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CHAPTER 25.
RECREATION
Bristol Bay Drainages

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ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
BBAP	Bristol Bay Area Plan
BLM	Bureau of Land Management
CUA	commercial use authorization
DWC	Division of Wildlife Conservation (ADF&G)
EFH essential	fish habitat
FDD	fisheries distribution database
GMU gam	e management unit
N/A	not applicable or not available
NMRRMP	Nushagak and Mulchatna Rivers Recreation Management Plan
NP&P	National Park and Preserve
NPS	National Park Service
Rd	public recreation and tourism–dispersed (land use designation)
RMP resource	management plan
Rp	public recreation and tourism–public use site (land use designation)
RV recreational	vehicle
SFD	Sport Fish Division (ADF&G)
SUA	Special Use Area
UCU	uniform coding unit
USGS	United States Geological Survey

25. RECREATION

25.1 Introduction

This chapter inventories, describes, quantifies and maps the outdoor recreational resources and activities in the Bristol Bay drainages study area.

25.2 Study Objectives

The study objectives were as follows:

- Describe the location, use, and management status of important recreational resources in the study area.
- Describe, quantify, and map the location of recreational activities.
- Estimate the economic contribution of recreation to the study-area economy.

25.3 Study Area

Two general study areas, a regional study area and a central study area, were defined in the Bristol Bay drainages for the recreation baseline study (Figure 25-1). In addition, the regional study area incorporates three usage-focused study areas: land use, big game hunting, and sportfishing.

The regional study area covers an expansive area, much of which is far from the Pebble Deposit and transportation corridor study area. This broad definition of the study area partly reflects the mobile life cycle of some of the region's important fish and wildlife populations. It also takes account of public concern for the region's three national park units and one state park. Finally, it recognizes that the region's limited support services and logistical infrastructure are essential for access to and enjoyment of the recreational resources of this remote, vast, and thinly populated region. The central study area focuses on the area in the immediate vicinity of the Pebble Deposit and transportation corridor study area.

As a practical matter, and for various reasons, the regional study area's outer boundary was flexibly defined to fit the geographic databases for different recreational resources and activities and their management regimes. Several key public agencies manage recreational resources and generate recreational data for differently defined geographic units. For example, the Alaska Department of Natural Resources (ADNR) has two major management plans—the Bristol Bay Area Plan (BBAP; ADNR, 2005a) and the Nushagak and Mulchatna Rivers Recreation Management Plan (NMRRMP; ADNR, 2005b)—whose jurisdictions partly overlap the study area. The planning boundaries for the two plans do not match each other or the management boundaries used by other state and federal management agencies. Two large national park units—Katmai National Park and Preserve (Katmai NP&P) and Lake Clark National Park and Preserve (Lake Clark NP&P)—straddle the Bristol Bay/Cook Inlet drainages boundary, but most of their recreational use occurs in the Bristol Bay drainages, west of the divide; for simplicity, both park units are treated entirely as part of the Bristol Bay drainages study area. The Alaska

Department of Fish and Game (ADF&G) collects data on sportfishing and big game hunting for geographic units specifically designed for management of fish or wildlife resources.

The study areas for sportfishing and big game hunting extend beyond the land use study area into the Mulchatna and Nushagak drainages to address a greater potential range of mobile fish and wildlife resources.

With the above considerations in mind, the study-area boundaries for land use, big game hunting, and sportfishing were defined as follows (Figure 25-1):

- The land use study area encompasses an estimated 22,526 square miles (approximately 14,416,640 acres). It is based on the planning units of the two state plans, the BBAP and the NMRRMP, and the boundaries of the region's two large national park units, the Katmai and Lake Clark NP&Ps. It is bordered on the west by the perimeter of the Naknek and Kvichak river drainages and Mulchatna River corridor, and on the east by the Bristol Bay/Cook Inlet drainages boundary, except that it includes all of Katmai and Lake Clark NP&Ps.
- The big game hunting study area encompasses an estimated 23,283 square miles (approximately 14,901,120 acres). Its boundary is based on ADF&G's game management units and their subdivisions. Its western boundary extends beyond the land use study area to cover additional territory in the Nushagak/Mulchatna drainages where the Mulchatna caribou herd ranges.
- The sportfishing study area encompasses an estimated 26,233 square miles (approximately 16,789,120 acres). Its boundary is based on ADF&G's fishery management areas. It extends on the west to include the entire upper Nushagak River drainage. This includes the Tikchik/Nuyakuk drainage (in the northern part of Wood-Tikchik State Park), which joins the Nushagak River about eight miles north of the village of Koliganek.

The recreation central study area in the Bristol Bay drainages encompasses the local drainage areas in the vicinity of the Pebble Deposit and transportation corridor study area (Figure 25-1). Because they are nearer to Pebble Deposit and/or transportation study area, recreational lands and sportfishing and big game hunting activities for the central study area are described and mapped in greater detail than those for the regional study area.

