and bottom of section.								
			Possible other correlations suggest this unit is								
			equivalent to unit Dld of this quadrangle and								
	Amy Creek unit of Weber	Late Proterozoic? to early	age of Devonian, which would simply some								
pCa	and others (1992)	Cambrian?, Devonian?	regional stratigraphic and structural issues.			TN003	6680	Tanana	Sed	6680	SZa
P			·								
				Platy limestone and a							
			Light- to medium-gray or tan marker units of	limestone bed thought							
			sandy, platy limestone and massive-bedded	to be part of the							
			silicified limestone and dolostone baying	section contains							
		Latest Devenian	extensive locally developed betwerk silica	sparso considents of							
DIA	Limestone and delemite	(Esmonnian)	Not on OED09 122	Engennian ago		TNOO2	CODE	Tanana	Ead	6044	DCI
Diu	Limestone and dolonnite	(Faillelilliall)	Not on OFR96-155	Failleilliall aye.		11003	0905	Tallalla	Seu	0944	031
DI.	Didas	Lata Davanian 2	Gray micruic imesione and precciated	Undescribed		TNOOD	6021	<b>T</b>	C - 1	60.1.1	DCI
Dir	Ridge	Late Devonian?	limestone.	megarossiis		11003	6931	Tanana	Sea	6944	DSI
_			Distinctive marker bed of coarsely					_			
Pzmr	Marble	Paleozoic?	recrystallized marble within Pzsr unit			TN003	6955	Tanana	Meta	6955	DIC
	Fossil Creek Volcanic unit		Agglomeratic matic volcanic rocks,								
	of Weber and others		volcaniclastic rocks, and assoiciated					_	_		
Ofc	(1992)	Ordovician	argillaceous sedimentary rocks			TN003	7610	Tanana	Ign	7610	Ofc
			Heterogeneous, low-grade, blastomylonitic								
			assemblage of silicieous to cherty argillite,								
			recrystallized chert, intermediate to mafic								
			volcaniclastic rocks and greenstone,								
			graywacke, grit, and oolitic limestone.								
			Resembles lower grade parts of unit Pzs in								
Pzlc	Livengood Dome Chert?	Ordovician	this quadrangle.			TN003	7712	Tanana	Meta	7710	Och
			Distinctive marker bed of lime mudstone,								
1			locally characterized by coated ooids; is part								
Pzll	Limestone	Paleozoic?	of Livengood Dome Chert			TN003	7711	Tanana	Sed	7711	Oldl
	Wickersham unit of		Poorly sorted guartzite and grit, having		1		1	1	1	1	
	Weberr and others	Cambrian and or Late	abundant quartz and plagioclase clasts in a								
pCw	(1992), undivided	Proterozoic	quartzofeldspathic-wacke matrix.			TN003	8410	Tanana	Meta	8300	CZw
			Low to moderately high-grade.								
			blastomylonitic, polymetamorphic assemblage								
			of pelitic to quartzitic schist containing								
1			subordinate layers of quartzo-feldspathic								
			schist calc-schist calc-sliciate gnoise								
1			amphibolitic schist quartzite marble and								
			metaconglomerate (Shown on source man								
DTC	Schiet	Palaazaia?	compilation as Prac)			TNOOR	0620	Tanana	Moto	0225	Dazrea
P25	SUIISL	raie0201C?	compliation as P2qs)			111003	0200	rdiidiid	meta	3325	rzzrys
1			Relatively pure quartrite units lessly								
			menable and turically								
1			inappable and typically associated with mafic								
			rocks (unit Pzm) and metalimestone and								
L			marble (unit PzI). (Shown on source map			-	0.00	-		0005	
Pzq	Quartzite	Paleozoic?	compliation as uncolored Pzqs)			I N003	8640	Tanana	Meta	9325	Pz∠rqs

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
			· ·								
	Quartzofeldspathic	Late Proterozoic? and or	Quartzofeldspathic orthogneiss, located only								
PzpCqg?	orthogneiss	Paleozoic?	on west side of Ray Mountains pluton.			1N003	8800	Tanana	Meta	8801	Pz∠rpg
			Separate from Pzlc which was described as:								
			Heterogeneous, low-grade, blastomylonitic								
			assemblage of silicieous to cherty argillite,								
			recrystallized chert, intermediate to mafic								
			volcaniclastic rocks and greenstone,								
			graywacke, grit, and oolitic limestone.								
			Resembles lower grade parts of unit PZS In								
OIC	Livengood Dome Chert	Ordovician	for this see Livengood unit Old)			TNOO3	7710	Tanana	Meta	7710	Och
						111005	//10	Tununu	lictu	//10	
			Brown to gray, massive to locally								
			porphyroblastic, garnet-chlorite-biotite								
			hornfels derived from carbonate and clastic								
TKhf	Hornfels and skarn	Cretaceous and Paleocene	rocks. Assigned to unit of provenence			MG002	none	McGrath	Meta		
00	Activo Glaciors	Plaistocope and Holocope	Occupy circues with base level above 4,800 to			MG002	101	McGrath	Unconsol	101	
Qg	Active Glaciers					110002	101	MCGratin	Officilisor	101	y .
			Fluvial silt, sand, and gravel deposited by								
	Stream Alluvium,		streams in floodplains, fans, and meandering								
Qa	undifferentiated	Holocene	to distributary stream channel deposits			MG002	100	McGrath	Unconsol	100	Qs
			Moderately to well sorted, well stratified, gray								
			to tan (oxidized), fluvial silt, sand, and gravel								
			floodplains that now lie above or boyond the								
		Wisconsin to early	normal depositional regime of Holocene								
Oat	Terrace Alluvium	Holocene	streams.			MG002	110	McGrath	Unconsol	100	Os
			Poorly to moderately well sorted, gray to tan				-				
			(oxidized), fluvial silt, sand, and gravel								
			deposited where first- and second-order								
Opf	Alluvial fan denesite	Late Wisconsin to	tributaries join third- and fourth-order			MC002	105	McCrath	Unconcol	100	00
Qai	Alluvial-fall deposits	Holocelle	Mixed or alternating poorly to moderately			MG002	105	MCGIatii	UNCONSOL	100	QS
			sorted, silt, sand, gravel, and diamicton of								
Qca	Colluvial-alluvial deposits	Holocene	colluvial and alluvial origins			MG002	115	McGrath	Unconsol	100	Qs
			Angular, unsorted debris derived from frost								
			riving of bedrock followed by rapid gravity								
Oct	Taluc	Holocene	steep gullies and avalanche chutes			MG002	120	McGrath	Unconsol	100	05
QU	10103	holocene				110002	120	ncoratii	onconsor	100	Q3
			Chaotically deformed colluvium derived from								
			relatively sudden mass movement of bedrock								
			or surficial deposits along a plane of failure.								
QCI	Landslide deposits	Holocene	Hummocky and usually frozen			MG002	125	McGrath	Unconsol	100	Qs
0.0	Folian deposits	Holocene	deposited by wind Usually frozen			MG002	135	McGrath	Unconsol	100	05
QC		holocene	deposited by wind. Osdany nozen			110002	155	heorath	onconsor	100	Q3
			Poorly stratified, black to brown, organic rich,								
		Late Wisconsin to	alluvial, eluvial, lacustrine, and bog silt and								
Qsp	Silt and Peat	Holocene	peat. Usually frozen, except near stream cuts			MG002	130	McGrath	Unconsol	100	Qs
			Church Grad annual and the still be still be								
1		Wissensin and early	Stratified gravel, sand, and flowtill deposited								
Odic	Ice-contact deposits	Holocene	dacial ice by meltwater streams			MG002	165	McGrath	Linconsol	100	05
Quic		Late Wisconsin and	Unsorted to poorly sorted clay, silt sand and			110002	105	ncorau		100	43
Qdt	Till, undifferentiated	Holocene	gravel deposited by glacial ice			MG002	170	McGrath	Unconsol	100	Qs
											-
1			Unsorted, angular, frost-shattered cobbles								
	Rock Glaciers and Rock-		and boulders, commonly containing							100	
Qrg	Giacier deposits	Holocene	considerable intersticial ice. Usually frozen.	1	1	MG002	145	IncGrath	Unconsol	1100	lQs