25.4 Scope of Work

The scope of work for the recreation study was to inventory, describe, quantify and map the outdoor recreational resources and activities, mainly sportfishing, big game hunting, and wildlife viewing, in the Bristol Bay drainages study area. The scope of work includes public and private recreational lands and waters in the regional study area. The work was conducted by Kevin Waring Associates.

25.5 Methods

This baseline description draws on several state and federal land use plans and resource management documents for public lands in the study area. Additionally, it relies heavily on ADF&G's published and online reports and documents and unpublished data records on sportfishing and big game hunting. Additional information—for example, the inventory of recreation lodges—was compiled from extensive Internet searches and other unpublished sources.

The existing information base for describing recreational resources is well detailed for state lands and less detailed for federal lands. The State of Alaska is the study area's largest landowner. In 2005, it revised and adopted two comprehensive management plans for its lands in the area covered by the regional study area. These plans document recreational resources on state lands and identify tracts that are to be managed primarily for recreational purposes. In 2007, the federal Bureau of Land Management (BLM) finished its first resource management plan (RMP) that covers its landholdings in the study area; that plan's resource inventory and management guidelines are more general than those in the state plans. The National Park Service (NPS) does not have detailed management plans for its three national park units (Lake Clark and Katmai NP&Ps and the Alagnak Wild River) that are in the study area; however, much information on the park units was gathered from NPS websites and publications. Finally, the available information on recreational assets and uses on private lands is minimal.

The resource database for the state lands in and near the central study area is relatively strong. The Pebble Deposit is on state land. The possible transportation corridor traverses state and private land, but no federal land. There are no national park units or BLM landholdings in the central study area. For the most part, the national park units are in the periphery of the regional study area. No national parks are directly downstream of the Pebble Deposit or the transportation corridor study area. However, each national park contains some drainages that flow into rivers or waterbodies that are downstream of the Pebble Deposit or transportation corridor study area. Anadromous fish species may migrate through these downstream waters en route to spawning habitats in the NPS units. For example, drainages in Lake Clark NP&P flow into Lake Iliamna and into the Mulchatna River; some Katmai NP&P streams and the Alagnak River flow into the Kvichak River; other Katmai NP&P streams flow via the Naknek River into Kvichak Bay. BLM's landholdings tend to have relatively low recreational value because they consist of the unselected tracts left after land selections made under the Alaska Statehood Act, the Alaska Native Claims Settlement Act (ANCSA), the Alaska National Interest Lands Conservation Act (ANILCA), and Native allotments and other federal land-selection laws.

The information base for describing recreational activities in the study area is also uneven in detail. The state actively manages fish and wildlife resources, and regulates and monitors sportfishing and big game hunting. As a result, the database on sportfishing and big game hunting—two of the most popular activities in the study area—is comprehensive, geographically detailed, and statistically robust. The NPS has counted visitors to some of its facilities in the Lake Clark and Katmai NP&Ps, but not visitors to the Alagnak Wild River. In addition, many recreational uses of state and federal lands in this vast wilderness region, especially wilderness activities such as backcountry camping and hiking, river trips, wildlife viewing, and flight-seeing, do not require personal registration or permits. These recreational uses are not counted in any systematic way and may go unnoticed; consequently, information about these recreational activities tends to be spotty and anecdotal, and qualitative rather than quantitative. Finally, the routine outdoor recreation of local residents goes mostly undocumented.

This baseline study is descriptive in nature. The study area is vast, nearly as large as West Virginia. Its geography and natural endowments are diverse, and its varied recreational resources and activities are spread unevenly across its landscape. Additionally, the quantitative data for two key activities (sportfishing and big game hunting) are voluminous. For this reason, this chapter relies heavily on detailed maps, complemented by tabular geographic databases, to display the spatial distribution of recreational resources and activities.

25.6 Results and Discussion

25.6.1 Introduction

The regional study area is sparsely populated and developed. The state and federal governments are the largest landowners. Most of the area is wilderness or near-wilderness. Outside its few small settlements, the principal human uses of the region's resources are subsistence (see Chapter 23) and recreation. Of the land use study area's 22,526 square miles (approximately 14,416,640 acres), some 12,945 square miles (approximately 8,284,800 acres) or 57 percent, are managed primarily for recreation-related purposes. This includes the three national park units (totaling approximately 11,697 federally-owned square miles or 7,487,778 acres) and 1,248 square miles (approximately 798,720 acres) of state lands managed for recreation under the BBAP and NMRRMP. Recreation and related support services are major contributors to some local economies. However, several circumstances constrain the opportunities for recreation in the study area. The study area is remote and lightly populated, and has few roads. It is costly and time-consuming to access.

The regional study area's thousands of square miles of remote wilderness possess abundant and varied natural attractions. These include the world's most productive wild-salmon habitat, world-class sportfishing, mountain ranges with several active volcanoes, including the Valley of Ten Thousand Smokes, brown bear and other wildlife viewing, the largest lakes in Alaska (Iliamna Lake) and in the national park system (Naknek Lake), one of the state's larger caribou herds. There are also opportunities for backcountry recreation.

These attractions support a wide variety of outdoor recreational activities, depending on the season. The prime times for sportfishing and big game hunting are summer and fall. The wilderness areas in the national park units and on state lands are visited most heavily in the mid-year months, when they are popular destinations for sportfishing and hunting, wildlife viewing, photography, sightseeing, flight-seeing, backcountry hiking and camping, and river sports. Many in-region residents use the study area for recreation, but recreational visitors from elsewhere in Alaska and from outside Alaska are much more numerous. The nonresident visitors support some visitor-oriented businesses that are important to the local economy, including air charter services and other transportation providers, fishing and hunting guides and outfitters, lodges and other accommodations, food services, and suppliers of other recreational and ecotourism experiences such as hiking, backpacking, kayaking, rafting, nature photography, and wildlife viewing. Such businesses are clustered particularly in King Salmon, Iliamna, and Port Alsworth.

25.6.2 State Recreational Lands

The BBAP and the NMRRMP govern the State of Alaska's management of its lands in the study area. These plans identify state lands, waters, and tidelands with high recreational values and establish guidelines for their management. The BBAP and the NMRRMP do not apply to federal or municipal public lands or to private lands, some of which also have important recreation value.

25.6.2.1 Bristol Bay Area Plan

The BBAP (ADNR, 2005a) is the management plan for all state-owned and state-selected uplands, tidelands, submerged lands, and shorelands in a 48.8-million-acre (approximately 76,250 square miles)

planning area that includes the Alaska Peninsula, the Bristol Bay region, part of the eastern Aleutian Islands, and part of the Kuskokwim River drainage (Figure 25-2). The original BBAP was first adopted in 1984, and a revised plan was approved in 2005. The regional study area composes just a part of the BBAP's planning area.

The BBAP inventories resources and defines land use designations, management intent, and management guidelines for all state lands within its planning boundary. It incorporates the State of Alaska's resource inventory and policies for management of its lands. The BBAP planning area is divided into twenty-one large planning regions (Figure 25-2), five of which (Region 7—Upper Mulchatna and Upper Hoholitna, Region 8—Lake Clark and Newhalen, Region 9—Eastern Iliamna Lake, Region 10—Western Iliamna Lake and Kvichak, and Region 11—Bristol Bay Borough Area) are wholly in the land use study area and are discussed in this chapter. (The eastern part of Region 6, Nushagak and Mulchatna, is also in the regional study area. Region 6, however, is discussed below under the NMRRMP because the NMRRMP's resource inventory and management guidelines overlap Region 6 and are more detailed than the BBAP's). The state owns or has selected approximately 3.6 million acres (approximately 5,625 square miles) in these five planning regions (Table 25-1). Approximately two-thirds of this acreage is in Region 7 (1,606,959 acres or approximately 2510.9 square miles) and Region 10 (823,566 acres or approximately 1286.8 square miles), which are north and southwest of the Pebble Deposit, respectively. The state has fewer landholdings in Region 9 (690,646 acres or approximately 1,079.1 square miles), Region 11 (395,824 acres or approximately 618.5 square miles), and Region 8 (71,779 acres or approximately 112.2 square miles). The planning regions are further subdivided into numerous management units (Figure 25-3), each of which has its own land use designation(s) and management guidelines.

The BBAP identifies state lands with high public recreational value based on a comparative analysis of their recreational resources and uses. (The plan also inventories cultural and historic, economic, mineral, oil and gas, materials, and forestry resources and uses.) Appendix 25A excerpts the BBAP's general inventory and characterization of the values, resources, and uses related to recreation and to fish and wildlife in the five planning regions in the study area. (The same fish and wildlife resources are also apt to be used by local residents for subsistence.) The most common and widespread recreational uses are wilderness recreation activities such as sportfishing, big game hunting, camping, river and water sports (kayaking, rafting, boating), wildlife viewing, and nature photography. Noteworthy wildlife resources included caribou, moose, and brown bear populations and their habitats. Region 7 contains important caribou calving grounds. Each planning region supports freshwater fish habitat, spawning grounds, and populations of prime sport fish. All five regions contain popular sportfishing destinations. The BBAP rates the Kvichak River system, including the Alagnak River and Iliamna Lake, as "the single most important source of salmon in the Bristol Bay area" (ADNR, 2005a). (All five Alaska Pacific salmon species are present in the study area.) The watery lowlands west of Iliamna Lake are prime nesting habitat for a variety of waterfowl. The Alagnak River, the west end of Iliamna Lake, and the Naknek River have many eagle nesting sites.