Reck und         Unit harres         Age         Description         Field         Rediometric age         Open         Lies code         Cales code							Source					
Control         One-of-of-open space         One-of-open space	Rock unit	Unit hame	Ane	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Lahel
Control         Notice	ROCK UNIC	onicitanie	Age	Unsorted to poorly sorted clay, silt, gravel,	103311	Radiometric age	coue	Class coue	Quadrangie	ROCK Class	NOA Clubb	Laber
Cell Control Constrained WisconsinWisconsinWisconsin Handback Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofie Microsofi				and boulders deposited by glacial ice as								
Qet         The of Parewell Guidation         Model we made of Parewell 1 and Parewell 1.         MODEQ         P         Model we made of Parewell 1.           Qet         On-workin         Waconsin         Statistics of cases sub-worked of cases sub-worked of parewell 1.         MODEQ         1.55         Model 1.         None of the operation of the oper				around terminal and lateral moraines								
QeffTil of Fareweil GlassminWisnerinJostefferStrategiel of the controlMCG00175McGraftUneened100QQifeOutweihWisnerinStrategiel of the controlMcG00155McGraftUneened100QQifeOutweihWisnerinRestorementUsering of the controlMcG00155McGraftUneened100QQifeOutweihWisnerinRestorementUsering of the controlMcG00155McGraftUneened100QQifeOutweihRestorementUsering of the poorly sorted day, site, and gaved departed by poorly sorted day, site, and gaved day, site, and gaved day, site, and gaved day, site, and gaved				Mostly the result of Farewell I and Farewell II								
get         (b) a function         (b) a function <td>Odtf</td> <td>Till of Farewell Glaciation</td> <td>Wisconsin</td> <td>alaciations</td> <td></td> <td></td> <td>MG002</td> <td>175</td> <td>McGrath</td> <td>Unconsol</td> <td>100</td> <td>0.0</td>	Odtf	Till of Farewell Glaciation	Wisconsin	alaciations			MG002	175	McGrath	Unconsol	100	0.0
outwashNervoneStraturding dirt constant of constant of constant of propactionNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervoneNervon	Quu		Wisconsin	giaciations			110002	175	ncoratii	0110011301	100	Q3
OuthomNumberSubcristing intermed intermed opposite intermed expansionNumber intermed expansionNumber intermed expansionNumber intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed intermed interm				Stratified drift consisting of coarse								
Que Que Que Que Constrained Term ParticipationWeiconsinIntermediate and enclose properties intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediates intermediatesMedical intermediates intermediates intermediates intermediates intermediates intermediatesMedical intermediates intermediates intermediates intermediates intermediatesMedical intermediates intermediates intermediates intermediatesMedical intermediates intermediates intermediatesMedical intermediates intermediates intermediatesMedical intermediates intermediatesMedical intermediates intermediatesMedical intermediates intermediatesMedical intermediates intermediatesMedical intermediates intermediates intermediatesMedical intermediates intermediatesMedical intermediates intermediatesMedical intermediates intermediates intermediatesMedical intermediates intermediates intermediatesMedical intermediates intermediates intermedia				subrounded gravel that contains cand and silt								
Qode         Outwash         Wisconsin         restore and wisconsin         Wisconsin         Mode of the second of				lansos donositod by sidoglasial and proglasial								
Queue         Outwesh Terrace         Period Section         International of Period Section         Internation of Period Section         Int	Oda	Outwash	Wiegenein				MCOOD	1	MaCupth	Unconcol	100	0.0
Odot         Outwash Terrace         Painty of malanet at rame of using and any at rame of using any at rame of using and any at rame of using any at rame of usi	Quo	Outwasn		Demonstration of features and features and features			MGUUZ	155	McGrath	Unconsol	100	QS
Operation         Outborish         Designer	<b>.</b>		Early to middle	Remnant of former outwash fan or plain				1.00			100	
Quest         Till of Selaten Silacition         Personnel of poorly synched (arry syncho)))))	Qdot	Outwash Terrace	Pleistocene	deposit (Qof)			MG002	160	McGrath	Unconsol	100	Qs
Qets         Till of Selatha Glacitation         Hestocene         Unconsol         Use operating												
Odds         Till of Selatina Guadation         Pleastoneme         deposited by glacial ice in ground moralines         MG002         100         MG004         Uncome         100         Qs           Till of Land Murdia         Early or middle (Pleastocneme (Pleastocn				Unsorted to poorly sorted clay, silt, and gravel								
Till of Lone Mountain Bielder Bielder Bielder Bielder Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Gelten Ge	Qdts	Till of Selatna GLaciation	Pleistocene	deposited by glacial ice in ground moraines			MG002	180	McGrath	Unconsol	100	Qs
Quitter         Giane         Description         Best operating of the sectore in the sect				Isolated patches of unsorted to poorly sorted								
QettimGlacitationPilotecenedeposited by glacial iceMeGaMeGa185MeGrathUnconsol100QeQeftUutwash-fan depositsMidda Pilotecene to endGlacitation constrained glacialMeGa150MeGrathUnconsol100QeQeftUutwash-fan depositsMidda Pilotecene to endGlacitation consolidated to waskly considered to unconsolidated to waskly unconsolMiG002190McGrathUuconsol100QeQrigOrsolidated Till and portige to and enotic toblogiesMigoa vasite to consolidated to waskly portige toblogiesMigoa vasite migrated to unconsolidated to waskly migrated to unconsolidated to waskly unconsolMigoa vasite migrated to unconsolidated to waskly migrated to unconsolidated to waskly migrated to unconsolidated to waskly unconsolMigoa vasite migrated to unconsolidated to waskly migrated to unconsolidated to waskly migrated to unconsolidated to waskly migrated to unconsolidated to waskly migrated to unconsolidated to waskly <b< td=""><td></td><td>Till of Lone Mountain</td><td>Early or middle (?)</td><td>silt, gravel, and highly eroded erratics</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></b<>		Till of Lone Mountain	Early or middle (?)	silt, gravel, and highly eroded erratics								
Qef         Outwash-fan deposits         Middle Preistocene to estry dramage         Gilcio/Livial sand and silt derived from arraysis. Usually forcen         Middle Preistocene to estry dramage         Middle Preistocene to estry dramage         Middle Preistocene (marraysis. Usually forcen         Middle Preistocene         Middle Preistocene         Middle Preis	Qdtlm	Glaciation	Pleistocene	deposited by glacial ice			MG002	185	McGrath	Unconsol	100	Qs
Qr         Middle Pierstocene to early Wisconsin         instrumentering margination per ancestral glacial margination         Middle Pierstocene (cometode Querta)         Middle Pierstocene (compareta)         Middle Pierstocene (cometode Querta)         Middle Pierstocene (compareta) <td></td> <td></td> <td></td> <td>Glaciofluvial sand and silt derived from</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>				Glaciofluvial sand and silt derived from								
Qef       Uutwash-fan deposits       Wisconsin       margins.       Usually frozen       Med       Med       100       Qe         nili of Pre-Lone Mountain Qettpim       Till of Pre-Lone Mountain Glaciation       Pilocene and Pleistocene traine-forming biller.       Isolated damic.ton, interbedded with rougely stratified outwash, derommet bill and outwash (QTg) interbedded with rougely stratified outwash, derommet bill and outwash (QTg) the outwash       MeG02       190       MeGrath       Uncored       100       Qe         Qtg       Outwash       Pilocene and Pleistocene with loogles       Brown to gray, massive to locally prophytobatic, garret-chorte-biotite- hornfels derived from carbonate and clastic rocks.       MeG02       190       MeGrath       Meda       100       Qe         Tr       Homfels and skam       Paleocene to Oligocene conglomerate with classific derived from carbonate and clastic rocks.       Assigned to unit of provenence rocks.       MeG02       200       McGrath       Meda       100       Qe         Td       Felste Conglomerate       Oligocene and Mocene Tocks.       India-roc traited deriver for carbonaceus of felsic ipeneus rocks.       MeG02       200       McGrath       Meda       100       To         Tg       Sandstone and sham       pre-Middle dark gray rocks.       India-rocks.       Freiste Conglomerate       Middle dark gray rocks.       MeG02       205       McG			Middle Pleistocene to early	streams originating near ancestral glacial								
Construction         Display and provided         Display and provided <thdisplay and="" provided<="" th="">         Display and provid</thdisplay>	Oof	Outwash-fan deposits	Wisconsin	margins. Usually frozen			MG002	150	McGrath	Unconsol	100	Os
Instant QettpInstant Instant Calculated number Calculated number 												
Till of Pre-Lone Mountain       Piccene and Piestocene       Generated idamicton largely recenented by considered with models       MG002       190       McGrath       Unconsol       100       Qe         Qttpin       Consolidated Till and Quivesh (QT)       Pilocene and Piestocene       Winderschaft Gamicton, mitterbedded with coules is staffed outwesh, mitterbedded with coules and staffed outwesh, coules and field is geneus       MG002       none       McGrath       Meta       Meta         The       Hornfels and skarn       Paleocene to Oligocene and Miccene       Brown to gray, massive to locally propriet with coules and staffed outwesh, coules       MG002       none       McGrath       Meta       Meta <t< td=""><td></td><td></td><td></td><td>Isolated patches of unconsolidated to weakly</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>				Isolated patches of unconsolidated to weakly								
Qutput         Glaciton         Pilocene and Piestocene         Calcite-forming tillite. May correlate with ' Weakly to well cemented diamicton, Weakly to well cemented, molerately Weakly to well cemented, buff, moleuredy, diamited, Weakly to well cemented, buff, moleuredy, diamited, Weakly to well cemented, buff, molecular diamited, Weakly to well cemented diamited, Weakly to				cemented diamicton largely recemented by								
Optim         Glacitation         Plocene and Pleistocene         deformed till and outwash (CTG)         MCG         190         McGrath         Incread         100         Qs           Consolidated Till and QTg         Consolidated Till and Outwash         Plocene and Pleistocene         Brown to gray, massive to locally phormals derived from carbonate and desite on phore to gray, massive to locally phormals derived from carbonate and desite phormals derived from carbonate and desite congiomerate         McGrath         Sed         Sed <td< td=""><td></td><td>Till of Pre-Lone Mountain</td><td></td><td>calcite-forming tillite May correlate with</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>		Till of Pre-Lone Mountain		calcite-forming tillite May correlate with								
Construction       Product       Direction       Direction <thdirection< th=""> <thdirection< th=""></thdirection<></thdirection<>	Odtolm	Glaciation	Pliacana and Plaistacana	deformed till and outwash (OTa)			MG002	100	McGrath	Unconcol	100	06
Consolidated Till and QTg       Pliocene and Pleistocene       With local and exotic lithologies       MG002       195       McGrath       Sed       100       Qs         Cmoslidated Till and QTg       Outwash       Pliocene and Pleistocene       with local and exotic lithologies       MG002       195       McGrath       Sed       100       Qs         Th       Hornfels derived from carbonate and clastic rocks. Assigned to unit of provennene weathered, light brown granule, cobble conjonerate with locals of fleist lightocs       MG002       none       McGrath       Meda	Qutpini	Glaciation	Photene and Pleistocene	Weakly to well comented dismister			MGUUZ	190	MCGIatti	UTICOTISOI	100	QS
QTg         Dotwash         Placene and Pleistacene         Interbedge Min (Publey Min (Publey Min (Publey) Min		Canaalidated Till and		interbodded with endely stratified outwork								
Qrig         Outwash         Pricore and Prestocene         With local and exode intrologies         Medu2         Its         Medu3	07-	Consolidated Till and	Dia and Disistenses	interbedded with crudely stratified outwash,			140000	105	Machine	C	100	0-
ImplementationBrown to gray, massive to locally porphyrolastic, game -chortes biotite porphyrolastic, game -chortes biotite porphyrolastic -chortes biotite porphyrolastic -chortes biotite porphyr	Qīg	Outwash	Pliocene and Pleistocene	with local and exotic lithologies			MGUUZ	195	McGrath	Sea	100	Qs
Trif     Hormfels and skarn     Paleocene to Oligocene     Paleocene to Oligocene     Paleocene to Oligocene     MG02     none     McGrath     Meta       Trif     Hormfels and skarn     Paleocene to Oligocene     Thick-bedded, poorly indurated, orange- wordened, light brown granule, cobble content between the orange- wordened, light brown granule, cobble conglomerate, minor sandstone, and Interbedded dark gray coarbonaceous shale and coal. Correlated with Ts     MG002     205     McGrath     Sed     640     Tcb       Trig     shale, and conglomerate     Oligocene     Thin- to thick-bedded, moderately indurated, erab-brown weathered, built reduint-grained, lithoquartzose sandstone.     MG002     210     McGrath     Sed     500     Tsu       Tsi     Sandstone and shale     pre-Middle Eocene     Thick- to thin-bedded, moderately indurated, erab-brown weathered, built reg     MG002     210     McGrath     Sed     500     Tsu       Tcl     Limestone conglomerate     Oligocene     Thick- to thin-bedded, moderately indurated, erab-brown bearet exposed in freel-b												
Inf     Hormfels and skarn     Paleocene to Oligocene     porphyroblastic derived from carbonate and dastic hormfels derived from carbonate and dastic rocks. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. Assigned to unit of provenence. The hormfels derived from carbonate and dastic hormfels. The hormfels derived from carbonate and dastic hormfels derived from carbonate an				Brown to gray, massive to locally								
Th       Hornfels and skarn       Paleocene to Oligocene       Information derived form carbonate and loadic rocks. Assigned to unit of provenence       MG002       none       McGrath       Meta       Meta         Tef       Felsite Conglomerate       Oligocene and Miocene       Tick-bedded, poorly indurated, orange-weathered, gray-phrown, granule cobble conglomerate, with clasts of felsic ingreuss       MG002       200       McGrath       Sed       500       Tsu         Teg       Felsite Conglomerate       Oligocene and Miocene       Tocks. Assigned to unit of provenence, and interbedded dark gray carbonace usshale and coal. Correlated with Tg       MG002       205       McGrath       Sed       640       Tcb         Teg       shale, and conglomerate       Oligocene       Thin- to thick-bedded, moderately indurated, gray carbonaceous shale and coal. Correlated with Tg       MG002       205       McGrath       Sed       640       Tcb         Tsi       Sandstone and shale       pre-Middle Eccene       Thin- to thick-bedded, moderately indurated, fissile, carbonaceous shale and fine sandstone. Correlated with Tg       MG002       210       McGrath       Sed       500       Tsu         Td       Limestone conglomerate       pre-Middle Eccene       Thick- to thin-bedded, moderately indurated, grave phrase and fine sandstone. Correlated with Tg       MG002       210       McGrath       Sed       500 <td></td> <td></td> <td></td> <td>porphyroblastic, garnet-chlorite-biotite</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>				porphyroblastic, garnet-chlorite-biotite								
Thf     Hornfels and skarn     Paleocene to Oligocene     rocks: Assigned to unit of provenence     MG002     none     MCGrath     Meta       Tcf     Felsite Conglomerate     Oligocene and Miccene     Thick-bedded, poorly intrusted, oranginated, colbile conglomerate with class of felsic igneous     MG002     200     McGrath     Sed     500     Tsu       Tcf     Felsite Conglomerate     Oligocene and Miccene     Think-bedded, poorly intrusted, oranginated, colbile conglomerate, intrust wathered, gray-brown, granule to coble conglomerate, minor sandstone, and interbedded dark gray carbonacceus shale and coll. Correlated with Ts     MG002     205     McGrath     Sed     640     Tcb       Tcg     shale, and conglomerate     Oligocene     Think-bedded, moderately indurated, red-brown weathered, buff, medun-granad, rithouurtace, analytic, interbedded dark gray carbonacceus shale and conglomerate     MG002     205     McGrath     Sed     640     Tcb       Ts     Sandstone and shale     pre-Middle Eocene     Think-bedded, moderately indurated, green-gray granule conglomerate exposed in fault sliver near Khuchaynik Creek. Although it is compositionally distinct, it crops out near Ts and Tcg, and is correlated with them Soft thick-section of fine-grained volcaniclastic sandstone     MG002     215     McGrath     Sed     500     Tsu       Tcl     Limestone conglomerate     Oligocene     Tink- to thin-bedded, moderately indurated, green-gray, granule conglomerate exposed in fault sliver near				hornfels derived from carbonate and clastic								
TcfFelsite ConglomerateOligocene and MioceneThick-bedded, poorly indurated, cobble conglomerate with class of felsic igneous rocks.MG002200McGrathSed500TsuTcfFelsite ConglomerateOligocene and MioceneThin- to thick-bedded, poorly to moderately indurated, purf-wathered, gray-brown, granule to cobble conglomerate, minor sandstone, and Interbedded dark gray carbonaceous shale and coal. Correlated with TcsMG002205McGrathSed640TcbTcgshale, and conglomerateOligoceneThin- to thick-bedded, moderately indurated, rarbonaceous shale and coal. Correlated with TcsMG002205McGrathSed640TcbTcgshale, and conglomerateThin- to thick-bedded, moderately indurated, rarbonaceous shale and coal. Correlated with poorly indurated, laminated, fissile, carbonaceous shale and fine sandstone. Correlated with poorly indurated, laminated, fissile, carbonaceous shale and fine sandstone. Correlated with rarbon vestimered, buff, mediumared, green-ray granule conglomerate exposed in fault sliver near Khuchaynik Creek. Atthough ti ts compositionally distinct, it crops on the ras and Tcg, and is correlated with them Ts and Tcg, and is correlated with them Ts and Tcg, and is correlated with them To and Tcg, and is correlated with them to software ray mediuc conglomerate with sets of probable laustrine interpreted with them Ts and Tcg, and is correlated with them to software ray medium conglomerate reprosed in fault sliver near Khuchaynik C	Thf	Hornfels and skarn	Paleocene to Oligocene	rocks. Assigned to unit of provenence			MG002	none	McGrath	Meta		
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Tcl       Limestone conglomerate       Oligocene       Ts and Tcg, and is correlated with them       MG002       215       McGrath       Sed       500       Tsu         Tcl       Limestone conglomerate       Oligocene       Ts and Tcg, and is correlated with them       MG002       215       McGrath       Sed       500       Tsu         Volcaniclastic sandstone       Brown to gray, medium- to fine-grained volcaniclastic sandstone that has a distinctive lacustrine origin agsscoiated with the Ship lacustrine silt       Metasequoia cuneata and Glyptostrobus foresk, Windy Fork, and Terra Cotta Volcanic       Metasequoia cuneata and Glyptostrobus foresk)       MG002       220       McGrath       Sed       880       Tfv				mick- to thin-bedded, moderately mourated,								
Tcl       Late Paleocene (?) to       Taute Silver near Knuchaynik Creek. Although it is compositionally distinct, it crops out near       MG002       215       McGrath       Sed       500       Tsu         Tcl       Limestone conglomerate       Oligocene       Ts and Tcg, and is correlated with them       MG002       215       McGrath       Sed       500       Tsu         Tcl       Limestone conglomerate       Oligocene       Ts and Tcg, and is correlated with them       MG002       215       McGrath       Sed       500       Tsu         Volcaniclastic sandstone       Brown to gray, medium- to fine-grained volcaniclastic sandstone that has a distinctive 50 ft thick section of fiora-rich paleosols and finely laminated, varved shales of probable lacustrine origin agsscoiated with the Ship Creek, Windy Fork, and Terra Cotta Volcanic       Metasequoia cuneata and Glyptostrobus       MG002       220       McGrath       Sed       880       Tfv	1			green-gray granule conglomerate exposed in								
Tcl       Late Paleocene (*) to       It is compositionally distinct, it crops out near       MG002       215       McGrath       Sed       500       Tsu         Tcl       Limestone conglomerate       Oligocene       Ts and Tcg, and is correlated with them       MG002       215       McGrath       Sed       500       Tsu         Volcaniclastic sandstone       Soft thick section of fior-arich paleosols and finely laminated, varved shales of probable lacustrine origin agsscoiated with the Ship and Glyptostrobus       Medage       Limestone conservation       Medage       Limestone conservation       Sed       Sed       Soft       Tsu         Volcaniclastic sandstone       Creek, Windy Fork, and Terra Cotta Volcanic       Medage       Medoge       Medoge       Limestone conservation       Sed       Sed       Sed       Sed       Sed       Sed       True	1		Lata Balances (2) :	rauit silver near Khuchaynik Creek. Although							1	
ICI       Limestone congiomerate       Oligocene       Is and Icg, and is correlated with them       MG002       215       McGrath       Sed       500       Tsu         In the state       Brown to gray, medium- to fine-grained       Volcaniclastic sandstone that has a distinctive       Soft thick section of flora-rich paleosols and finely laminated, varved shales of probable       Metasequoia cuneata       Interview       Sed       To         Volcaniclastic sandstone       Creek, Windy Fork, and Terra Cotta Volcanic       europaeus (plant       MG002       220       McGrath       Sed       880       Tfv	I		Late Paleocene (?) to	It is compositionally distinct, it crops out near				245			500	-
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Volcaniclastic sandstone that has a distinctive 50 ft thick section of flora-rich paleosols and finely laminated, varved shales of probable lacustrine origin agsscoiated with the Ship and lacustrine silt       Metasequoia cuneata Bacustrine origin agsscoiated with the Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields       Metasequoia cuneata and Glyptostrobus europaeus (plant       Metasequoia cuneata and Glyptostrobus         Tvs       and lacustrine silt       Eocene       Fields       forsilis)       MG002       220       McGrath       Sed       880       Tfv	1			Brown to gray, medium- to fine-grained							1	
Volcaniclastic sandstone       50 ft thick section of flora-rich paleosols and finely laminated, varved shales of probable lacustrine origin agsscoiated with the Ship and Glyptostrobus       Metasequoia cuneata and Glyptostrobus         Volcaniclastic sandstone       Creek, Windy Fork, and Terra Cotta Volcanic       europaeus (plant fossils)       MG002       220       McGrath       Sed       880       Tfv	1			volcaniclastic sandstone that has a distinctive							1	
Volcaniclastic sandstone       Finely laminated, varved shales of probable lacustrine origin agscoiated with the Ship Creek, Windy Fork, and Terra Cotta Volcanic       Metasequoia cuneata and Glyptostrobus       Image: Comparison of Compa	1			50 ft thick section of flora-rich paleosols and							1	
Volcaniclastic sandstone       lacustrine origin aqsscoiated with the Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields       and Glyptostrobus europaeus (plant       and Glyptostrobus       and Glyptostrobus         Tvs       and lacustrine silt       Eocene       Fields       fossils)       MG002       220       McGrath       Sed       880       Tfv	1			finely laminated, varved shales of probable	Metasequoia cuneata						1	
Volcaniclastic sandstone     Creek, Windy Fork, and Terra Cotta Volcanic     europaeus (plant       Tvs     and lacustrine silt     Eocene     Fields     fossils)     MG002     220     McGrath     Sed     880     Tfv	1			lacustrine origin aqsscoiated with the Ship	and Glyptostrobus						1	
Tvs         and lacustrine silt         Eocene         Fields         fossils)         MG002         220         McGrath         Sed         880         Tfv	1	Volcaniclastic sandstone		Creek, Windy Fork, and Terra Cotta Volcanic	europaeus (plant							
	Tvs	and lacustrine silt	Eocene	Fields	fossils)		MG002	220	McGrath	Sed	880	Tfv

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Тvа	Andesite flows and lapilli tuff	Paleocene and Eocene	Dark-gray to green-gray andesite flows and locally banded (red, green, purple, bleached) lapilli tuff. Groundmass is aphanitic to fine- grained of Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields		Whole-rock K/Ar age of 37.1 Ma from Windy Fork volcanic field	MG002	230	McGrath	Ign	1081	Tvb
			Very distinctive, light gray, distinctively tan weathering, hornblende and potassium- feldspar-rich, propylitically altered dacite containing very abundant angular clasts of sedimentary rocks of Ship Creek, Windy Fork,						_		
Tvvd	Vent facies dacite	Eocene and Oligocene	and Terra Cotta Volcanic Fields;			MG002	245	McGrath	Ign	1081	Tvb
Tvlr	Lapilli rhyodacite	Eocene and Oligocene	Light- to medium-gray, porphyro-aphanitic, potassium-feldspar-rich rhyodacite flows containing conspicuous layers of purple, green, and red lapilli tuff beds. Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields			MG002	255	McGrath	Ign	1081	Tvb
			Distinctly mid- to dark-green, fine to medium grained ash flow (?) tuff containing very minor blocks of darker green, altered agglomerate composed of rounded clasts. Marker bed for Terra Cotta volcanic field. Ship Creek, Windy	-					5		
Tvgt	Green tuff	Oligocene	Fork, and Terra Cotta Volcanic Fields;			MG002	260	McGrath	Ign	1081	Tvb
Tvl	Lahar deposits	Eocene	Medium- to dark-green-gray, very coarse grained lahar deposit. Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields			MG002	265	McGrath	Ign	1081	Tvb
T. 6	Falsis huff and flaus	Facence and Oligonous	hypocrystalline rhyolite tuff and flows. Ship Creek, Windy Fork, and Terra Cotta Volcanic			MC002	270	MaCuath	Tan	1001	Tub
IVF	Feisic tuff and flows	Eocene and Oligocene	Dark gray to maroon, locally porphyritic.		Four K/Ar ages	MG002	270	McGrath	Ign	1081	IVD
Tum	Basalt and basaltic	Palaacana and Facana	columnar jointed, olivine bearing, augite basalt and basaltic andesite flows. Ship Creek, Windy Fork, and Terra Cotta Volcanic		ranging from 41.3 Ma to 48.9 Ma from the Ship Creek volcanic	MC002	275	McCroth	Ico	1091	Tub
1 VIII	Undifferentiated sills and		Undifferentiated sills and dikes of matic and		neiu	MGUUZ	275	MCGrath	Ign	1001	IVD
Tid	dikes	Eocene to Miocene	felsic composition			MG002	435	McGrath	Ign	1010	Thf
Tia	Andesite-trachyandesite sills and dikes	Eocene to Miocene	Green-gray, fine-grained, hypidiomorphic- granular, porphyritic andesite dikes less than 65 ft thick. Local variety-granodiorite		Five K/Ar ages from 20.9 to 39.3 Ma	MG002	420	McGrath	Ign	1011	Thf
Tif	Felsic sills and dikes	Focene to Miocene	Felsic (light pinkish tan to white), aphanitic			MG002	425	McGrath		1011	Thf
			Mafic (dark brown), pandiomorphic-granular, sills and dikes up to 34 ft thick. Locally		K/Ar mineral ages ranging from 45.5 to						
Tim	Mafic sills and dikes	Paleocene and Eocene	porphyritic basalt, gabbro, and diabase		55.0 Ma	MG002	430	McGrath	Ign	1012	Thm
			Light gray to bleached white with yellowish staining, locally banded (purple, white), lapilli dacite and tuff of Ship Creek, Windy Fork, and								
IVIO	Lapilli tuff	Eocene and Oligocene	i erra cotta voicanic Fields			MG002	240	McGrath	ıgn	1081	IVD
Tvd	Massive dacite	Oligocene	Light- to medium-gray, porphyro-aphanitic, hornblende-bearing massive dacite of Terra Cotta volcanic field of Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields		Whole-rock Ar/Ar age of 31.3 from Terra Cotta volcanic field	MG002	235	McGrath	Ign	1081	Tvb
	Intermediate to felsic air-		gray, well laminated medium to very coarse grained, crystal-rich, air-fall tuff of Ship Creek, Windy Fork, and Terra Cotta Volcanic	Petrified wood, dicotyledon, and							
Tvt	fall tuff	Eocene	Fields	Metasequoia		MG002	225	McGrath	Ign	1081	Tvb