The BBAP uses 12 primary land use designations: general use, habitat, harvest, heritage resources, materials, minerals, public facilities–retain, public recreation and tourism–dispersed, public recreation and tourism–public use site, settlement, settlement–commercial, and waterfront development. The primary use designation does not necessarily preclude other compatible uses, but takes precedence over incompatible uses. Also, some management units may be designated for two or more compatible uses.

The BBAP defines four land use designations that relate to recreational uses or to fish and wildlife habitat or harvest areas that are especially important for recreation. The BBAP's definitions of these designations and their application are excerpted below (ADNR, 2005a):

> **Rd — Public Recreation and Tourism–Dispersed.** This designation applies to those areas that offer or have a high potential for dispersed recreation or tourism and where desirable recreation conditions are scattered or widespread rather than localized. Developed facilities are generally not necessary other than trails, trail signs, primitive campsites, and other minor improvements. Land in this designation may be conveyed to municipalities depending on the management unit's management intent and the relative value of the recreation resources for which the unit was designated. These lands cannot be sold to individuals.
>
> This designation can also apply to tidelands. If used as a tideland designation, it applies to areas that are widely used for recreation by either commercial recreation operators or the public, and are usually associated with the use of fisheries or the viewing of a unique or scenic area. Use patterns are dispersed over a fairly large area, and few public facilities are provided other than boat launches, docks, and mooring buoys. Tidelands can be conveyed to municipalities under certain conditions, but cannot be transferred to individuals.
>
> **Rp — Public Recreation and Tourism–Public Use Site.** These are areas used by concentrations of recreationists or tourists compared to the rest of the planning area, or areas with high potential to attract concentrations of recreationists and tourists. These areas offer localized attractions, or ease of access, or developed facilities. Examples include camping sites, marinas, cabins, lodges, anchorages, scenic overlooks, and road-accessible shore locations that are used for picnicking, sports and fishing. The recreation and tourism uses for which these units are designated may be either public or commercial. The primary management intent is to protect the opportunity of the public to use these sites, and their resource values for recreation. This land will remain in state ownership unless otherwise noted in the management intent for the management unit.
>
> **Ha — Habitat.** This designation applies to areas of varied size for fish and wildlife species during a sensitive life-history stage where alteration of the habitat or human disturbance could result in a permanent loss of a population or sustained yield of a species. This land will remain in state ownership
>
> **Hv — Harvest.** Fish and wildlife harvest areas are subsistence, recreational and/or community harvest areas of varied size where alteration of habitat could permanently limit sustained yield to traditional users; or are areas of intense harvest where the level of harvest has reached, or is projected to reach, the harvestable surplus for the resource. This land will remain in state ownership.

The state land area designated primarily for public recreation and tourism–dispersed (Rd) in the five BBAP regions in the study area are shown in Table 25-1, and locations with this designation are depicted on Figures 25-2 and 25-3. (Chapter 18 addresses the management designations for other state lands in the study area.) Overall, about 16 percent of state acreage in these planning regions is designated as Rd. About two-thirds of the Rd acreage consists of uplands in Region 10 northwest and west of Iliamna Lake and along the Kvichak River corridor; most of the balance is located in Region 7 along the Upper

Mulchatna River, Chilikadrotna River, and Chilchitna River corridors. Some small tracts in Region 8—Lake Clark and Newhalen—and Region 9—Eastern Iliamna Lake— also are designated as Rd. No state land in Region 11 —Bristol Bay Borough Area—is designated primarily as Rd.

Thirteen tracts totaling 2,062 acres (approximately 3.2 square miles) in the Upper Mulchatna/Upper Hoholitna watershed are designated for management for public recreation and tourism–public use sites (Rp). This designation reflects their utility and popularity for intensive public use. These tracts are discussed below as part of the NMRRMP (Section 25.6.2.2). Two other tracts totaling 3,281 acres (approximately 5.1 square miles) in the Western Iliamna Lake/Kvichak River area are designated Rp. These tracts are in the Lower Talarik River Special Use Area and are discussed below in Section 25.6.2.3.

The BBAP also designates several river corridors in Region 6 (Koktuli, Middle Mulchatna, and Stuyahok rivers) as Ha, habitat that is critical to the life cycle of fish and wildlife species (Figures 25-2 and 25-3).

The BBAP designates seven management units that are wholly or partly in the central study area to be managed primarily for recreation-related uses (Rd or Rp; Figure 25-4, Table 25-2). (All these units are also covered by the overlapping management provisions of the NMRRMP.) All these units are recommended for retention in either state or municipal (Lake and Peninsula Borough) public ownership. Five of the units are in the Upper Koktuli River corridor. Of those, four (R06-28, R06-29, R03-31, R06-32) are public use sites totaling 975 acres (approximately 1.5 square miles) that are used as remote landing areas or campsites The fifth (R06-30) is a 20,636-acre corridor along the north and south forks of the Koktuli River to their confluence west of management units R06-23 (Pebble) and R06-25 (Pebble Streams). Under the BBAP's designation scheme, the primary designations do not preclude other uses that are compatible with the primary designation. For example, the management intent for the Upper Koktuli Corridor unit states, in part:

> In general, authorizations should not be issued for nonrecreational uses that are incompatible with the management intent of this unit and the management objectives of the [NM]RRMP. Oil, gas, and mineral exploration and development are considered appropriate if consistent with these management objectives or if in the best interest of the state.

The two other management units designated for recreation-related uses in the central study area consist of a group of undeveloped islands in Iliamna Lake (R09-06; Figure 25-4) and a large (171,321 acres or approximately 267.7 square miles) upland unit (R10-03) southwest and mostly outside of the central study area (Figure 25-3). Of the latter unit, the BBAP notes, in part (ADNR, 2550a), "This unit is to be retained in state ownership and managed to maintain the recreational values and uses of this large area, although mineral exploration and development are considered appropriate within the unit." The Bristol Bay transportation corridor, as proposed in the *Revised Southwest Alaska Transportation Plan* (PB Consult Inc., 2004) also traverses part of this management unit.

The Pebble Deposit is situated in two BBAP management units (R06-23, R06-24) at the eastern edge of Region 6 (Figure 25-4). The primary use designation for these units is for minerals. Along its route from the Pebble Deposit to the eastern Bristol Bay drainage boundary, the transportation corridor study area traverses mostly ANCSA private lands and a few BBAP management units. All these management units are primarily designated for general use, minerals, or settlement. None are designated for recreation-related uses or habitat. (The designations for the management units in the central study area are discussed in greater detail in Chapter 18.)

25.6.2.2 Nushagak and Mulchatna Rivers Recreation Management Plan

The NMRRMP was first adopted in 1990 and was revised in 2005 as part of the overall BBAP revision. The NMRRMP is a component of the BBAP; it complements and elaborates on that plan. The state determined that the Nushagak and Mulchatna drainages had exceptional recreational and fish and wildlife values and, therefore, warranted a separate, more detailed management plan.

The NMRRMP overlaps all the territory identified as Region 6 in the BBAP (Figure 25-5), although only the eastern part of Region 6 is in the recreation land use study area. The NMRRMP also overlaps the part of the Upper Mulchatna River watershed that is in BBAP Region 7. That part of the land use study area which is within the NMRRMP's territory consists mostly of state lands, all of which are subject to the NMRRMP.

The NMRRMP subdivides the Nushagak/Mulchatna drainages into 25 management units, 11 of which (Management Units 15 through 25, Figure 25-6) are in the recreation land use study area. For each management unit, the NMRRMP provides an inventory of recreational resources and uses, including fisheries, wildlife, wilderness recreation, and scenic resources and uses. It specifies management guidelines and identifies public use sites.

Three of the eleven management units in the study area are near or downstream of the Pebble Deposit: Unit 15, Lower Mulchatna River Corridor; Unit 17, Koktuli River Corridor; and part of Unit 19, Lower Mulchatna Uplands. The resource inventory, BBAP use designations, management guidelines, and public use sites from the NMRRMP for these three units are summarized below and are excerpted in detail in Appendix 25B (ADNR, 2005b). (The NMRRMP contains similar information for the other management units in the study area.)

- **Unit 15, Lower Mulchatna River Corridor.** The inventory states that sportfishing use is generally moderate, with the heaviest use at the mouths of the Koktuli and Stuyahok rivers, where there are public use sites. The unit provides winter range for moose and migration routes for caribou. Scenic values are low. River-oriented commercial recreational use is high. Both commercial and unguided floating use is high and is increasing, originating from drop-offs on the Koktuli, Stuyahok, and upper Mulchatna rivers. Sportfishing and big game hunting are often associated with float trips. The management intent in the unit is for semi-primitive use.
- **Unit 17, Koktuli River Corridor.** Sportfishing use is moderate, with commercial sportfishing concentrated on the lower part of the river. Floating use is high, typically unguided, and often accompanied by sportfishing. (The BBAP designates the eastern portion of the Koktuli River system as Rd and Rp.) Caribou and brown bear densities are high, with parts of the unit providing important caribou calving habitat. Moose density is moderate. Guided big game hunting is moderate to high in the fall. There are five public use sites along the river corridor (Sites 27 through 31, Figure 25-7). One site (Site 31) is a floatplane landing on a small lake next to the south fork of the Koktuli River about 2.5 miles northeast of Sharp Mountain and about 3 miles downstream and southwest of Frying Pan Lake near the Pebble Deposit. Scenic values in the unit are high. The management intent is for primitive use. Permanent and temporary facilities and other improvements on state lands are prohibited.
- **Unit 19, Lower Mulchatna Uplands (part).** The inventory notes that fisheries values are low. Caribou and brown bear densities are moderate to high. Parts of the unit provide important

caribou calving habitat. Moose density is moderate. Fall hunting is high for caribou, moderate to high for moose, and moderate for brown bear. Scenic values are low to moderate. This unit is managed for semi-primitive use.