-						Courco		1	1	1	T
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Tvab	Andesite breccia	Eocene	Medium-gray, purple-hued weathering, porphyritic, pyroxene andesite containing distinctive zones of pyroclastic breccia consisting of in situ andesite fragments. Groundmass is aphanitic to interstitcial. Ship Creek, Windy Fork, and Terra Cotta Volcanic Fields		Ar/Ar age of 41.1 Ma from hornblende of Terra Cotta volcanic field	MG002	250	McGrath	Ian	1081	Tvb
									- 5		
Twg	Windy Fork granite	Oligocene	White to pink and locally blue-gray, medium- to coarse-grained, peralkaline arfvedsonite granite of Windy Fork pluton		K/Ar ages of 23.4 Ma from pyroxene, 30.1 Ma from biotite, and 29.0 Ma from hornblende	MG002	445	McGrath	Ign	1270	Togr
Tgd	Hartman pluton granodiorite	Eocene	Medium- to coarse-grained, equigranular, hornblende-biotite granodiorite with a strong hornfels aureole. (Not equivalent in age to Hartman plutons of Lime Hilles quadrangle.)		K/Ar age of 37.9 Ma from biotite	MG002	450	McGrath	Ign	1300	Tegr
Tqm	Quartz monzonite, monzonite breccia, and quartz porphyry	Paleocene and Eocene	Composite unit of light gray, fine- to medium- grained hypidiomorphic to equigranular, biotite quartz monzonite, aegirine-rich monzonite, and altered biotite quartz porphyry		Nine K/Ar ages range from 51.1 to 61.8 Ma	MG002	455	McGrath	Ign	1307	Tgdp
Tgr	South Fork granite	Paleocene and Eocene	Light gray, pink, medium- to coarse-grained, equigranular, biotite (muscovite) granite		K/Ar age of 58.8 Ma from biotite	MG002	460	McGrath	Ign	1320	Tpgr
Tggm	Middle Fork Plutonic Complex; granite, quartz monzonite, and monzodiorite	Paleocene and Eocene	Fine- to medium-grained, biotite- and hornblende-bearing plutonic rocks with variable quartz contents and feldspar ratios		Three K/Ar mineral ages of 56.1, 56.6, and 57.2 Ma from quartz monzonite. Two K/Ar ages of 57.7 and 55.6 Ma	MG002	470	McGrath	Ign	1320	Tpgr
Tgsy	Middle Fork Plutonic Complex; granite to quartz syenite	Paleocene and Eocene	Fine- to medium-grained, granite to quartz syenite			MG002	480	McGrath	Ign	1320	Tpgr
Тѕу	Middle Fork Plutonic Complex; syenite	Paleocene and Eocene	Green-gray, white-gray weathering, medium- to coarse-grained, olivine-clinopyroxene syenite. Locally iron stained			MG002	485	McGrath	Ign	1320	Tpgr
TKqm	Mount Estelle granodiorite	Cretaceous and Paleocene	Fresh, medium-gray, medium-grained, equigranular, hornblende-biotite granodiorite.		Ar/Ar age of 79.0 Ma from biotite	MG002	490	McGrath	Ign	1350	Thgd
Tgb	Middle Fork Plutonic Complex; alkali gabbro	Paleocene and Eocene	Dark green-brown, fine- to medium-grained, biotite-olivine-pyroxene gabbro			MG002	475	McGrath	Ign	1380	Tgl
TKvt	Air-fall tuff of intermediate composition	Cretaceous and Paleocene	Light- to medium-green-gray, well-laminated, crystal tuff. Veleska Lake Volcanic Field	'rich in undated plant fossils'		MG002	295	McGrath	Ign	1600	ΤKv
TKm	Gabbro-granodiorite	Cretaceous	Heterogeneous dike swarms consisting of augite gabbro, hornblende granodiorite, and monzodiorite		K/Ar ages of 69.7 Ma from biotite and 79.0 Ma from hornblende	MG002	495	McGrath	Ign	1601	TKd
TKvf	Rhyolite tuff	Cretaceous and Paleocene	White- to light-gray, locally banded, hypocrystalline rhyolite. Veleska Lake Volcanic Field			MG002	285	McGrath	Ign	1603	TKvr
TKvd	Dacite flows and dikes	Cretaceous and Paleocene	Light- to medium-gray, aphanitic to porphyro- aphanitic, chloritized hornblende dacite flows. Veleska Lake Volcanic Field		K/Ar age of 65.8 Ma	MG002	280	McGrath	Ign	1604	TKvd
TKvm	Basalt andesite	Cretaceous and Paleocene	Medium-gray-green, fine-grained, augite-rich basaltic andesite and minor andesite flow breccia. Veleska Lake Volcanic Field			MG002	290	McGrath	Ian	1605	TKvi

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
				Inoceramus							
				murgalensis and							
				Inoceramus							
			Medium- to very dark-gray, fine-grained, lithic	peltiformis							
Klch	Flyschold sandstone and	Juraccic and Crotacoous	Sandstone, slitstone, and shale. Kanlitha	Crotacouco		MC002	200	McCrath	End	2950	IV 1F
KJSII	Slidle		Terrane	Cretaceous)		MGUUZ	300	MCGIatti	Seu	2630	
			Medium-gray to distinctly tan-weathered.								
			lithic sandstone containing clasts of volcanic								
			rocks, sandstone and shale, granitic rocks,								
	Coarse sandstone and		quartz, and lime-rich sediments. Flute clasts	Early Cretaceous							
KJs	minor siltstone	Jurassic and Cretaceous	and ripple marks common. Kahiltna Terrane	pelecypods		MG002	305	McGrath	Sed	2850	KJf
	Pebble to boulder			Inoceramus							
	conglomerate and minor		Light-gray, tan weathered, pebble to boulder	murgalensis (Early							
KJC	sandstone	Jurassic and Cretaceous	conglomerate. Kahiltna Terrane	Cretaceous)		MG002	310	McGrath	Sed	2850	KJf
			Buff weathered dark groop grov cabbre and								
			diorite Unit may be equivalent to Jurassic-								
			Cretaceous gabbro-diorite swarm that								
			intrudes along a major suture separating the								
			Pingston Terrane from the Yukon-Tanana								
KJg	Gabbro and diorite	Jurassic and Cretaceous	terrane in Denali National Park			MG002	505	McGrath	Ign	2920	Jmu
			Very thin-bedded, fissile, rusty-brown-								
			weathered, black slate, metasiltstone,	Mesozoic radiolaria							
			micaceous metasandstone, and rare silty	and megafossils from			245			2052	1.000
КJM	Slate and metasiltstone	Jurassic and Cretaceous	Modium to vory dark gray distinctly	Talkeetha quad		MG002	315	McGrath	Meta	2852	KJfn
			bloached bluich-white, phocphatic chalo;								
	Tatina River Volcanics		areen medium arained concretion-rich								
	phosphatic shale and		volcaniclastic sandstone: and minor tan chert-	Entolium sp. and							
	green volcaniclastic		cobble pebble conglomerate. Farewell	Expecten (?) sp. of							
IJs	sandstone	Jurassic	Composite Terrane	Jurassic age		MG002	335	McGrath	Sed	3210	JTrtv
				_							
			Thin-bedded, medium gray quartzitic								
			limestone; gray, silty limestone, and shale.								
			Basal beds mainly fine-grained, gray	Manatia an (Lata							
Tele	Lineastana and shala	Triogoio	sandstone and slitstone and subordinate	Monotis sp. (Late		MCOOD	220	MaCrath	Cod	40.22	Tues
Tris		THASSIC	Tap to greenish-gray, buff to grange	Thassic) pelecypou		MG002	320	McGrath	Seu	4033	Tres
			weathered nebble rich immature	Monotis subcircularis							
	Tatina River Volcanics:		conglomerate, coarse volcaniclastic	and Halobia cf. fallax							
	shale, coarse		sandstone, distinctly brown silty shale, and	late-Early-to-early							
	volcaniclastic sandstone,		light gray, green, and black chert. Farewell	Late Norian of the							
Trs	and chert	Triassic	Composite Terrane	Late Triassic		MG002	345	McGrath	Sed	4050	Trcg
			Dark green-gray, massive, aphanitic to								
			medium-grained, olivine-clinopyroxene rich,								
			pillow basalt, olivine diabase and gabbro sills,								
	Tatina River Velcanics		daveloped pillow structure. Earowell								
Trab	nillow basalt and gabbro	Triassic	Composite Terrane			MG002	340	McGrath	Ian	4215	1Trtv
IIUD	philow busult and gabbro		Dark green-gray, fine- to coarse-grained.			110002	510	ricorden	ign	1215	51100
1			ultramafic sills, olivine gabbro, and diorite. 50								
Trum	Ultramafic to diorite sills	Late Triassic	to 66 ft thick			MG002	510	McGrath	Ign	4320	Trgb
			Brownish weathered, dark green-gray, very								
1			fine- to medium-grained phaneritic, locally								
		1	micropegmatoidal, olivine, aegirine-augite,								
M-D-i	Gabbro and diorite sills		gappro, diorite, and uncommonly alkali			MCOOD	E1E	MaCasth	Tan	E1 00	M-D-i
MZPZI	anu ulkes	Early Paleozoic	syemite			MG002	512	McGrath	ign	2120	IMZPZI
1			Dark grav-greep to distinctly marcon pyrite-								
1			rich volcanogenic phyllite cut by thin guartz-								
uPzs	Volcanogenic phyllite	Permian	carbonate veins. Yukon-Tanana Terrane			MG002	325	McGrath	Ian	5545	PMpc
-											

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
uPzc	Phyllitic chert and siliceous phyllite	Mississippian to Permian	White-weathered, gray-green, banded phyllitic ribbon chert. Yukon-Tanana Terrane	Pennsylvanian through Permian radiolaria; Mississippian through Permian Radiolaria and conodonts		MG002	330	McGrath	Sed	5545	РМрс
PDs	Sheep Creek Formation; sublithic sandstone, limestone-chert conglomerate, and minor limestone	Middle Devonian to Permian	Medium-gray, distinctly brown-red weathered, medium- to coarse-grained, sublithic sandstone and pebble conglomerate that contains clasts of limestone, chert, lithic fragments, volcanic clasts, and polycrystalline quartz. Limestone-chert conglomerate near the top of PDs probably correlative with non- marine, conglomerate-rich Mystic subterrane rocks at Mount Dall in Talkeetna Quad. Farewell Composite Terrane;	Fusilinids (Late Pennsylvanian to Permian), Palmatolepis sp. and Polygnathus sp. conodonts (Frasnian(Late Devonian)), Dendrostrella sp. cf. D. trigemme (Late Eifelian and Givetian (Middle Devonian)),		MG002	350	McGrath	Sed	6010	PDsc
mSl	Terra Cotta Mountains Sandstone; argillaceous graptolitic limestone	Silurian	Medium- to dark-gray and brown weathered limestone containing graptolite-bearing silty sandstone intervals. Generally equivalent to Middle Limestone member of Churkin and Carter (1996). Dillinger Subterrane	Pristiograptus dubious, Monograptus cf. M. ludensis, and Monograptus digitatus (Wenlockian stage of the Silurian) Also orthoconic nautiloid cephalopods, cardiolid bivalves, and ribbed atrypacean brachiopods of probably Silurian age		MG002	390	McGrath	Sed	6660	Str
ISI	Post River Sandstone;	Farly Silurian	Thin, dark gray, fetid, laminated limestone with thin silty sand layers, and thin interbeds of black cherty arguiltie. Dillinger Subterrane	Cryptograptus centrifugus of C. centifugus zone, earliest Wenlockian stage, late Early Silurian		MG002	400	McGrath	Sed	7580	SCol
uSsl	Terra Cotta Mountains Sandstone; thin-bedded calcareous sandstone, graptolitic shale, and silty limestone	Silurian	Thin-bedded, gray to tan, micaceous sandstone, silty limestone, and dark gray graptolitic shale. Local flute clasts and ripple marks. Probably equivalent of Upper Limestone member of Churkin and Carter (1996). Dillinger subterrane	Monograptus cf. M. pseudodubius, Lobograptus progenitor, and Pristiograptus cf. P. tumescens from the Neodiversograptus nilssoni zone, Ludlovian stage (Late Silurian)		MG002	380	McGrath	Sed	6660	Stc
mSvs	Terra Cotta Mountains Sandstone; phyllite, volcaniclastic sandstone and chert	Silurian	Thin-bedded, complexly folded, maroon to green phyllite, medium-green, medium- grained volcaniclastic sandstone, and green- gray chert. Dillinger Subterrane			MG002	385	McGrath	Sed	6660	Stc

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
mSs	Terra Cotta Mountains Sandstone; feldspathic- lithic sandstone, limey siltstone. and araillite	Silurian	Medium olive gray to terra cotta, medium-to coarse-grained, thin-bedded to massive, calcareous lithic sandstone, and siltstone containing local gray shale intervals and minor pebble conglomerate beds. Sandstones have well developed oscillation ripple marks, flute clasts, and planer crossbedding. Limey beds of lower part of the unit are thought to be equivalent of Lower Limestone member of Churkin and Carter (1996). Dillinger Subterrane	Monograptus aff. M. Priodon and Cryptograptus lundgreni (middle to early Wenlockian stage of Silurian)		MG002	395	McGrath	Sed	6660	Stc
uDI	St. Johns Hill Formation; massive micritic limestone	Devonian	Medium-gray, massive- to thck-bedded, micritic limestone that contains crypto-algal laminations, thin, black chert partings, and dolomitic nodules. Identical in age and character of unit described by Reed and Nelson (1980) near base of Mystic subterrane in Talkeetna quadrangle. Farewell Composite Terrane;	Rugose corals, brachiopods, and pelecypods (Frasnian (early Late Devoian))		MG002	365	McGrath	Sed	6931	DSml
DIs	St. Johns Hill Formation; limestone and minor siltstone	Devonian	Brown to terra cotta, micaceous, slightly pyritic, thinly laminated mudstone, siltstone, limestone, and medium-grained lithic sandstone. Tentatively correlative basal portion of PDs. Farewell Composite Terrane			MG002	370	McGrath	Sed	6931	DSml
DSI	Barren Ridge Limestone; calcarenite, calcareous siltstone, and laminated limestone	Silurian and Devonian	Thin- to thick-bedded, buff to orange- weathered, light- to medium-gray, phyllitic calcarenite, thin-bedded orange to buff siltstone, and light-gray silty limestone. Dillinger subterrane	Conodonts (Late Silurian to Late Devonian)		MG002	375	McGrath	Sed	6952	DSca
IDI	Sheep Creek Formation; massive algal limestone	Devonian	Massive, thick-bedded, medium-gray limestone, rich in algal laminations and Amiphipora sp. Farewell Composite Terrane	Ozarkodina sp. indet. or Kockelella sp. indet. (Middle Silurian- to-early Devonian)	-	MG002	355	McGrath	Sed	6931	DSml
IDd	Sheep Creek Formation; dolomite	Devonian	Light gray, dolomitized, algal (?) limestone similar in appearance to IDI. Thought to be correlative with IDI. Farewell Composite Terrane			MG002	360	McGrath	Sed	6931	DSml
SOsh	Post River Sandstone; graptolitic shale, siltstone, and chert	Ordovician and Silurian	Medium- to dark-gray, fetid, fissile, isoclinally folded, carbonaceous shale, siltstone, and black bioturbated, silaceous siltstone and chert. Local distinctive sulfurous plumes. One of the most complete Ordivician-Lower Silurian graptolite successions in the world. Thought to be the equivalent of Mudstone, Upper Siltstone, and Graptolite Canyon member of Churkin and Carter (1996). Also equivalent to Road River Formaion in east- central Alaska. Dillinger Subterrane	15 graptolite zones representing 5 of 6 Ordivician stages and most of the Landoverian stage of the Early Silurian		MG002	405	McGrath	Sed	7580	SCpl
OCIs	Lyman Hills Formation; silty limestone and shale	Cambrian and Ordovician	Rhythmically layered, thin-bedded, orange to buff, light gray when fresh, limestone, silty shale, and light olive shale. Lime units have parallel and cross laminations. Shale and siltstone have ripple-laminated structures with amplitudes of 5 to 70 cm. Unit includes the lower Siltstone member of the Post River Formation of Churkin and Carter (1996). Dillinger Subterrane	Adelograptus graptolite zone of the Early Ordovician, Teridontis nakamurai of the Cordylodus lindstromi zone of the Late Cambrian-to- Early Ordovician		MG002	410	McGrath	Sed	7580	SCpl