In all, the NMRRMP identifies 29 public use sites on state lands in the land use study area (Figure 25-7). [1] All of these sites are remote campsites and/or landing areas for small aircraft. Thirteen public use sites are on the Mulchatna River, six on the Chilikadrotna River, three on the Stuyahok River, and two at remote upland lakes. As noted previously, five public uses sites are located on the Koktuli River system; two campsites and one wheeled airplane landing area on the main stem of the Koktuli River, and two floatplane landing areas on the lower reaches of the South Fork Koktuli River to the northwest of Sharp Mountain.

The NMRRMP does not apply to the BBAP management units in the easternmost part of Region 6 that are designated by the BBAP for mineral use and, therefore, are covered only by the BBAP. This includes management units R06-23 (Pebble) and R06-24 (Pebble Streams), which include the Pebble Deposit.

25.6.2.3 Lower Talarik Creek Special Use Area

ADNR created the Lower Talarik Creek Special Use Area (SUA) in 1999 (ADNR, 1999). [2] This SUA borders on Iliamna Lake (Figure 25-8) about 18 miles south-southwest of the Pebble Deposit and about 24 miles west-southwest of Iliamna. The Lower Talarik Creek watershed is separate from the watersheds around the Pebble Deposit (Upper Talarik Creek and the north and south forks of the Koktuli River).

The Lower Talarik Creek SUA was created "for the purpose of enhancing the world class recreational rainbow trout fishery, protecting high value fish and wildlife habitat, and providing recreational opportunities for commercial and noncommercial users" (ADNR, 1999). Lower Talarik Creek is important sockeye salmon-spawning habitat. The Lower Talarik Creek SUA is within the BBAP, but according to additional guidelines adopted by ADNR, is to be managed specifically "for fish and wildlife with emphasis on protecting the rainbow trout fishery and bear population; to provide for traditional subsistence harvest activities; and to accommodate public recreation" (ADNR, 1999). The Lower Talarik Creek SUA is managed as a "fly fishing only, catch and release" fishery area.

25.6.3 Federal Recreation Lands

The NPS manages three national park units in the regional study area: Lake Clark NP&P, Katmai NP&P, and the Alagnak Wild River (Figure 25-1). Though all are located on the northern Alaska Peninsula, the three units are very different in character and in their recreational assets and use patterns. The BLM administers other federal resource lands in the study area, most of which are situated west and southwest of Iliamna Lake.

1. The general locations of the public use sites shown on Figure 25-7 are identified more precisely at http://www.dnr.state.ak.us/mlw/planning/mgtplans/nushagak_mulchatna_revision/pdf/rrmp_append_c.pdf.
2. General management guidelines for the Lower Talarik Creek SUA and other SUAs are summarized in ADNR, 2006.

25.6.3.1 Lake Clark National Park and Preserve

Lake Clark NP&P is located east and north of the central study area (Figure 25-1). The park comprises roughly the eastern two-thirds of the NP&P unit; the preserve is a broad north-south strip on the western side of the unit. (See NPS, 2007c, and National Geographic, 2001, for more detailed information about Lake Clark NP&P.) At its closest point, the preserve's southwest boundary is 15 miles northeast of the Pebble Deposit, but most of the land in the southwest part of the preserve consists of Native-owned inholdings or Native-selected tracts (Figure 25-9). The preserve is also north and east of the village of Nondalton, on Sixmile Lake, but again Native-owned or -selected lands buffer federally owned parkland from the settlement. The transportation corridor study area roughly parallels the park's southern boundary. The park's southeast boundary in the rugged Chigmit Mountains is about 16 miles northeast of Williamsport in the Cook Inlet study area.

Lake Clark NP&P was created in 1980 by the Alaska National Interest Lands Conservation Act. Section 101 of ANILCA established general purposes for the national parks and preserves it created and specified that they be managed according to the National Park Service Organic Act. ANILCA Section 201(7)(a) created and set out management purposes and limits for the park and preserve, as follows:

> (7)(a) Lake Clark National Park, containing approximately two million four hundred thirty-nine thousand acres of public lands, and Lake Clark National Preserve, containing approximately one million two hundred and fourteen thousand acres of public lands, as generally depicted on map numbered LACL-90,008, and dated October 1978. The park and preserve shall be managed for the following purposes, among others: To protect the watershed necessary for perpetuation of the red salmon fishery in Bristol Bay; to maintain unimpaired the scenic beauty and quality of portions of the Alaska Range and the Aleutian Range, including active volcanoes, glaciers, wild rivers, lakes, waterfalls, and alpine meadows in their natural state; and to protect habitat for and populations of fish and wildlife including but not limited to caribou, Dall sheep, brown/grizzly bears, bald eagles, and peregrine falcons.

ANILCA Section 601 designated as wild rivers the sections of the following three rivers that are within Lake Clark NP&P: the Chilikadrotna River, an 11-mile corridor from Twin Lake to the western boundary of Lake Clark NP&P; the Mulchatna River, 24 miles from Turquoise Lake to the western boundary of Lake Clark NP&P; and the Tlikakila River, 51 miles from its glacial headwaters below Lake Clark Pass to Lake Clark (Figure 25-9).

Congress designated most of the park and part of the preserve—2,619,550 acres (approximately 4,093 square miles) in all—as wilderness, as defined by the Wilderness Act of 1964. The wilderness status prohibits permanent roads and commercial enterprises, except commercial services that may provide recreational needs or other purposes of the Wilderness Act. Generally, motorized equipment, motor vehicles, mechanical transport, temporary roads, and permanent structures or installations are not allowed in wilderness areas; however, small planes and floatplanes historically have been and still are commonly used to access remote areas in these large national park units.

The current management document for Lake Clark NP&P is the *Strategic Plan for Lake Clark National Park and Preserve* (NPS, 2005b).

Lake Clark NP&P (Figure 25-9) is the sixth largest NPS park unit in the nation (exceeded in federally owned area by five other national park units in Alaska: Wrangell St. Elias NP&P, Gates of the Arctic NP&P, Noatak National Preserve, Denali NP&P, and Katmai NP&P). As of 2008, the boundaries of Lake Clark National Park and Preserve encompassed over 4 million acres (approximately 6,315 square miles) (Table 25-3). Most of this land (over 3.4 million acres or approximately 5,372 square miles) is federally owned, but there are substantial private inholdings. Much of the uplands bordering on and inland of the southwest third of Lake Clark, around Lower Tazimina Lake, and some near the park's Cook Inlet coast are privately owned or selected by ANCSA village or regional corporations. In particular, the Nondalton Village Corporation has substantial inholdings in the NP&P that are not part of the park and preserve. ANILCA Section 201(7)(b) provides that the NPS may acquire any of those lands for addition to the park and preserve only with the consent of the Nondalton Village Corporation: "No lands conveyed to the Nondalton Village Corporation shall be considered to be within the boundaries of the park or preserve; if the corporation desires to convey any such lands, the Secretary [of the Interior] may acquire such lands with the consent of the owner and any such lands so acquired shall become part of the park or preserve, as appropriate. Subsistence uses by local residents shall be permitted in the park where such uses are traditional in accordance with the provisions of Title VIII." There are also numerous Alaska Native allotments and other small, private inholdings along Lake Clark's shoreline, along river drainages, and at scattered remote locations elsewhere in Lake Clark NP&P.

Consistent with the park's remoteness and wilderness designation and the management emphasis on preservation of its watershed, habitat, and natural values, park facilities are limited. NPS maintains a small year-round visitor center, newly built in 2005, and field headquarters in Port Alsworth. The park's administrative headquarters are in Anchorage. There are no lodge facilities, improved campgrounds for tent or recreational vehicle (RV) camping, or improved trails on park property. There are several private lodges at Port Alsworth and a few remote lodges on private inholdings at scattered locations elsewhere in the park. These lodges host visitors, provide recreational services, and serve as bases for accessing the park's recreational resources. In 1984, the Kijik Corporation (an ANCSA Native village corporation) developed a large subdivision with an airstrip on Keyes Point in southern Lake Clark, about 11 miles southwest of Port Alsworth; many lots were sold, but only a few have been built on.

There is no road access into the park. The primary mode of access to the park is by air. Small planes and floatplanes or boats are the main means of access to areas within the park. Local air access is mainly through Port Alsworth, where several flight services are based. Flight services based in Iliamna or Anchorage, or on the western Kenai Peninsula also fly directly to destinations in the park.

According to NPS statistics, Lake Clark NP&P is one of the least visited units in the national park system. In 2006, NPS reported 5,320 recreational visits and 3,939 recreational visitor days (Table 25-4).[3] (A visit can be of any length; a visitor day must last at least 12 hours.) Lake Clark NP&P ranked 346th out of 359 NPS park units in recreational visits in 2006 for the entire national park system (NPS, 2007d). In 2005, Lake Clark NP&P accounted for 0.2 percent of recreational visits to NPS units in Alaska and 0.2 percent of recreational visitor days. In these respects, Lake Clark NP&P ranked well below more popular NPS park units in Alaska (Table 25-4).