						Source				, I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.I.	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ittoeit unit			Light- to medium-gray, fine- to coarse-	100011	radiometric age	couc		Quuunungie			2000.
			grained, metaguartzite, guartz-feldspar "grit",						1	!	
	Metaguartzite and		calcareous phyllite, and minor metachert.						í –	1	
PzpCs	calcareous phyllite	Precambrian to Devonian	Minchumina subterrane			MG002	415	McGrath	Meta	8300	CZw
	. ,		Large linear zones of multiple dikes of variable						[	· · · · ·	
			composition and size that create extensive						1	!	
			hornfels aureole and include fragments of						í –	1	
Tids	Dike swarm and hornfels	Paleocene to Oligocene	layered country rocks			MG002	435	McGrath	Meta	1010	Thf
									1		
Qs	Surficial deposits	Holocene and Pleistocene	Surficial deposits, undifferentiated			GU002	100	Gulkana	Unconsol	100	Qs
Qa	Alluvial deposits	Holocene	Alluvial deposits			GU002	106	Gulkana	Unconsol	100	Qs
Qco	Colluvial deposits	Holocene	Colluvial deposits, river bluff type			GU002	107	Gulkana	Unconsol	100	Qs
			Conglomerate, fluvial deposits derived from						(	1	
			Wrangell Lava and deposited on unit QTu,						í –	1	
			undifferentiated volcanic rocks and older, pre-						í –	'	
Qc	Conglomerate	Pleistocene	Wrangell rocks			GU002	112	Gulkana	Sed	100	Qs
QI	Lacustrine deposits	Late Pleistocene	Lacustrine deposits			GU002	109	Gulkana	Unconsol	100	Qs
	Active cliff-head dune								í –	1	
Qds	deposits	Holocene	Active cliff-head dune deposits			GU002	105	Gulkana	Unconsol	100	Qs
									1	!	
	Volcanic rocks-Nathlie								1	!	
Qnf	Mountain eruptive center	Pleistocene	Flows, breccias, and sedimentary rocks			GU002	127	Gulkana	Sed	300	Qv
-	Volcanic rocks-Capital								Í.		
Qcc	Volcano	Pleistocene	Caldera lavas			GU002	130	Gulkana	Ign	300	Qv
-	Volcanic rocks-Capital	<b></b>							1-		
Qcs	Volcano	Pleistocene	Shield lavas			GU002	131	Gulkana	Ign	300	Qv
0.46	Volcanic rocks-Drum	Disista sau s	Come building flavor			CLIODO	110	Culling	T	201	0
Qar	Volcano	Pleistocene	Cone building flows			G0002	118	Guikana	Ign	301	Qw
0-6	Volcanic rocks-Sanford	Disista sau s	Basalt, andesite, and dacite lava,			CLIODO	100	Culling	T	201	0
Qsr	voicano	Pleistocene	Undifferentiated			G0002	123	Guikana	Ign	301	Qw
			Debris derived from collapse of a dome on						í –	1	
	Canford Dobria flaw		Samoru Voicano. Flow traveleu a great						í –	1	
Ocdf	deposite	Quatornary	valley to confluence with the Conner Piver			GUIDOD	190	Gulkana	Unconcol	312	Odf
Qsui	Veleznie rocke Drum	Quaternary	valley to confidence with the copper River			60002	160	Guikalia	UNCONSOL	512	Qui
cho	Volcano	Plaistocopo	Volcanic avalancho donosito			GUIDOD	117	Gulkana	Unconcol	314	0.12
Qua	Minoral spring and mud	Fleistocelle				60002	11/	Guikalia		514	Qva
Ome	volcano donosito	Holocopo and Plaistocopo	Minoral Spring and mud volcano doposits			GUIDOD	108	Gulkana	Unconcol	315	Omey
QIIIS	Volcanic rocks-Sanford	holocene and helstocene				00002	100	Guikana	onconsor	-515	QIII3V
Och	Volcano	Pleistocene	Hyaloclastite			GU002	122	Gulkana	Ian	316	Oat
2511	Cinder cones and					00002	122	Guilland	Ign	510	Qui
Obc	associated flows	Pleistocene	Cinder cones and associated flows			GU002	111	Gulkana	Ian	320	Ocs
250	Volcanic rocks-Drum					00002		ountand	1		400
Odc	Volcano	Pleistocene	Collapsed dome			GU002	121	Gulkana	Ian	400	Oi
	Volcanic rocks-Sanford									I	
Osi	Volcano	Pleistocene	Shallow plutons			GU002	124	Gulkana	Ian	400	Oi
	Volcanic rocks-Drum									· · · · ·	
Qdd	Volcano	Pleistocene	Dacite domes			GU002	119	Gulkana	Ign	401	Qvd
	Volcanic rocks-Drum									1	-
Qdr	Volcano	Pleistocene	Rhyolite domes			GU002	120	Gulkana	Ign	401	Qvd
	Volcanic rocks-Sanford								(	1	
Qsr	Volcano	Pleistocene	Rhyodacite dome and flow			GU002	125	Gulkana	Ign	401	Qvd
									í l		
	Volcanic rocks-Nathlie								1	!	
Qni	Mountain eruptive center	Pleistocene	Dacite pluton			GU002	126	Gulkana	Ign	401	Qvd
	Volcanic rocks-Capital								í –	1	
Qcr	Volcano	Pleistocene	Rhyolite dikes and laccoliths			GU002	128	Gulkana	Ign	401	Qvd
	Volcanic rocks-Capital								í. —	I ¬	
Qcd	Volcano	Pleistocene	Radial dike swarm and plugs			GU002	129	Gulkana	Ign	403	Qds
		Pleistocene and Pliocene							(	1	
QTu	Volcanic rocks	(?)	Volcanic rocks, undifferentiated			GU002	110	Gulkana	Ign	450	QTv
	Volcanic rocks-Wrangell	Holocene (?) and							1-	'	
Qwf	Volcano	Pleistocene	Andesite flows and fragmental rocks			GU002	115	Gulkana	Ign	455	QIW

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
		Pleistocene and Pliocene						<b>Q</b> ====:j==			
ОТІ	Intrusive rocks	(?)	Intrusive rocks			GU002	113	Gulkana	Ian	460	ОТІ
	Volcanic rocks-Wrangell	Holocene (?) and							5		
Qwd	Volcano	Pleistocene	Dacite flows			GU002	116	Gulkana	Ign	465	QTva
Ts	Sedimentary rocks	Cenezoic	Sedimentary rocks			GU002	135	Gulkana	Sed	500	Tsu
-	Olivine basalt and										
Czab	andesite	Cenozoic	Olivine basalt and andesite			GU002	114	Gulkana	Ian	1000	Tvu
	Andesite flows;										
	Metamorphic Complex of										
Та	Gulkana River	Tertiary (?)	Andesite flows			GU002	158	Gulkana	Ign	1000	Tvu
Km	Matanuska Formation	Cretaceous	Matanuska Formation			GU002	176	Gulkana	Sed	2010	Km
Kg	Granodiorite pluton	Cretaceous (?)	Granodiorite pluton, Wrangellia Terrane			GU002	137	Gulkana	Ign	2420	Kgd
Kgd	Wrangellia Terrane	Cretaceous (?)	Granodiorite pluton			GU002	136	Gulkana	Ign	2900	KJq
	Hornblende-biotite										
	quartz diorite; Peninsular										
hbqd	Terrane	Jurassic or Cretaceous	Hornblende-biotite quartz diorite			GU002	173	Gulkana	Ign	2900	KJg
	Hornblende-biotite								-		_
	quartz monzonite;										
hbqm	Peninsular Terrane	Jurassic or Cretaceous	Hornblende-biotite quartz monzonite			GU002	174	Gulkana	Ign	2900	KJg
	Hornblende-biotite										
	granodiorite; Peninsular										
hbgd	Terrane	Jurassic or Cretaceous	Hornblende-biotite granodiorite			GU002	175	Gulkana	Ign	2900	KJg
	Rhyodacite flows;		Rhyodacite flows with minor sandstones and								
Jtrd	Talkeetna Formation	Early Jurassic	lesser dacite flows			GU002	177	Gulkana	Sed	3250	JTrtk
	Hornblende andesite										
_	flows; Talkeetna								_		
Jta	Formation	Early Jurassic	Hornblende andesite flows			GU002	178	Gulkana	Ign	3250	JTrtk
_	Talkeetna Formation,										
Jts	sandstone	Early Jurassic	Sandstone with sparse volcaniclastics			GU002	179	Gulkana	Sed	3250	JTrtk
	Schistose hornblende										
	gabbro; Metamorphic										
a la se la	Complex of Gulkana		Cabiata a hamphlan da an bhua			CU 1002	1.64	Cullus as		2540	1
sngb	River	Late Jurassic or older	Schistose nornbiende gabbro			G0002	164	Guikana	Meta	3540	Jmu
	Schistose clinopyroxene										
	Gampley of Cullians										
aaab		Lata Junania an aldan	Cabiataga alinanyyayana antahaa			CU 002	165	Culliana	Mata	2545	1
scgb	River Schistoco guartz	Late Jurassic or older	Schistose clinopyroxene gabbro			G0002	105	Guikana	Meta	3545	JIIIU
	monzonito: Motamorphic										
	Complex of Gulkana										
sam	River	Late Jurassic or older	Schistose quartz monzonite			GU002	160	Gulkana	Mota	5245	1Paur
Sqm						00002	100	Guikana	neta	5245	51 001
	Schistose quartz diorite:										
	Metamorphic Complex of										
sad	Gulkana River	Late Jurassic or older	Schistose quartz diorite			GU002	161	Gulkana	Meta	5245	JPaur
	Schistose granodiorite:										
	Metamorphic Complex of										
sgd	Gulkana River	Late Jurassic or older	Schistose granodiorite			GU002	162	Gulkana	Meta	5245	JPaur
	Schistose hornblende										
	diorite; Metamorphic										
	Complex of Gulkana										
shd	River	Late Jurassic or older	Schistose hornblende diorite			GU002	163	Gulkana	Meta	5245	JPaur
	Amphibolite gneiss;										
	Metamorphic Complex of									1	
ag	Gulkana River	Late Jurassic or older	Amphibolite gneiss			GU002	166	Gulkana	Meta	5245	JPaur
			Clinopyroxene-hornblende gabbro, and								
Trg	Wrangellia Terrane	Late Triassic (?)	diabase and gabbronorite dikes			GU002	138	Gulkana	Ign	4320	Trgb
									_	1	
Trcg	Wrangellia Terrane	Late Triassic (?)	Clinopyroxene-hornblende stocks and plugs			GU002	139	Gulkana	Ign	4320	Trgb
Trn	Nikolai Greenstone	Late Triassic	Nikolai Greenstone			GU002	155	Gulkana	Sed	4420	Trn

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
	Quartz-muscovite-										
	feldspar schist;										
	Metamorphic Complex of										
qmfs	Gulkana River	Late Paleozoic (?) or older	Quartz-muscovite-feldspar schist			GU002	168	Gulkana	Meta	5203	PPast
	Metamorphosed pelitic										
	And calc-schist;										
mmp	Gulkana Bivor	Lata Palaozoic (2) or older	Matamorphosod politic and calc-schist			CU002	160	Gulkana	Mota	5200	PPact
mmp						00002	109	Guikalia	Heta	5209	FFASL
			Coarse guartz-biotite schist, altered and								
			cataclastic meta-andesite, over lain(?) by								
			amphibolite schist, mica-schist, and minor								
			meta-limestone. Intruded by								
			unmetamorphosed coarse-grained quartz								
			diorite dikes. Also includes sheared meta-								
			gabbro. Dadina Schist (Mendenhall, 1905).								
			Correlated with Klutina of Schrader (1900) or								
1.			with Streina Formation of Moffit and Mertie			GU 1000	4 70			5364	
as	Dadina schist	Late Paleozoic (?) or older	(1923) [probably NOT Streina].			60002	1/2	Gulkana	meta	5204	PPast
1	horphlopdo andosito									1	
	Metamorphic Complex of										
mha	Gulkana River	Late Paleozoic (?) or older	Metamorphosed horphlende andesite			GU002	167	Gulkana	Meta	5550	PPast
iiiid		Middle and Late				00002	107	Guillana	i ietu	5550	11 450
		Pennsylvanian and Early									
PPs	Slana Spur Formation	Permian	Slana Spur Formation			GU002	156	Gulkana	Sed	5630	PPasc
	Metamorphosed										
	clinopyroxene basalt;										
	Metamorphic Complex of										
mcb	Gulkana River	Late Paleozoic (?) or older	Metamorphosed clinopyroxene basalt			GU002	170	Gulkana	Meta	5641	PPast
	Amphibolite;										
	Metamorphic Complex of					GU 1000				5600	
am	Gulkana River	Late Paleozoic (?) or older	Amphibolite			G0002	1/1	Gulkana	Meta	5680	PPast
DDf	Abtall Blutan	Permian and	Fine grained histite granite			CUIDOD	145	Cullcono	Ian	E970	Dmai
PPI		Permise and				G0002	145	Guikalia	Ign	3670	Piligi
PPn	Abtell Pluton	Pennsylvanian	Porphyritic horphlende granodiorite			GU002	146	Gulkana	Ian	5870	Pmai
		Permian and				00002	1.0	Guillana	19.1	5070	g.
PPa	Ahtell Pluton	Pennsylvanian	Biotite-hornblende granite and granodiorite			GU002	147	Gulkana	Ian	5870	Pmai
		Permian and									
PPa	Diorite Complex	Pennsylvanian	Altered diabase and gabbronorite			GU002	148	Gulkana	Ign	5880	PPad
		Permian and									
PPd	Diorite Complex	Pennsylvanian	Diorite, granodiorite, and gabbronorite			GU002	149	Gulkana	Ign	5880	PPad
Pt	Tetelna Volcanics	Pennsylvanian	Tetelna Volcanics			GU002	157	Gulkana	Ign	6220	Pat
TKbf	Hornfold	Tortiany and Crotacoour	above Km Kmd TKer TKen Ted Ter Ter	1		MG002	647	McGrath	Mota	1070	KL
ткп	Oustorpary surficial		above : Km, Kmu, TKgr, TKgp, Tgu, Tqm, Tgr			MG003	047	MCGrath	Meta	1970	ĸĸ
0	denosits undivided	Quaternary	Surficial deposits			MG003	100	McGrath	Linconsol	100	05
Q		Quaternary		Fossil data		110005	100	Heoradh	Onconsor	100	Q3
	Nonmarine sedimentary		Coal-bearing sandstone, shale and	summarized in						1	
Tcg	rocks	Eocene to Oligocene	conglomerate	Bundtzen		MG003	605	McGrath	Sed	640	Tcb
	Nonmarine sedimentary		-								
Tclg	rocks	Eocene to Oligocene	Limestone-rich conglomerate			MG003	606	McGrath	Sed	500	Tsu
Tgr	Granite	Tertiary	Granite of Cheeneetnuk River area		38 Ma	MG003	646	McGrath	Ign	1300	Tegr
Tqm	Quartz Monzonite	Tertiary	Quartz monzonite of Selatna Hills area		60 Ma	MG003	645	McGrath	Ign	1307	Tgdp
			Granodiorite of the Selatna and Tatlawiksuk								
Tgd	Granodiorite	Tertiary	Hills area		61 and 62 Ma	MG003	644	McGrath	Ign	1350	Thgd
	Granite of Lone Mt.									1.055	
IKgr	Complex	Tertiary and Cretaceous	Granite of Lone Mt. Complex		58.5 Ma and 65 Ma	MG003	642	McGrath	Ign	1655	IKg
Tilan	Cuppite Douphum	Late Cretaceous and Early	Creatite Development			MC002	643	MaCaath	Tan	1655	TKa
ткдр	Granice Porphyry	reruary	Granice Porphyry			1110003	1043	mcGrath	ligu	1022	likg

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ribert unit	Kuskokwim Group: Deep			1.00011	i dalometrie age			Quuurungie			2000.
	Water (Turbidite-Fan)		Coarse lithic sandstone and pebble								
Kcs	Facies	Late Cretaceous	conglomerate			MG003	609	McGrath	Sed	1970	Kk
	Kuskokwim Group; Deep		-								
	Water (Turbidite-Fan)		Fine, medium, and coarse-grained lithic								
Kss	Facies	Late Cretaceous	conglomerate			MG003	610	McGrath	Sed	1970	Kk
	Kuskokwim Group; Deep										
	Water (Turbidite-Fan)		Calcareous medium to coarse-grained lithic								
Kls	Facies	Late Cretaceous	sandstone and siltstone			MG003	611	McGrath	Sed	1970	Kk
	Kuskokwim Group;										
	Lithologies of Unknown		Kuskokwim Group clastic rocks-				64.0			1070	
Kus	Facies Assignment	Late Cretaceous	undifferentiated			MG003	612	McGrath	Sed	1970	КК
	Kuekekusing Creans										
	kuskokwim Group;		Chalo and eiltetene and your miner fine								
Kch	Encios Assignment	Lata Crotacoouc	shale and sitistone and very minor me-			MC002	612	McCrath	End	1070	KL
K5II	Kuckokwim Group:			Loaf bach and		110005	015	MCGratin	Jeu	1970	
	Shallow Marine to Locally			nonmarine to brackish							
1	Nonmarine Shoreline		Quartzose sublithic sandstone, siliceous shale	water pelecypod							
Kas	Facies	Late Cretaceous	and siltstone: minor coal	fauna		MG003	607	McGrath	Sed	1985	Kkn
	Kuskokwim Group;						1.2.				
	Shallow Marine to Locally		Coarse grained sandstone and pebble-to-								
	Nonmarine Shoreline		cobble conglomerate. Quartz-rich sublithic to								
Kqcs	Facies	Late Cretaceous	bleached white coarse facies of Kqs			MG003	608	McGrath	Sed	1985	Kkn
	Basaltic Andesite of		·								
	Takotna and Candle Hills										
	Volcanic-Plutonic		Basaltic Andesite of Takotna and Candle Hills								
Kvm	Complex	Cretaceous	volcanic-Plutonic Complex		74 Ma	MG003	648	McGrath	Ign	2270	Kvl
	Porphyritic Basaltic										
	Andesite of Candle Hills		Demokratic Deservice Andreite of Conductivity								
16	and Takotha Volcanic-	Custores	Porphyritic Basaltic Andesite of Candle Hills		72.14-	MCOOR	C 10	Machine	T	2270	16.1
кутр	Plutonic Complex	Cretaceous	and Takotha Voicanic-Plutonic Complex		73 Ma	MG003	649	McGrath	Ign	2270	KVI
16 mg	Candle Hille Duter	Cretagogue	Oliving managing of the Candle Hills Blutan		70 Ma	MC002	C 10	MaCushh	Tan	2470	K.a.
NIII	Monzonito and	Cretaceous			70 Ma	MG003	040	MCGratii	Ign	2470	ĸġ
	Monzodiorito of Takotna										
Kmd	Pluton	Cretaceous	Monzonite and monzodiorite of Takotna Plutor	1	72 Ma	MG003	641	McGrath	Ian	2470	Ka
Rind			Tholeijtic nillow basalt: Equivalent to Tatina	•	72110	110005	011	ricordan	ign	2170	itg
			River Volcanics of Buntzen and others, 1997								
			(Farewell Composite terrane, Mystic sub-								
Trb	Tholeiitic pillow basalt	Late Triassic	terrane			MG003	614	McGrath	Ign	4215	JTrtv
MzPzi	Olivine Gabbro sills	Triassic to Tertiary	Olivine Gabbro sills			MG003	650	McGrath	Ign	5180	MzPzi
			Argillite and chert; Equivalent to Sheep Creek	:							
	Argillite and chert,		Formation as defined by Buntzen and others,								
1	equivalent to Sheep		1997 (Farewell Composite Terrane; Mystic								
uPzac	Creek Formation	Late Devonian to Permian	Subterrane)	Pennsylvanian fossils		MG003	616	McGrath	Sed	6010	PDsc
1_	Sandstone and detrital		Sandstone and detrital limestone (Farewell	Contains Upper							
uPzs	limestone	Late Paleozoic	Composite Terrane; Mystic Subterrane)	Paleozoic fossils		MG003	615	McGrath	Sed	6010	PDsc
1	Character Constants		Brown siltstone of Sheep Creek Formation	Demonstration							
PDc	Sneep Creek Formation,	Lata Dovanian to Down	(Fareweii Composite Terrane; Mystic	rennsylvanian		MCOOR	617	McCrath	End	6010	DDcc
PDS	brown sitstone	Late Devolian to Permian	Grantolitic chalo and charts Pact Divor	rusiimus		110003	01/	mcGrath	Seu	0010	PDSC
	Post River Formation		Formation of Churkin and Cartor 1996 and								
1	Grantolitic shale and		Buntzen and others 1997 (Farewell								
SOsh	chert	Silurian and Ordovician	Composite Terrane: Dillinger Subterrane)			MG003	638	McGrath	Sed	7580	SCol
50511			Shale and siltstone: equivalent to Paradise								Pi
1			Fork Formation of Dutro and Patton, 1982								
1			(Farewell Composite Terrane: Nixon Fork								
Ssh	Shale and siltstone	Mid-Silurian	Subterrane)			MG003	624	McGrath	Sed	6620	Spf

						Sourco					
Book unit	Unit hama	1.00	Description	Fossil	Radiomotric ago	Source	Class code	Quadrangla	Bock class		Label
ROCK UNIL	Unit name	Age	Eeldenathic lithic candetoney Terra Cotta	FOSSI	Radiometric age	code	Class code	Quadrangle	ROCK Class	INSA Class	Label
	Tama Catta Mauntaina		relaspathic-lithic sandstone; Terra Cotta								
	Terra Colla Mountains		Sandstone of Churkin and Carter, 1996 and								
m Ca	Sanustone; reluspatnic-	Middle Cilurian	Composite Terreney, 1997 (Farewell			MCOOR	637	MaCaath	Cod	6660	Cha
mss	lithic sandstone	Middle Silurian	Composite Terrane; Dillinger Subterrane)			MG003	637	McGrath	Sea	6660	Stc
	Thick bedded dark gray		Thick bedded dark gray limestone (Farewell								
uDI	limestone	Late Devonian (Frasnian)	Composite Terrane; Mystic Subterrane)			MG003	618	McGrath	Sed	6931	DSml
		Middle Devonian (Late	Cheeneetnuk limestone (Farewell Composite								
mDl	Cheeneetnuk limestone	Emsian to Givitian)	Terrane; Mystic Subterrane)			MG003	619	McGrath	Sed	6931	DSml
			Shallow water limestone and dolomite of								
	Whirlwind Creek		Whirlwind Creek Formation as defined by								
	Formation (limestone	Middle Devonian (Late	Dutro and Patton, 1982 (Farewell Composite								
SDIw	and dolomite)	Emsian to Givitian (?))	Terrane; Nixon Fork Subterrane)			MG003	620	McGrath	Sed	6960	DSwc
			Calcarenite, calcareous siltstone, and								
	Barren Ridge limestone;		laminated limestone; Barren Ridge limestone								
	calcarenite, calcareous		of Churkin and Carter, 1996 and Buntzen and								
	siltstone, and laminated		others, 1997 (Farewell Composite Terrane;								
DSI	limestone	Silurian and Devonian	Dillinger Subterrane)			MG003	636	McGrath	Sed	6952	DSca
			Thick bedded, cream-colored dolomite								
			(Farewell Composite Terrane: Nixon Fork								
IDd	Dolomite	Farly Devonian	Subterrane)			MG003	621	McGrath	Sed	6960	DSwc
	Grav limestone	Early Beroman					021		000	0300	bone
	interbedded with		Grav limestone interhedded with IDd (Farewell								
IDI	dolomito	Farly Dovonian	Composito Torrano: Nixon Fork Subtorrano)			MC003	622	McGrath	Sod	6960	DSWC
	doloinite		Algal limostone (boundstone) thick-bodded			110005	022	MCGraun	Jeu	0900	DSWC
			algal rich stromatoparid rich limostopa								
			(Farawall Composite Terranes Niven Fark								
Cla	Algolingesterne	Mid Cilurian	(Farewell Composite Terrane; Nixon Fork	Chuomatanavid		MCOOR	633	MaCrath	Cod	6060	DCuus
SId	Algar limestone	Miu-Silurian	Subterrane)	Stromatoporid		MG003	023	McGrath	Seu	6960	DSWC
			I amingted limestance Dechably activalant to								
			Laminated limestone; Probably equivalent to								
			upper part of Teisitna Formation of Dutro and								
			Patton, 1982 (Farewell Composite Terrane;				6.05			7520	
uOII	Laminated limestone	Late Ordovician	Nixon Fork Subterrane)			MG003	625	McGrath	Sed	7520	Ont
			Limestone, limestone breccia, and argillite;								
	Limestone, limestone		Interbedded with uOII (Farewell Composite	Upper Ordivician							
uOl	breccia, and argillite	Late Ordovician	Terrane; Nixon Fork Subterrane)	fossils		MG003	626	McGrath	Sed	7520	Ont
			Thick grainstone and micritic limestone								
	Thick grainstone and		(Farewell Composite Terrane; Nixon Fork	Middle Ordivician							
mOl	micritic limestone	Middle Ordovician	Subterrane)	fauna		MG003	627	McGrath	Sed	7520	Ont
			Limestone and argillite; Thought to be								
			equivalent to Novi Mt. Formation of Dutro and								
		Middle(?) and early	Patton, 1982 (Farewell Composite Terrane;								
OI	Limestone and argillite	Ordovician	Nixon Fork Subterrane)			MG003	628	McGrath	Sed	7520	Ont
			Silty limestone and shale; essentially								
1			equivalent to Lyman Hills Formation in								
1		Cambrian and Earliest	Dillinger Subterrane (Farewell Composite								
OCIs	Silty limestone and shale	Ordovician	Terrane: Nixon Fork Subterrane)			MG003	630	McGrath	Sed	7580	SCol
			Silty limestone and shale: Lyman Hills								
			Formation of Churkin and Carter, 1996 and								
1	Lyman Hills Formation		Buntzen and others, 1997 (Farewell								
OCIS	Silty limestone and shale	Ordovician and Cambrian	Composite Terrane: Dillinger Subterrane)			MG003	639	McGrath	Sed	7580	SCol
0.010	site, intestone and shale		Limestone breccia and micrite: Equivalent to								
1			Novi Mt Formation of Dutro and Patton 1982							1	
1	Limostopo broccia and		(Earowell Composite Terrane: Niver Fork							1	
IOIh	micrite	Farly Ordovician	Subterrane)			MG003	629	McGrath	Sod	7520	Ont
1010	miche					110003	029	mcorau	Jeu	1320	Unit
1			Pandad mudatana, Palianad by Crant Albert							1	
1			1080 to be similar to a Middle Combuint							1	
1		Combuien and Foultont	1909, to be similar to a midule Camprian Unit							1	
0.0	David ad an oddata a s		exposed near Hess River in Yukon (Farewell			140000	621	Macharth	Carl	7520	Out
UCM	Banded mudstone	Uraovician	Composite Terrane; Nixon Fork Subterrane)			IMG003	1631	IncGrath	Sea	/520	Unt

r				1		C	1	-			
						Source					
ROCK UNIT	Unit hame	Age	Description	FOSSI	Radiometric age	code	Class code	Quadrangle	ROCK Class	INSA class	Label
			the second stand second states and								
	Lineau atwined mudatene		Limey, striped mudstone and slitstone;								
Char	Limey, striped mudstone	Middle (2) Canalarian	Probably equivalent to OCIII (Fareweil			MCOOR	624	MC.u.th	C . d	7500	CC-1
CIM	and siltstone	Middle (?) Cambrian	Composite Terrane; Nixon Fork Subterrane)			MG003	634	McGrath	Sed	/580	SCPI
			Oolitic limestone; same unit as Khuchaynik								
			Dolomite of Babcock and others, 1994								
		Proterozoic to Early	(Farewell Composite Terrane; Nixon Fork								
XCI	Oolitic limestone	Cambrian	Subterrane)			MG003	632	McGrath	Sed	8350	CZds
			Oolitic, peletoidal dolomite; Probably Big River	-							
			dolostone of Babcock and others, 1994								
	Oolitic, peletoidal	Proterozoic to Early	(Farewell Composite Terrane; Nixon Fork								
XCd	dolomite	Cambrian	Subterrane)			MG003	633	McGrath	Sed	8350	CZds
			Red ferriginous shale and orthoquartzite;								
			Correlative with Windy Fork Formation of								
			Babcock and others, 1994. Also been called								
			the Redstone Unit by Buntzen in 1984								
	Red ferriginous shale and		(Farewell Composite Terrane; Nixon Fork								
Xmso	orthoquartzite	Late Proterozoic	Subterrane)			MG003	635	McGrath	Sed	8350	CZds
			Dark-greenish-gray, fine-grained to gritty(?),								
			poorly sorted graywacke composed largely of								
			first- and second-cycle volcanic debris but								
			locally containing abundant granitic and								
			metamorphic rock debris. Graded bedding								
			common, Dark gray mudstone interbeds.								
			Some intercalated crystal tuffs. Hornfels								
	Volcanic graywacke and	late Early Cretaceous	bordering granodiorite (Kg). Age based on								
Kgm	mudstone	(Albian)	correlation with HU and KT guads			RB004	2105	Ruby	Sed	2105	Kvgm
			Non-marine deposits of olive-green, fine- to							1	
			coarse-grained, crossbedded, quartzose								
			sandstone and grit; quartz-pebble								
			conglomerate, and dark micaeous shale and								
			siltstone. Ironstone lenses and concretions.								
			Better sorted and higher % quartz than Kgm.								
	Sandstone, Quartz		Probabaly correlative with Upper Cretaceous,								
	Conglomerate, shale,		plant-bearing nonmarine strata in Kateel River	Abundant carbonized							
Ks	and siltstone	Probably Late Cretaceous	quad.	plant debris		RB004	1941	Ruby	Sed	1941	Kss
		· · ·		•							
			Massive poorly sorted conglomerate with								
			pebble to cobble sized clasts primarily of mafic								
			intrusive and extrusive rocks and varied								
			colored chert. Interbedded with fine-grained								
			to gritty (?), dark-green to green graywacke								
			and mudstone. grades upward into								
			sandstone, quartz conglomerate, shale, and								
		late Farly Cretaceous	siltstone (Ks). In part overlies and in part								
	Igneous peoble-cobble	(Albian) may be as young	laterally gradational with volcanic graywacke	Indeterminate							
Kc	conglomerate	as Late Cretaceous	and mudstone (Kgm)	pelecypods		RB004	2030	Ruby	Sed	2030	Kca
	congronnerate		Kovukuk River- Pillow basalt and andesitic	perceypout			2000			2000	itteg
			flows: andesitic tuffs, volcanic conglomerate,								
			and breccia: chert and fine-grained cherty								
1			tuff: coguinoidal limestone composed largely								
1			of Buchia sp. Widely altered to a hard dark	1							
1			areen hornfels Dulhi-Melozitha Rivers-								
1			Andesitic and dacitic tuff breccia volcanic								
1			condomerate and tuffaceous dravwacko	Buchia sublaevis							
1		earliest Cretaceous	Flows and hyphyssal bodies of andesite and	belemnite: Buchia							
1		(Neocomian) but may	dacite porphyry Dark-green hornfols poar	cf B crassicollis:							
Kv	Andesitic volcanic rocks	include Albian age strata	Ka	Buchia keyserlingi		RB004	2330	Ruby	Ian	2330	KVP
					1		1-000		1		

						Source		1			
Pock unit	Unit hamo	100	Description	Fossil	Padiomotric ago	codo	Class codo	Quadranglo	Pock class		Labol
ROCK UTIL		Age	Description	FUSSII	Radiometric age	coue		Quadrangle	RUCK CIdSS	INSA Class	Label
					K Ar data of 91 E to						
					R-AI date of 81.5 to						
					89.0 Ma from similar						
					plutons in Melozitha						
					quad., however later						
					data suggests Latest						
					Cretaceous or Early						
					Tertiary age from						
Ka	Cranitic rocks	Lata Crotacoouc?	Cranadiarita		Nulate guadrangle	DB004	2410	Buby	Tan	1655	TKa
ĸġ	Granitic TOCKS	Late Cretaceous:	Gidilouloille		Nulato quadi aligie.	KDUU4	2410	Kuby	Ign	1033	ING
			Splittic basalt and diabase largely altered to								
			greenstone. Along contact with Km, altered								
			to mafic hornfels. Probabaly correlative with								
			similar rocks on strike to the NE in the Tanana								
JPb	Basalt and diabase	Permian to Jurassic.	and Bettles guads			RB004	5140	Ruby	Ign	5140	JMab
			Small bodies of serpentinized peridotite and						5		
			dunite with closely associated gabbro and								
10.	Liltura na ofice	Downsian to Junacia	anarthasite			<b>DDOOA</b>	E1E0	Dubu	Tan	E1 E0	1
JPU	Ultramatics		anorthosite.			КБ004	5150	киру	Ign	5150	Jaum
			Garnetiferous quartz-feldspar-biotite gneiss of								
1			almandine-amphibolite facies. Also includes	1							
1			some quartzitic gneiss, amphibolitic gneiss,								
			migmatite, small bodies of marble, and a few								
PzpCa	Gneissic rocks	Paleozoic or Precambrian	small bodies of granitic rock			RB004	8630	Ruby	Meta	8801	PzZrpa
1 2pcg			Politic schiet quartzite, and calcaroous to			112001	0030	Ruby	lineta	0001	122199
1	Motomorphic rocks		delemitic marble, generally of grosseshist	1							
	Metamorphic rocks		doiomitic marble, generally of greenschist								
PzpCm	(Pelitic schist)	Paleozoic or Precambrian	facies.			RB004	8600	Ruby	Meta	9325	Pz∠rqs
			Silt, sand, and gravel of stream beds, flood								
Qu	Unconsolidated deposits	Quaternary	plains, and terraces			RB004	100	Ruby	Unconsol	100	Qs
		· · · ·									
	Gabbroic phaciods in	Jurassic and Late	Strongly altered gabbroic phacoids that are								
CC.	McHugh Complex	Triaccic(2)	tectonic inclusions in the McHugh Complex			VA004	1800	Valdoz	Mota	1800	Mzum
00	Menugin complex		tectoriic inclusions in the Mchagn Complex	Loof book and		VA004	4090	valuez	meta	4090	Mzum
				Lear nash, and							
	Kuskokwim Group:		Shallow marine to fluvial facies quartzose	brackish water							
	Quartzose sublithic		sublithic sandstone, siliceous shale, and	pelecypods and minor							
Kas	sandstone	Late Cretaceous	siltstone; part of Kuskokwim Group	coal		LH004	1986	Lime Hills	Sed	1985	Kkn
			Shallow marine to fluvial facies coarse-grained								
			sandstone and pebble-to-cobble								
	Kuskokwim Group:		conglomorato; minor yony coarso-grained								
	Candetene and		function of the second conditions of the second condition of the second conditions of the second								
	Sandstone and		fluvial conglomerate and sandstone; part of								
Kqcs	conglomerate	Late Cretaceous	Kuskokwim Group			LH004	1985	Lime Hills	Sed	1985	Kkn
			Shallow marine to fluvial facies coarse-grained								
	Kuskokwim Group:		sandstone-conglomerate rich in volcanic								
Kavs	Sandstone	Late Cretaceous	clasts: part of Kuskokwim Group			LH004	1987	Lime Hills	Sed	1985	Kkn
<u> </u>			Deep water turbidite facies fine medium and						1		
1	Kuckokwim Croup		coarco-grained canditions and siltetons: not	1							
Kaa	Candetene and elt-t	Lata Crata angua	of Kuskalauing Croup			111004	1070	Linna Llilla	Cad	1070	121.
155	Sanustone and slitstone					LU004	1310		Joeu	1910	r.K
			Deep water, very coarse-grained, turbidite								
1	Kuskokwim Group:		tacies (proximal fan); part of Kuskokwim	1							
Kcs	Turbidite facies	Late Cretaceous	Group			LH004	1971	Lime Hills	Sed	1970	Kk
	Kahiltna Assemblage:		Fine-to-coarse grained turbidite sandstone								
1	Turbidite sandstone and	Late Jurassic to Farly	and siltstone with minor fossil-rich prismite-	1							
K1c	ciltatono	Crotacoous	rich limostono	Inocoramus		1 4004	2850	Limo Hillo	Sod	2850	K 1F
KJS	SIIISIONE	Cretaceous	Theleiitic pillow becelty part of Farewell	Inoceranius		LH004	2650		Seu	2630	NI
1			molencic pillow basalt, part of Farewell	1							
			Composite terrane and Mystic subterrane and								
1			equivalent to Tatina River Volcanics of	1							
Trb	Tholeiitic pillow basalt	Late Triassic age	Bundtzen and others, 1997			LH004	4215	Lime Hills	Ign	4215	JTrtv
			Volcanogenic sandstone and tuff: part of						-		
	Volcanogenic sandstone		Farewell Composite terrane and Mystic								
Truc	and tuff		cubtorrano	Lato Triassic fossile		1 4004	4050	Limo Hills	Sod	4050	Trea
1172						LN004	+030	Line Hills	Jeu	4030	incy
1			rossiliterous limestone with minor siltstone;								
1			part of Farewell Composite terrane and Mystic	Fossiliferous							
uMI	Fossiliferous limestone	Late Mississippian	subterrane	limestone		LH004	6335	Lime Hills	Sed	6335	PMI
			Thick bedded, gray, fossiliferous, limestone:								
1			part of Farewell Composite terrane and Mystic	Fossiliferous							
וחיי	Thick hadded limestone	Lato Dovonian (Frachian)	cubtorrano	(Frachian)		1 4004	6031	Limo Hillo	Sod	6031	DSml
uDI	THICK Dedued IIIIestone		Isublemane			111004	10321		Joeu	10321	וווניס

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
reserver unit			Shale and chert: contains SEDEX barite	10001	Induction age			Quadrangie			Label
		Devonian (Gevitian to	deposits: part of Farewell Composite terrane								
Dsc	Shale and chert	Frasnian)	and Mystic subterrane			LH004	6911	Lime Hills	Sed	6911	Dsc
			Thick bedded, dark-gray, limestone: part of								
			Farewell Composite terrane and Mystic								
IDI	Thick bedded limestone	Early Devonian (Emsian)	subterrane			LH004	6932	Lime Hills	Sed	6931	DSml
			Brown siltstone and sandstone of Sheep Creel	k							
			Formation after Bundtzen and others (1997) :	Pennsylvanian							
		Devonian to	part of Farewell Composite terrane and Mystic	fusilinids and							
PDs	Siltstone and sandstone	Pennsylvanian	subterrane	brachiopods		LH004	6010	Lime Hills	Sed	6010	PDsc
-	Mystic Subterrane,		Mystic subterrane, part of Farewell Composite								
Pzmu	undivided	Devonian to Triassic	terrane			LH004	5375	Lime Hills	Sed	5375	JDm
-											-
			Massive micritic limestone karst rich and								
			dolomitic; may be roughly equivalent to lower	-							
			Whirlwind Creek Formation in Medfra and								
	Massive micritic	Late Silurian to Early	McGrath quadrangles; part of Farewell								
SDIw(h)	limestone	Devonian	Composite terrane and Nixon Fork subterrane			LH004	6960	Lime Hills	Sed	6960	DSwc
			Holitna-Nixon Fork carbonates, undivided;								
	Holitna-Nixon Fork		part of Farewell Composite terrane and Nixon								
Pzh	carbonates, undivided	Paleozoic	Fork subterrane			LH004	8340	Lime Hills	Sed	8340	DZn
			Barren Ridge Limestone after Churkin and								
			Carter (1996) and Bundtzen and others								
			(1997); part of Farewell Composite terrane								
DSI	Barren Ridge Limestone	Silurian to Devonian	and Dillinger subterrane			LH004	6952	Lime Hills	Sed	6952	DSca
			Terra Cotta Sandstone after Churkin and								
			Carter (1996) and Bundtzen and others								
			(1997); part of Farewell Composite terrane								
mSs	Terra Cotta Sandstone	Middle Silurian	and Dillinger subterrane			LH004	6660	Lime Hills	Sed	6660	Stc
			Post River Formation after Churkin and Carter	•							
			(1996) and Bundtzen and others (1997); part								
			of Farewell Composite terrane and Dillinger								
SOsh	Post River Formation	Ordovician to Silurian	subterrane			LH004	7580	Lime Hills	Sed	7580	SCpl
			Lyman Hills Formation after Bundtzen and								
			others (1997); a separate mappable, lime rich	1							
			zone (class 7582) is shown separately; part o	f							
			Farewell Composite terrane and Dillinger								
OCIs	Lyman Hills Formation	Cambrian to Ordovician	subterrane			LH004	7581	Lime Hills	Sed	7580	SCpl
			Gabbro-diorite sills, dike swarms, and mafic								
	Gabbro-diorite sills,		volcanics; part of Farewell Composite terrane	2							
MzPzi	dikes, and volcanics	Paleozoic and Mesozoic	and Dillinger subterrane			LH004	5180	Lime Hills	Ign	5180	MzPzi
	Dillinger subterrane,		Dillinger subterrane, undivided; part of								
Pzdu	undivided	Paleozoic	Farewell Composite terrane			LH004	5310	Lime Hills	Sed	5310	DCd
Гgr	Granite	Tertiary	Coarse-grained granite		K/Ar of 55 Ma	LH004	1320	Lime Hills	Ign	1320	lpgr
L	Quartz monzonite dikes	L							_		L.
Tqm	and plutons	Tertiary	Quartz monzonite dikes and small plutons		K/Ar of 55 Ma	LH004	1307	Lime Hills	Ign	1307	Tgdp
Tb	Basalt flows	Tertiary	Basalt flows		K/Ar of 58 Ma	LH004	1004	Lime Hills	Ign	1004	Tb
TKf	Felsite pluton	Cretaceous and Tertiary	Felsite pluton, age unknown			LH004	1655	Lime Hills	Ign	1655	TKg
1 -	Quartz monzonite and		Quartz monzonite to diorite pluton with gold-							I –	
TKqm	diorite pluton	Tertiary and Cretaceous	copper skarn		K/Ar of 64 Ma	LH004	1656	Lime Hills	Ign	1655	TKg
	Schwatka unit										
Dsl	Limestone	Middle and Early Devonian	Limestone			CI003	703	Circle	Sed	6945	Ds
		Late Cretaceous or									
TKk	Kichatna pluton	Tertiary	Probably granite to tonalite			TL002	280	Talkeetna	Ign	1660	TKm
Q	Surficial deposits	Quaternary	Alluvium, colluvium, and loess			RB004	100	Ruby	Unconsol	100	Qs
			Medium- to coarse-grained equigranular to								
1			porphyritic biotite granite composed of							1	
			anhedral quartz, anhedral to euhedral								
1			(porphyritic variety) K-feldspar, anhedral		K-Ar age of 65.5 +/-					1	
TKg	Granite	Cretaceous-Tertiary	plagioclase and subhedral biotite		3.3 m.y. from biotite	RB004	110	Ruby	Ign	1655	TKg

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Pzmi	Intermediate to mafic intrusive rocks	Paleozoic	Fine- to medium-grained gabbro, subordinate quartz diorite, quartz monzonite, orthopyroxene gabbro, and pyroxenite. Commonly sill-like. Wallrocks are restricted t the Rampart Group	0		RB004	114	Ruby	Ign	5113	JPztm
			Argillaceous and arenaceous rocks, siliceous and calcareous chemical sedimentary rocks and volcanic rocks. Pzrgs is of a lower metamorphic grade than Pzrgmsv and consists of gray, green, black, and tan slate and siltstone interbedded with green to gray								
Pzrgs	Rampart Group	Paleozoic	gray-wacke and lesser white to green chert.			RB004	112	Ruby	Meta	5133	JMtu
			Argillaceous and arenaceous rocks, siliceous and calcareous chemical sedimentary rocks and volcanic rocks. Pzrgmsv is of a higher metamorphic grade than Pzrgs and consists o phyllite or fine-grained quartz-muscovite- chlorite schist intercalated with metagraywacke, recrystalized chert, and greenstone. Three cleavage planes create	f							
Pzrgmsv	Rampart Group	Paleozoic	pencil fracturing			RB004	113	Ruby	Meta	5133	JMtu
Pzrp	Ruby Phyllite	Paleozoic (?)	Graphitic phyllite with minor interbedded graphitic quartzite and quartzite. Locally fine grained graphitic schist and graphitic quartz- mica schist. Hornfelsed when adjacent to TK (not shown on map)	-		RB004	115	Ruby	Ign	5542	TrMtqp
			Medium- to coarse-grained marble composed								
Pzrm	Ruby Marble	Paleozoic (?)	diopside (?). Probably correlative with Tamarack Bluff limestone			RB004	117	Ruby	Meta	6905	Dm
Pztbl	Tamarack Bluff Limestone	Paleozoic (?)	Marble and recrystallized limestone, dominantly fine- to coarse-grained calcitic marble, with some sedimentary structures preserved. Probably correlative with Ruby Marble			RB004	116	Ruby	Meta	8620	Pzrm
PzpCs	Pelitic Schist	Precambrian and/or Paleozoic	Fine- to medium-grained graphitic quartz- muscovite +/- chlorite schist. Minerology consistent with greenschist facies metamorphism			RB004	118	Ruby	Meta	8601	PzZrqs
PzpCsg	Pelitic Schist and Gneiss	Precambrian and/or Paleozoic	Medium- to coarse-grained quartz +/- muscovite +/- chlorite +/- biotite +/ grapphite +/- garnet +/- staurolite schist, quartzofeldspathic orthogneiss, and foliated greenstone. Minerology consistant with amphibolite facies metamorphism			RB004	119	Ruby	Meta	8801	PzZrpg
	Volcanic and	Tartiany (2) and/or	Porphyritic basalt, andesite, and rhyolite								
ΤKv	Sedimentary rocks	Cretaceous (?)	intercalated siltstone and sandstone			RB004	120	Ruby	Ign	1605	TKvi
Pa	Graywacke, conglomerate and	Pormian	Fine- to medium-grained graywacke, graywacke conglomerate with basalt, andesite, shale, chert, quartzite, and schist clasts, and green to gray mudstone. Possibly correlative to gray mudstone. Possibly	microfossils of		PRODA	121	Buby	Sod	5745	Pig
i'y		i ciffian		probable retifiant age		10004	121	Ruby	Jeu	5745	i ig
MDc	Chert and Slate	Mississippian and Devonian	Thin-banded grey, green, and red chert with thin interheds of slate	Chert contains radiolarians of Devonian, Mississippian(?), and Mississippian age		RB004	122	Ruby	Meta	6390	TrMica

						Source					
Pock unit	Unit hamo	A.g.o	Description	Fossil	Padiametric ago	codo	Class codo	Quadranglo	Pock class		Labol
ROCK UTIL	Unit fidfie	Age	Description	FUSSII	Radiometric age	coue	Class coue	Quaurangle	RUCK CIASS	NSA Class	Label
	Undifferentiated	<b>a</b> .					200	Talkeetha		100	
Qs	Quaternary Deposits	Quaternary	Undifferentiated Quaternary deposits			1K003	200	Mountains	Unconsol	100	
			Slightly calcareous interbedded polymictic								
			conglomerate, lithic graywacke, siltstone and								
			shale. Correlative with Kahiltna flysch basin								
			(or terrane) of Jones and others (1981) and								
	Carbonate and		the Gravina-Nutzotin flysch belt of Richter	late Jurassic fossil				Talkeetna			
K1s	Sandstone	Mesozoic	(1976)	assemblage		ткооз	10121	Mountains	Sed	2850	Klf
			Light grey to dark grey carbonaceous	g-							
			limestone lenses and shale of the mafic								
			milestone lenses and associated acdimente of	Manatia an aflata				Talliastas			
Tal	Lineastana and Chala	Tripagia	the Amphitheter Crown			TKOOD	10145	Mauntaina	Cod	4020	17.4.00
1 El	Limestone and Shale	Triassic	the Amphitheter Group	Thassic age		TKUUS	10145	Mountains	Seu	4030	JINN
			Very dark green-grey to reddish-oxidized,								
			medium- to coarse-grained, mafic metabasalt								
			of the mafic metavolcanics and associated					Talkeetna			
Trmb	Mafic Basalt	Triassic	sediments of the Amphitheter Group			TK003	10141	Mountains	Ign	4420	Trn
	Partial marine and		Dark to medium green, generally altered,								
	subareal amvodaloidal		partial marine and subareal amygdaloidal								
	basalt flows, basaltic and		basalt flows, basaltic and andesitic tuffs							1	
	andesitic tuffs flows		flows dikes sills and applomerates of the							1	
	dikes sills and		mafic metavoleanics and accessized codiments					Talkootaa			
Tuch	uikes, sills, dilu	Tripagia	of the Amphitheter Crown			TKOOD	10142	Mauntaina	Tan	4420	T
Trab	aggiomerates	Triassic	or the Amphitheter Group			16003	10142	Mountains	Ign	4420	Trn
			Submarine erruptive sequence of dark green,								
			fine- to coarse-grained, pillow metabasalt and								
			andesite of the mafic metavolcanics and								
	Pillow basalt and		associated sediments of the Amphitheter					Talkeetna			
Tra	andesite	Triassic	Group			TK003	10143	Mountains	Ign	4422	Trn
			·								
			Light grey to medium grey meta-argillite,								
			metachert, and cherty argillite intercalated								
			with very fine-grained siliceous aguagene tuff								
	Light grow to modium		I ow grado regional metamorphism								
	arow moto praillito		Correlated with lower partians of the Tangle								
	grey meta-arginite,		Correlated with lower portions of the range								
	metachert, and cherty		subterrane of Nokelberg and Fisher (1989).								
	argillite intercalated with		Section includes the Mankomen group of								
	very fine-grained		Richter and Dutro (1975), Richter (1976), and					Talkeetna			
Pac	siliceous aquagene tuff	Permian	Richter and others (1977)			TK003	10124	Mountains	Meta	5950	Pe
			Olive green, medium-grained volcaniclastic							1	
			crystal lithic tuff, pyroxene-hornblende meta-							1	
			andesite flows, and metasandstone. Low							1	
			grade regional metamorphism. Correlated							1	
			with lower portions of the Tangle subterrane							1	
			of Nokelberg and Fisher (1989) Section							1	
			includes the Mankomen group of Richtor and							1	
	Moto andocito flows		Dutro (107E) Dichtor (1076) and Dichtor and					Talkootna		1	
D. dt	tuff and matagand to a	Dermien	athere (1077), Kichler (1976), and Kichter and			TKOOD	1 2 2	Mauntaina	Mata	5620	DDaaa
PVt	Lun, and metasandstone	remian	Others (19//)			1K003	123	mountains	meta	020	Prasc
			medium greenish-grey, sneared meta-								
1			andesite and metadacite flow rocks. Minor								
1			sheared Iapilli tuff. Low grade regional							1	
			metamorphism. Correlated with lower							1	
1			portions of the Tangle subterrane of							1	
			Nokelberg and Fisher (1989). Section							1	
			includes the Mankomen group of Richter and							1	
	Sheared mafic volcanic		Dutro (1975), Richter (1976), and Richter and					Talkeetna		1	
IPsmv	rocks	Permian	others (1977)			ткооз	10150	Mountains	Meta	6120	Pat
	1.00.00	r er men	100.00 (2077)	1	1	1	120100	,	1	0120	

						Source					
Rock unit	Unit hame	Are	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Lahel
Rock unic		//ge	Light grev fine- to medium-grained, impure,	10551	Rudiometrie uge		Clubb couc	Quuurungie			Laber
			siliceous bioclastic limestone with guartz and								
			argillitic angular lithic detritus. Chert and								
			minor guartzite. Low grade regional	Late Wolcampian to							
			metamorphism. Correlated with lower	Leonardian (middle to							
	Impure somewhat		portions of the Tangle subterrane of	late Early Permian)							
	recrystallized siliceous		Nokelberg and Fisher (1989). Section	and Leonardian to							
	bioclastic limestone.		includes the Mankomen group of Richter and	Guadolupian (late							
	chert and minor		Dutro (1975) Richter (1976) and Richter and	Farly to Farly Late				Talkeetna			
ulPla	quartzito	Pormian	others (1977)	Pormian) considents		TKOO3	10120	Mountains	Sod	5055	PPackm
uiria	quartzite	rennian	Undifferentiated altered volcanic flows	Fermian) conodonics		1005	10129	Houndains	Jeu	3933	FFASKIII
			pyroclastics and tuff Metabasalt meta-								
			andesite and metadacite Low grade regional								
			motomorphism Correlated with lower								
			portions of the Tangle subtorrane of								
			Nekelberg and Ficher (1080) Section								
			includes the Mankeman group of Dichter and								
	Matabasalt, mata		Dutre (1075) Dichter (1076) and Dichter and					Talliastes			
Duran	Metabasait, meta-	Damasian.	Dutro (1975), Richter (1976), and Richter and			TKOOD	10105	Talkeetha	N4 - 1 -	5620	DD
Pmvs	andesite, and metadacite	Permian	others (1977)			16003	10125	Mountains	мета	5630	PPasc
			Dark grow to black, crystal rich aguagona tuff								
			Dark grey to black, crystal-fich aquagene tun								
			with interbedded dark green-grey fine-grained								
			voicaniciastic metasandstone and cherty								
			argillite. Low grade regional metamorphism.								
			Correlated with lower portions of the Tangle								
			subterrane of Nokelberg and Fisher (1989).								
			Section includes the Mankomen group of								
	Aquagene tuff, argillite		Richter and Dutro (1975), Richter (1976), and					Talkeetna			
Pat	and metasandstone	Permian	Richter and others (1977)			TK003	10126	Mountains	Meta	5630	PPasc
			Light- to medium-grey, very fine-grained,								
			laminated siliceous bioclastic limestone								
			composed of fine-grained carbonate, chert,								
			angular quartz, and pelitic material. Low								
			grade regional metamorphism. Correlated								
			with lower portions of the Tangle subterrane								
			of Nokelberg and Fisher (1989). Section	Crinoid columnal-rich							
			includes the Mankomen group of Richter and	carbonate lavers vield							
	Silicious bioclastic		Dutro (1975), Richter (1976), and Richter and	late Wolfcampian				Talkeetna			
IPIs	limestone and argillite	Permian	others (1977)	conodonts		ткооз	10128	Mountains	Sed	5955	PPaskm
			Skarp formed adjacent to TKif by IPIs (not	conocicio			10120	Talkeetna	000	5555	
Tek	Skarn	Permian	likely this unit)			TKOO3	10160	Mountains	Sed	4030	1Trlm
TJK	Skam	rennan				11005	10100	Houndania	Jea	4030	511111
1			Distinctive white dolomitic marble and tan to							1	
1			green metatuff Regionally metamorphosed	1							
1			from prebnite-numpellyite through lower	1							
1			aroonschist to amphibalite metamorphic	1							
			greenschist to ampribolite metamorphic								
			racies. Correlated with the metamorphic								
			complex of the Guikana River of Nokelberg					<b>-</b> 11 .			
			and others (1989) and the Streina				10100	Talkeetna		5055	
uPzat	Dolomite and metatum	Late Paleozoic	Metamorphics of Platker and others (1989)			1K003	10130	Mountains	Meta	5955	PPaskm
1			Cilicified folgie metatuffs and metature "							1	
			Silicified feisic metatums and metarnyolite to								
1			metadacite flows intercalated with minor	1							
1			marble and dolomitic marble. Regionally							1	
1			metamorphosed from prehnite-pumpellyite	1							
1			through lower greenschist to amphibolite							1	
1			metamorphic facies. Correlated with the	1							
1	Silicified felsic metatuffs		metamorphic complex of the Gulkana River of							1	
1	and metarhyolite to		Nokelberg and others (1989) and the Strelna					Talkeetna		1	
uPzfv	metadacite flows	Late Paleozoic	Metamorphics of Plafker and others (1989)			TK003	10131	Mountains	Meta	5625	PPast

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
uPzsv	Mafic metabasalts, metaandesites, agglomerates, minor impure carbonates and pelitic semischists	Late Paleozoic	Mafic metabasalts, metaandesites, agglomerates, minor impure carbonates, and pelitic semischists. Regionally metamorphosed from prehnite-pumpellyite through lower greenschist to amphibolite metamorphic facies. Correlated with the metamorphic complex of the Gulkana River of Nokelberg and others (1989) and the Strelna Metamorphics of Plafker and others (1989)			ТК003	10132	Talkeetna Mountains	Meta	5550	PPast
uPzsl	Metapelites, mainly dark slate and phyllites	Late Paleozoic	Metapelites, mainly dark slate and phyllites. Regionally metamorphosed from prehnite- pumpellyite through lower greenschist to amphibolite metamorphic facies. Correlated with the metamorphic complex of the Gulkana River of Nokelberg and others (1989) and the Strelna Metamorphics of Plafker and others (1989)			ТК003	10133	Talkeetna Mountains	Meta	5950	Pe
uPzas	Pelitic and mafic metavolcanic schist and amphibolite	Late Paleozoic	Brown to grey, biotite-rich, quartz, feldspar, pelitic and mafic metavolcanic schist. Massive, fine-grained hornblende amphibolite. Regionally metamorphosed from prehnite- pumpellyite through lower greenschist to amphibolite metamorphic facies. Correlated with the metamorphic complex of the Gulkana River of Nokelberg and others (1989) and the Strelna Metamorphics of Plafker and others (1989)			ТК003	10134	Talkeetna Mountains	Meta	5920	PPast
TKif	Felsite and fine grained granite plugs	Tertiary and Cretaceous	Highly altered and weathered small bodies of felsite and fine grained granite plugs			ТК003	10112	Talkeetna Mountains	Ign	1655	TKg
Kam	Quartz monzonite	Cretaceous	Medium-grained, equigranular biotite quartz		Probably similar to other Late Cretaceous plutons in the region radiometrically dated by Turner and Smith (1974)	ткооз	10116	Talkeetna	Ian	2470	Ka
Tqd	Medium- to coarse- grained, generally equigranular, hypidiomorphic pyroxene- hornblende diorite	Cretaceous	Medium- to coarse-grained, generally equigranular, hypidiomorphic pyroxene- hornblende diorite			ткооз	10117	Talkeetna Mountains	Ign	2540	Kg
Tqd-f	Foliated medium- to coarse-grained, generally equigranular, hypidiomorphic pyroxene- hornblende diorite	Cretaceous	Foliated medium- to coarse-grained, generally equigranular, hypidiomorphic pyroxene- hornblende diorite			<u>TK003</u>	10118	Talkeetna Mountains	Ign	2540	Kg
Tqd-p Kqab	Porphyritic medium- to coarse-grained, generally equigranular, hypidiomorphic pyroxene- hornblende diorite Gabbro	Cretaceous	Porphyritic medium- to coarse-grained, generally equigranular, hypidiomorphic pyroxene-hornblende diorite Medium to dark grey, eqigranular, pyroxene- hornblende rich qabbro			<u>TK003</u> TK003	10140	Talkeetna Mountains Talkeetna Mountains	Ign Ian	2540	Kg Kmum

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
										[]	
	Diorite, gabbro, picrite,		Diorite, gabbro, picrite, and pyroxenite,								
	and pyroxenite sill and		ultramafic sill and dike swarm complex. Also					Talkeetna			
Mzms	dike swarm complex	Mesozoic	hypabyssal stocks and laccoliths			TK003	10127	Mountains	Ign	5245	JPaur
			Light to medium grey, medium-grained								
			equigranular to gneissic biotite-hornblende					Talkeetna			
KJgd	Granodiorite	Cretaceous and Jurassic	granodiorite			TK003	10119	Mountains	Ign	3402	Jgd
			Foliated light to medium grey, medium-								
			grained equigranular to gneissic biotite-								
			hornblende granodiorite. Unit not					Talkeetna			
KJgd-f	Foliated Granodiorite	Cretaceous and Jurassic	distinguished on map.			TK003	10120	Mountains	Ign	3402	Jgd
_								Talkeetna			-
gossan	gossan		gossan			TK003	110	Mountains	Unconsol		
-			Lava tubes and pillow structures of Tra, which								
			is submarine erruptive sequence of dark								
			green, fine- to coarse-grained, pillow								
	Pillow basalt and		metabasalt and andesite of the mafic								
	andesite displaying		metavolcanics and associated sediments of					Talkeetna			
Trap	structures	Triassic	the Amphitheter Group			ткооз	10144	Mountains	Ian	4422	Trn
										-	
			Hornfelsed mafic metabasalts, metaandesites,								
			agglomerates, minor impure carbonates, and								
			pelitic semischists. Regionally								
	Hornfelsed mafic		metamorphosed from prehnite-pumpellyite								
	metabasalts,		through lower greenschist to amphibolite								
	metaandesites,		metamorphic facies. Correlated with the								
	agglomerates, minor		metamorphic complex of the Gulkana River of								
	impure carbonates and		Nokelberg and others (1989) and the Streina					Talkeetna			
uPzsyh	pelitic semischists	Late Paleozoic	Metamorphics of Plafker and others (1989)			ткооз	10136	Mountains	Meta	25550	
	F		Two outcrops within Klad, on the southern					Talkeetna			
Hf			boundary of the map.			ткооз	111	Mountains			
						111000		Talkeetna			
TKir		Tertiary and Cretaceous	May be a typo on the map. If so, this is TKif			ткооз	10113	Mountains	Ian	1655	ТКа
			In the Kam description, a unit named Kad is				10110	riountanio		1000	
			described as a quartz diorite. This may be a								
			foliated quartz diorite May also be a typo. If					Talkootna			
Kad-f		Cretaceous	so it may be Kad-f or Klad-f			TKOO3	10114	Mountains	Ian	2540	Ka
Rgu i		Cretaceous	One outcrop on the southern boundary of the			110005	10111	Talkeetna	ign	2310	ittg
Klan		Cretaceous and Jurassic	man			TKOO3	10122	Mountaine		3402	lad
Togh			One outcrop on the couthern houndary of the			110005	10122	Talkootna		5102	Jgu
uPzem		Late Paleozoic	man			TKOO3	135	Mountaine	Mota	5955	PPackm
ui 23111	Wilber Creek and		Wilber Creek and Wolverine quartzite units			11005	155	Fiouritariis	inclu	5555	TTUSKIT
	Wolverine quartzite		undivided (TN003 modified shown as								
Klwc	units undivided	Cretaceous and Jurassic	southern TrPs)			TNOO3	2812	Tanana	Sed	2812	KIWC
Tro	Carbonatite		Magnetite rich carbonatite			TN003	2405	Tanana	Jan	4240	Tro
					+	111004	5495	raildlid	1911	+340	
1			l ocal biogenic limestone builduns in basal							1	
1			Quail unit deposited on the Troubleams unit							1	
1	Quail unit bacal		Are as much as 30 m thick and have a lateral							1	
Dal	limostono	Lata Dovenian?	Are as much as 50 m times and nave a lateral			1 0002	040	Livengood	Ead	6020	DCI
DYI	Innestone		Tevent of several number meters.	1		16002	1040	Livenguuu	Joeu	0520	וכטן

						Source				1	
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
ТКу	Volcanic rock	Tertiary to Late Cretaceous	Indian River, Takhakhdona Hills, and Dulbi River areas- light-gray to pink rhyolite tuff, welded (?) tuff, flows, and breccia. Subordinate pumice, dark vitrophyre, and obsidian. In Takhakhdona Hills also includesdark-green to black vesicular basalt flows. Big Creek- dark-green to green dacite and andesite porphyry flows and crystal tuffs. Probabaly correlative with similar flows and tuffs in Tanana and Bettles quads. These unit are Tertiary according to Patton (1998) however large area of TKv in the northeastern part of quad. should still be mapped as TKvr	Obsidian chippings and artifacts found in archeological site in NW AK may have source in obsidian occurrence north of Little Indian River.	Flows in Tanana and Bettles quads have K Ar date of 58 m.y.	MZ002	210	Melozitna	Ign	1603	TKvr
Ка	Granodiorite	Late Cretaceous?	Two small plutons in the se part of quadrangle. Fine- to medium-grained hornblende-biotite granodiorite with subordinate quartz monzonite and quartz diorite. Distinguished from others to the north by Bill Patton (March 1999)		K-Ar date of 82.3 and 89.0 m.y. from the Dulbatna Mountain pluton and 81.5 m.y. from the Indian Mountain pluton in adjoining Hurdhes quad	MZ002	300	Melozitna	Ian	2460	Ka
itg			Conglomerate, phyllite, calc-phyllite, siltstone,			112002	500	TICIOZICIIC	Ign	2100	ity .
Da	Quail unit, revision	Late Devonian?	and sandstone. Part of unit recorrelated to			1 6002	844	Livengood	Sed	6940	Dch
D Y			Argillite, chert, and mafic intrusive and			20002		Livengood	560	0510	000
Dt	Troublesome unit	Devonian(?)	extrusive rocks		11/Db aga 250 Ma	LG002	846	Livengood	Sed	6910	Dtr
Moa	Orthogneiss	Devonian	Orthogneiss		protolith(?) age	LG003	6521	Livengood	Ian	6521	MDvao
JMr	Rampart Group and associated mafic intrusive rocks, undivided	Mississippian to Jurassic	Rampart Group volcanic and sedimentary rock sequence, mafic rocks divided out			TN003	5133	Tanana	Ign	5130	JTrtmu
_	Serpentinite and or								_		
Jsc Kwca	Carbonatite Wilber Creek unit of Weber and others (1992), guartzite	Early Cretaceous	Carbonatite of unit Jsc Brown, argillaceous, impure quartzite and graywacke sandstone; locally mappable within dominantly argillaceous and graywacke section.			TN003	2118	Tanana	Ign Sed	2115	Kwcf
JMr	Rampart Group and associated mafic intrusive rocks, undivided	Mississippian to Jurassic	Rampart Group volcanic and sedimentary rock sequence, mafic rocks divided out			TN003	5132	Tanana	Ign	5132	JMtru
PzpCsq	Schist and Quartzite	Paleozoic or Precambrian	Quartz-muscovite-biotite schist, quartz- muscovite schist, quartzite, and amphibole schist; locally garnetiferous. Upper greenschist to lower amphibolite facies. Age unknown. Unit subdivided on published OFR98-133 into PzZysa and PzZysq.			BD002	451	Big Delta	Meta	8630	PzZysa
ьс	Birch Creek Schist	Uncertain but believe to be early Paleozoic or Precambrian	Light- to dark-gray, reddish-brown to tan- weathering schists, predominately quartz- sericite schist and micaeous quartzite. Includes mu-bio schist, garnet-mica schist, calcite-and dolomite-bearing schist, chloritic and graphitic schist, amphibolite, impure marble, and gneiss. Southern most part assigned to NSACLASS = 9322, part out in flats assigned to NSACLASS = 6511		120 m.y. to 1,170 m.y.	FB002	600	Fairbanks	Meta	9322	PzZaqs

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
bc	Birch Creek Schist	Uncertain but believe to be early Paleozoic or Precambrian	Light- to dark-gray, reddish-brown to tan- weathering schists, predominately quartz- sericite schist and micaeous quartzite. Includes mu-bio schist, garnet-mica schist, calcite-and dolomite-bearing schist, chloritic and graphitic schist, amphibolite, impure marble, and gneiss. Southern most part assigned to NSACLASS = 9322, part out in flats assigned to NSACLASS = 6511		120 m.y. to 1,170 m.y.	FB002	600	Fairbanks	Meta	6511	MDt?
bc	Birch Creek Schist	Uncertain but believe to be early Paleozoic or Precambrian	Light- to dark-gray, reddish-brown to tan- weathering schists, predominately quartz- sericite schist and micaeous quartzite. Includes mu-bio schist, garnet-mica schist, calcite-and dolomite-bearing schist, chloritic and graphitic schist, amphibolite, impure marble, and gneiss. Southern most part assigned to NSACLASS = 9322, part out in flats assigned to NSACLASS = 6511, part also assigned to NSACLASS = 8630 Birch Creek Schist, part correlated with		120 m.y. to 1,170 m.y.	FB002	600	Fairbanks	Meta	8630	PzZysa
bc	Birch Crook Schict	Palaozoic	Spruce Creek sequence of Kantishna Hills			FB002	600	Fairbanks	Mota	5666	Pace
ЬС	Birch Creek Schist	Uncertain but believe to be early Paleozoic or Precambrian	Light- to dark-gray, reddish-brown to tan- weathering schists, predominately quartz- sericite schist and micaeous quartzite. Includes mu-bio schist, garnet-mica schist, calcite-and dolomite-bearing schist, chloritic and graphitic schist, amphibolite, impure marble, and gneiss. Southern most part assigned to NSACLASS = 9322, part out in flats assigned to NSACLASS = 6511. Other parts coded 5660 and 5662.		120 m.y. to 1,170 m.y.	FB002	600	Fairbanks	Meta	5660	Pzk
bc	Birch Creek Schist	Uncertain but believe to be early Paleozoic or Precambrian	Light- to dark-gray, reddish-brown to tan- weathering schists, predominately quartz- sericite schist and micaeous quartzite. Includes mu-bio schist, garnet-mica schist, calcite-and dolomite-bearing schist, chloritic and graphitic schist, amphibolite, impure marble, and gneiss. Southern most part assigned to NSACLASS = 9322, part out in flats assigned to NSACLASS = 6511. Other parts coded 5660 and 5662.		120 m.y. to 1,170 m.y.	FB002	600	Fairbanks	Meta	5662	Pzkcp
			Metavolcanic and metavolcaniclastic rocks.					Kantishna			
MDt?	Totatlanika Schist?	Mississippian or Devonian	Unit added based on Bundtzen and Weber		Lood alpha are 55	KH005	6511	River	Meta	6511	MDt?
Kg	Granite?	Late Cretaceous	Unit not described on source map missing from legend		60 Ma, highly suspect.	RB005	111	Ruby	Ign	2460	Kg
Kg	Granitic rocks	probably Late Cretaceous and Early Cretaceous	Chiefly quartz monzonite in Kokrines Hills		K-Ar date of 111 Ma in Melozitna quad.	RB004	2410	Ruby	Ign	2530	Kg
Unk	Unknown		Where did this come from? The younger unit, mcb, contains schist and			KB?	0	Ruby	Ign	4210	Irn
mcb	Metamorphic complex	Precambrian or Paleozoic	quatzite with some crystalline limestone, slate, and greenstone. Part of unit recorrelated (D.N. Bradley, USGS, pers commun., 1998)			RB002	503	Ruby	Meta	7580	SCpl

						Source					
Rock unit	Unit hame	Ane	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
ROCK UTIL	onichame		In eastern part of quad, metamorphic complex	10331	Radiometric age	coue		Quadrangie	ROCK Clubb		Label
			manned as two units mca and mch. The								
			older unit mea is composed of crystalline								
			limestone and greenstone with some schist								
mca	Motamorphic complex	Procembrian or Paloozoic	and phyllito			PB002	504	Ruby	Mota	8600	VZnm
ilica			and phymee.			KD002	504	Ruby	Meta	8000	121111
					K-Ar on biotite 921						
					+/- 25 Ma						
			Shoarod motamorphocod porphyritic quartz		mouscovito in bordor						
nCm	Moto quarta diarita	middle Brotorozoic?	diorito		Topo 662 / 20 Mo	DBOOZ	0710	Buby	Moto	9710	Voad
pem			Mostly gray fine- to modium-grained		2011e 003+/- 20 Ma	KDUU7	8710	KUDY	Meta	8710	riiqu
			quartzite interlayered with mostly gray								
	Quartzite argillite		greenish-gray reddish-gray and tan argillite								
	conglomerate and	Cretaceous and/or	(1 northwesternmost polygon at CI-IG guad								
K1ga	bornfolc	luraccic	boundary			C1002	400	Circlo	Mota	2115	Kwcf
Бусл	normeis		boundary		K-Ar ages range from	C1002	400	CITCLE	Meta	2115	RWCI
			Chloritized perphyrite (herphlanda) histite		$57 \pm 4$ 2Ma to $71 \pm 4$						
			monzograinto Also includos rocks mannod as		2 Ma: Ar-Ar studios						
			units Kap and Kard, grapito or grapodiorito(2)		z Ma, Al-Al Studies						
Ka	Granito	Crotacoous	porphyry and grapodiorite		of 90 Ma	C1005	2460	Circlo	Ian	2460	Ka
ĸy	Granite	Cretaceous	porpriyry and granoulonite.		01 90 Ma	C1005	2400	CITCLE	Ign	2400	кy
	Quartzite argillito		Mostly gray fine- to modium-grained								
	condomorate and	Crotacoous and/or	auartzita interlayered with mostly gray								
Kwef	bornfolo		quartizite, internayered with mostly gray,			C1002	FEOO	Circle	Sod	2115	Kuucf
<b>NWCI</b>	normeis	Julassic	Gray black or olive-gray siltstone and			C1003	5500	CITCIE	Seu	2115	KWCI
			argillite and mudstone. Tan dolomite gray to								
			dark-gray fine-grained limestone, gray or dark								
			aray chart Mafic ignorus racks are dikes	Ī							
			gidy chert. Malic igneous focks are unles,								
			Sills, did Sildi lense-like boules of dark-								
			of evenesure negative contains short couther								
	Ciltate a de la seite		of exposure, northern contains chert, southern								
	Slitstone, dolomite,		matic igneous rocks. This insaciass								
<b>CO</b> -	chert, and maric igneous		assignment is for the southern of the two			67000	6250	Cinala	T	7610	06-
SUS	rocks	Silurian and/or Ordovician	areas.			C1002	6250	Circle	Ign	7610	OfC
D-7	Calebra and disaits		Gabbro and diorite and some sedimentary			67002	6500	Cinala	T	0450	NA-7
PZZM	Gabbro and diorite	Paleozoic or precambrian	rocks of unknown affinity			C1003	6500	Circie	Ign	8450	Mzzum
			Various limestone symbol shown on Circle								
			map in a variety of rock units. No further								
		Paleozoic and or	description in text. Includes on southern								
unk	Limestone	preCambrian	polygons of unit			C1002	1900	Circle	Sed	8430	Is
			Various chert symbols shown on Circle map in								
			a variety of rock units. No further description								
1.		Paleozoic and or	in text. Assigned to Rampart-Tozitha			67000		<u>.</u>		5000	
cn	Chert	preCambrian	sedimentary rock unit on the basis of location.			C1002	1910	Circle	Sed	5020	TrMts
			Gray or greenish-gray quartzite and quartzitic								
			schists are dominant rock types. Minor pelitic								
		<b>.</b>	schist, calc-silicate, matic schist, and rare								
	Quartzite and quartzitic	Paleozoic and/or	marble are interlayered with quartzite and								
PzpCq	schists	Precambrian	quartzitic schists.			CI002	1600	Circle	Meta	9320	PzZyqs
1										1	
1			Gray, maroon, and green slaty argillite							1	
1			interlayered with gray and greenish-gray grit							1	
	Argillite, grit, and	Paleozoic and/or	and quartzite. Minor limestone in southern								
PzpCa	quartzite	Precambrian	part of exposure. Western exposures in part.			C1002	1000	Circle	Meta	8310	CZwa
			Chiefly dark-greenish gray to pale-olive								
1			tuffaceous and feldspathic fine-to-very coarse-	Association and						1	
1			grained sandstone. Subordinate dark-gray	gradational(?) with						1	
1			mudstone. Many sandstone beds distinctly	units containing						1	
1	Graywacke sandstone		mottled due to partial zeolitization of volcanic	Buchia of earliest						1	
Kgs	and mudstone	Early(?) Cretaceous	material.	Cretaceous age.		KT002	200	Kateel River	Sed	2180	Kvm
						Source					
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Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
								<b>Q</b> ===== <b>j</b> ==			
			Chiefly porphyritic pyroxene andesite and								
			trachyandesite flows, andesitic crystal and								
			lithic tuff, and massive andesite breccia,								
			agglomerate, and conglomerate. Commonly								
			altered and therefore nale green								
			Interbedded dark-greenish-gray tuffaceous								
			graywacka chart shalo and impure								
			limestone containing Ruchia Mildly deformed								
	Andositis valennis value		and uppleared upplear boost and personated								
	Andesitic voicanic rocks -		and unaitered vesicular basalt and associated								
	Roundabout Mountain	Cretaceous and	pyroclastic rocks along Koyukuk River near			1/7000			-	1001	
KJV	volcanic field	Jurassic(?)	Roundabout Mt. may be of Tertiary age.			K1003	801	Kateel River	Ign	1081	IVD
			Undifferientiated units Km and Kn. Units on								
	Undifferentiated		east side of quadrangle reassigned to unit Kv	9							
Knm	sedimentary rocks	Cretaceous	(NSA 2180).			KT002	212	Kateel River	Sed	2180	Kvm
			Lime rich zone in the Lyman Hills Formation								
			after Bundtzen and others (1997); part of								
			Farewell Composite terrane and Dillinger								
OCIs	Lyman Hills Formation	Cambrian to Ordovician	subterrane			LH004	7582	Lime Hills	Sed	7580	SCpl
1	Northeast Prong, Tired		Large fine- to coarse-grained seriate, biotite		K-Ar biotite ranging						/
Tnen	Pup pluton	middle Tertiary	or biotite-amphibole granite pluton		from 25.4 to 26.7 Ma	1 H004	902	l ime Hills	Ian	1270	Tour
ттер					110111 23.4 to 20.7 110	LIIUU	502	Line mis	- Ign	1270	Togi
1			Sedimentary rocks Undifferentiated shale								
			siltstone argillite and limestone. Essel								
			chiefly grapetlites, collected from these rocks								
			chieffy grapotities, conected from these focks								
			are Late Camprian(?), Ordovician, Silurian,								
			and Devonian in age. Tentatively correlated								
			with Dilinger sequence of sedimentary rocks.								
			Unit description from LH003. Consists of								
	Sedimentary rocks		slected polygons re-assigned to Kahiltna								
Pzu	(limey)	Paleozoic	flysch sequence.			LH002	190	Lime Hills	Sed	2850	KJf
			Light to medium-gray biotite-aegerine-olivine								
			diorite, monzonite, and subordinate quartz								
	Diorite, monzonite, and	Latest Cretaceous, earliest	svenite. Forms bulk of Cripple Creek								
TKm	quartz svenite	Tertiary	Mountains pluton		K-Ar age of 71 3 Ma	MD003	1660	Medfra	Ian	1660	TKm
	quarte syerine		Light to medium-gray biotite-segerine-olivine		it / i uge of / 1.5 Hu	112003	1000	ricuiru	ign	1000	
			digrite monzonite and subordinate quartz								
	Diguite meaning and	Labort Crata social applicat	avanita Forma hully of Crinple Creek								
TI	Dionte, monito	Tertiers	Meuntaine aluten		K An age of 71 2 Ma	00003	1000	Madfin	Tan	1000	TI/ma
ткш	quartz syenite	Teruary			K-AF age of 71.5 Ma	00003	1000	Meurra	Ign	1000	ткш
			Greenish gray, poorly sorted fine- to coarse-								
	Coarse-grained		grained lithic-volcaniclastic sandstone and								
	volcaniclastic sandstone		pebble conglomerate composed chiefly of								
Kcvs/Kcs	and conglomerate	earliest Cretaceous	volcanic rock and chert detritus, and quartz.	Inoceramus		MD003	2180	Medfra	Sed	2180	Kvm
			Unit not described. Sinlge polygon located								
1			north of coal-bearing sedimentary rocks in the	e							
OCI	Unknown	Cambrian and Ordovician	southwestern McGrath guadrangle.			MG003	630	McGrath	Sed	7520	Ont
			Medium-gray to medium-green, medium- to								
			coarse-grained schistose foliated actinolite-								
1	Greenschist and quartz	early Paleozoic or	chlorite-epidote areenschist and hiotite-								
P7nCc	mica schist	proCambrian	chlorite-albite-quartz schist			MD003	8601	Modfra	Mota	8601	Dz7rac
rzpcs		precambrian	Medium to dark gray green and come red			110005	8001	Heulia	Ineca	8001	F22145
			radiolarian chart interhedded darly are								
	Devided share 1	Demonstration of the	rauioiarian chert. Interbedded dark-gray								
	Banded chert and	Pennsylvanian and	argillite, and very minor tuffaceous volcanic								
TrMc	argillite	Mississippian	госкя	Radiolarians		MD003	6080	Medfra	Sed	6080	IrMica
1			Dark-greenish, very fine grained cherty tuff								
	Siliceous tuff, crystal and		grading into greenish-gray radiolarian chert.								
	lithic tuffs, and		Fine to coarse-grained dark greenish-gray								
1	metasiltstone and Mafic		crystal and lithic tuff. Volcanic breccia and	Radiolaria and							
1	volcanic breccia, tuff,		conglomerate composed of poorly sorted	conodonts reported by	,						
JTrt:	siltstone, chert, and		clasts of mafic volcanic rocks and cherty tuff	Patton and others.							
JTrma	agglomerate	Triassic and early Jurassic	in a crystal and lithic tuff matrix.	1980 (MD002)		MD003	3851	Medfra	Ian	3851	JTrta
			, , , , , , , , , , , , , , , , , , ,							<del>.</del>	

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Ouadrangle	Rock class	NSA class	Label
	Mafic tuff, volcaniclastic		Medium- to dark-gray, coarse-grained augite- plagioclase-rich mafic tuff, volcaniclastic sandstone, and porphyritic basaltic andesite and basalt. Also. light- to medium-green-	Veghicyclia spp., Pseudoheliodiscus spp., and Sarla spp. of Norian age and Crytostome bryozoan.							
	sandstone, and minor		gray, medium- to coarse-grained, commonly	brachiopod and							
	mafic flows and		calcareous lithic pebble sandstone and minor	pelmatozoan							
TrMv;	Calcareous, lithic pebble		medium-gray siltstone containing distinctive	fragments of probable							
TrMcs	sandstone	Triassic to Mississippian	pebbles of green-gray chert, argillite, and tuff	. late Paleozoic age		MD003	5021	Medfra	Sed	5021	TrMis
			Gnessic phase in southern part of the								
Km 🗆	Augon orthognioco	Farly Crotacoouc	neiozitha piuton now recognized as augen			M7002	270	Molozitaa	Moto	6522	MDrae
	Augen orthogniess		or chogneiss.			142002	370	Melozitila	meta	0322	MDIau
	Pelitic and quartzose	Paleozoic and	Pelitic and quartzose schist sequence, recoder	1				Mount			
PzpCp?	schist sequence	preCambrian?	as Wickersham on northern part of map.	•		MM002	8631	McKinley	Meta	8300	CZW
·			Pelitic and quartzose schist sequence.								
	Pelitic and quartzose	Paleozoic and	Reclassified single polygon on the northeast					Mount			
PzpCp	schist sequence	preCambrian?	part of map			MM002	8630	McKinley	Meta	8300	CZw
			Sandstone, shale, and conglomerate marine								
	Undifferentiated		and nonmarine deltaic deposits in south and				1.0.0				
Ksu?	sedimentary rocks	Late and Early Cretaceous	east part of quadrangle			NL003	1940	Nulato	Sed	2020	Kme
Ka	Turbidite deposits	Early Cretaceous	Graywacke and mudstone turbidite deposits. Polygons north of Kaltag fault on west side of quadrangle of this unit reassigned to unit Ksm			NL003	2105	Nulato	Sed	2101	Ksse
Kg	Turbidite deposits	Early Cretaceous	Graywacke and mudstone turbidite deposits. Polygons in extreme northwest of quadrangle of this unit reassigned to unit Kgw on DOG map, lumped back by W.W. Patton, Jr., (1999)			NL003	2115	Nulato	Sed	2180	Kvm
	Dearth arthly dishare										
TrMb	Basalt, gabbro, diabase,	Mississippian to Triassis				NI 002	E120	Nulata	Icn	E140	1Mab
						INLUUS	5150	Nulato	Ign	5140	JIMBD
TrMc	Banded chert and argillite	Triassic, Permian, Pennsylvanian, and Mississippian	Medium- to dark-gray, green, and some red radiolarian chert, interbedded dark-gray argillite, and very minor tuffaceous volcanic rocks.	Albaillella sp.(Middle and Late Mississippian), Latentibifistula sp. (Pennsylvanian and Permian), Capnodoce sp. (Triassic?)		OP003	6080	Ophir	Sed	5112	TrMica
Kcvs/Kcs	Coarse-grained volcaniclastic sandstone and conglomerate	earliest Cretaceous	Greenish gray, poorly sorted fine- to coarse- grained lithic-volcaniclastic sandstone and pebble conglomerate composed chiefly of volcanic rock and chert detritus, and quartz.	Inoceramus		OP003	2180	Ophir	Sed	2180	Kvm
JTrt; JTrma	Siliceous tuff, crystal and lithic tuffs, and metasiltstone and Mafic volcanic breccia, tuff, siltstone, chert, and agglomerate	Triassic and early Jurassic	Dark-greenish, very fine grained cherty tuff grading into greenish-gray radiolarian chert. Fine to coarse-grained dark greenish-gray crystal and lithic tuff. Volcanic breccia and conglomerate composed of poorly sorted clasts of mafic volcanic rocks and cherty tuff in a crystal and lithic tuff matrix.	Radiolaria and conodonts reported by Patton and others, 1980 (MD002)		OP003	3851	Ophir	Ian	3851	JTrta

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Rock unic		hge		10331	Rudiometrie uge	couc	Clubb Couc	Quuunungie			Laber
				Veghicyclia spp.,							
			Medium- to dark-gray, coarse-grained augite-	Pseudoheliodiscus							
			plagioclase-rich mafic tuff, volcaniclastic	spp., and Sarla spp.							
			sandstone and porphyritic basaltic andesite	of Norian age and							
	Mafic tuff volcaniclastic		and basalt Also light- to medium-green-	Crytostome bryozoan							
	sandstone and minor		aray medium- to coarse-grained commonly	brachiopod and							
	matic flows and		calcaroous lithic pobble candstone and minor	polmatozoan							
T-M	Calesraque, lithia nabhla		calcaleous inflic pebble satustone and minor	free amonto of probable							
TrMv;	calcareous, ittnic pebble	Tuinesis to Mississinnian	medium-gray sitistone containing distinctive	Inagments of probable		00000	5021	Onhin	Cad	5021	TaMia
TrMCS	sandstone	Thassic to Mississippian	peoples of green-gray chert, arginite, and tun.	late Paleozoic age		00003	5021	Ophir	Seu	5021	Triviis
	Cabiataga matamanhia	Farly Delegrate or Late	Schistose metamorphic rocks Unit on								
	Schistose metamorphic	Early Paleozoic or Late	northern edge of map recorrelated based on			0.000		o		FF 43	
PzpCs	rocks	Precambrian	Information from Bill Patton			00002	802	Ophir	Meta	5542	TrMtqp
		Triassic, Permian,	Sandstone, grit, and argillite some polygons								
		Pennsylvanian, and	in northeast part of map reassigned to unit								
TrMs	None	Mississippian	PzpCph, per Bundtzen and others (1997)			OP003	601	Ophir	Sed	8601	PzZrqs
	Dishna River mafic and		Dishna River mafic and ultramafic rocks								
Jdr	ultramafic rocks	Jurassic	extension into Ophir quadrangle			OP002	600	Ophir	Ign	5191	Jium
			Medium-greenish-gray, aphanitic to fine-								
1			grained, porphyritic, hornblende-rich basaltic								
	Basaltic andesite, basalt,		andesite; uncommon basalt and very fine								
TKva	and lapilli tuff	Tertiary(?) and Cretaceous	grained lapilli tuff(?)			OP003	1600	Ophir	Ign	1600	TKv
			Sandstone, shale, and conglomerate marine								
	Undifferentiated		and nonmarine deltaic deposits in southwest								
	sedimentary rocks		part of guadrangle. Addition of subdivision by								
Ksu?	conglomerate facies	Late and Early Cretaceous	W.W. Patton, 1r., 1999			NI 004	1940	Nulato	Sed	2024	Kccf
	g	Pleistocene and Pliocene									
оті	Intrusive rocks		Intrusive rocks			VA002	460	Valdez	Ian	460	оті
QII		(.)	Schist crystalline limestone quartzite			171002	100	Vuluez	1911	100	Q II
			greenstone slate and phyllite Areas of								
			crystalling limestone manped congrately when								
mc	Motomorphic complex	Procambrian or Paloozoic	possible as mel			PB002	501	Ruby	Mota	0325	Dz7rac
IIIC						KD002	501	Ruby	meta	9323	FZZIYS
			Medium- to dark-gray, generally isoclinally								
			folded, thick sequence of lithic graywacke.								
			nhvilite and shale with local lenses of quartz-								
			chert conglomerate Minor fossiliferous								
			limestone, radiolarian chert, and red								
			forruginous candstone and siltstone								
			Description suggests could include recks of								
			the Talkestra Fermation Matanucka								
			Line Talkeetina Formation, Matanuska								
			Formation, and Neichina LS. or Herendeen	T							
			[Fm., along with other units.] South of Denali	Inoceramus,							
			Fault. This single polygon recoded as Chinitha	ammonites,							
	Undivided marine	Cretaceous and Early	Fm and Tuxedni Group, undivided based on	brachiopods, and			201			24.40	
KJS	sedimentary rocks	Jurassic	reasonable correlation.	pelecypods		11002	301	Talkeetna	Sea	3140	Jtxc
			Medium- to dark-gray, generally isocimally								
			Tolded, thick sequence of fittic graywacke,								
			phyllite, and shale with local lenses of quartz-								
			chert congiomerate. Minor rossiliterous								
1			limestone, radiolarian chert, and red								
			ferruginous sandstone and siltstone.								
1			[Description suggests could include rocks of								
1			the Talkeetna Formation, Matanuska								
1			Formation, and Nelchina Ls. or Herendeen								
1			[Fm., along with other units.] South of Denali	Inoceramus,							
1			Fault. These polygons recoded as Tatina River	ammonites,							
1	Undivided marine	Cretaceous and Early	volcanics, upper member based on reasonable	brachiopods, and							
KJs	sedimentary rocks	Jurassic	correlation.	pelecypods		TL002	301	Talkeetna	Sed	3210	JTrtv

						Source					
Rock unit	Unit hame	Age	Description	Fossil	Radiometric age	code	Class code	Quadrangle	Rock class	NSA class	Label
Kag	Argillite and lithic	Early Cratacoous	These rocks occur in a monotous, intensely deformed flyschlike turbidite sequence, probably several thousand meters thick. The rocks are highly indurated, and many are sheared and pervasively cleaved. Most cleavage is axial plane cleavage. The argillite is dark gray to black with detrital mica as much as 1 mm in diameter. Graywacke is dark to medium gray, fine to medium grained, and occure intercalated with the argilite	poorly preserved fossils of Incoceramus sp.; a block of Buchia- bearing limestone was found in float	5	TK002	510	Talkeetna	Sod	2850	V1f
кад	graywacke	Early Cretaceous	and occurs intercalated with the arguilite.	found in float.		I KUU2	1510	Mountains	Sea	2850	KJT