3. NPS visitor statistics, especially for remote wilderness parks in Alaska that lack point-of-entry checkpoints, often undercount the actual level of visitorship; therefore, official visitor statistics for Lake Clark and Katmai NP&Ps may be regarded as conservative.

NPS visitor statistics report that the annual visitation for the seven most recent years (2000 through 2006) averaged 5,051 visitors, with small year-to-year variations (Table 25-5). With no lodges or improved tent or RV campgrounds on NPS property, most of the overnight recreational visitors to the park are backcountry users. In 2000 through 2006, backcountry campers averaged 2,042 visits annually, or about 40 percent of reported recreational visits. Park visitation patterns have been very seasonal, peaking in the summer months (Table 25-6). In 2000 through 2006, the four months from June through September accounted, on average, for 72 percent of annual visits.

In accordance with Lake Clark NP&P's management purpose—preservation of its watershed and habitat for red salmon and other species, the wilderness status of most of its territory, and its lack of recreational improvements—the prevailing human use is low-intensity backcountry recreation. Port Alsworth, as field headquarters and gateway to the park for many recreational users, is a local center for some park-related recreational activities and services. The few remote wilderness lodges also are stepping-off points to local and backcountry recreational activities.

Backpacking trips and wilderness hiking are relatively popular backcountry activities. The three wild rivers (Chilikadrotna, Mulchatna, and Tlikakila rivers) are used for rafting trips. (The Mulchatna and Chilikadrotna rivers are also popular for raft and kayak trips downstream of the park.) Flights from Cook Inlet through Lake Clark Pass to Port Alsworth and the park interior offer views of glaciers and the Chigmit Mountains. The region's two highest mountains, Mount Redoubt (elevation 10,197 feet) and Mount Iliamna (elevation 10,016 feet), are active volcanoes. The park's Cook Inlet coastal bays, tidelands, and salt marshes offer some wildlife viewing, particularly for brown bears, shorebirds, and sea mammals.

The national park is closed to hunting, but under ANILCA (Section 1313), "the taking of fish and wildlife for sport purposes and subsistence uses, and trapping" are allowed in the national preserve, subject to regulation by ADF&G. Sportfishing is allowed everywhere, as regulated by ADF&G. Under ANILCA, both the park and preserve are open to all traditional subsistence activities, including hunting and fishing. Big game hunting and sportfishing activities are described in greater detail in Sections 25.6.4 and 25.6.5, respectively.

25.6.3.2 Katmai National Park and Preserve

Katmai NP&P is located inland and south of Iliamna Lake (Figures 25-1 and 25-10). At its nearest point, this NPS unit is approximately 43 miles south of the Pebble Deposit. The park, which comprises most of this NPS unit, extends from the coast of Shelikof Strait on the east across the northern Alaska Peninsula to west of Naknek Lake. The preserve is adjacent to the western part of the northern boundary of the park and includes the headwaters of the Alagnak River. Almost all the park is classified as a wilderness area. Almost all of Katmai NP&P west of the Bristol Bay/Cook Inlet divide drains into Kvichak Bay via the Alagnak or Naknek rivers. (See NPS, 2007c, and National Geographic, 1996, for more detailed information about Katmai NP&P.)

Katmai National Monument, the predecessor of the NP&P, was established in 1918. It originally included only the area of the 1912 Novarupta volcanic eruption—the greatest volcanic eruption of the twentieth century—near Mt. Katmai and the Valley of Ten Thousand Smokes. There were several additions to the monument before 1980, when ANILCA expanded and redesignated the monument as a national park,

created and added the national preserve, and established their management purpose (ANILCA Section 202 (2)):

> Katmai National Monument [is expanded] by the addition of an area containing approximately one million and thirty-seven thousand acres of public land. Approximately three hundred and eight thousand acres of additional public land is hereby established as Katmai National Preserve. . . The monument addition and preserve shall be managed for the following purposes, among others: To protect habitats for, and populations of, fish and wildlife including, but not limited to, high concentrations of brown/grizzly bears and their denning areas; to maintain unimpaired the water habitat for significant salmon populations; and to protect scenic, geological, cultural and recreational features.

Congress designated most of the federal park land and part of the preserve lands—3,384,358 acres (approximately 5,288 square miles) in all—as wilderness, as defined by the Wilderness Act of 1964.

The current management document for Katmai NP&P is the *Strategic Plan for Katmai National Park and Preserve, Aniakchak National Monument and Preserve, and Alagnak Wild River* (NPS, 2005a).

Since the establishment of Katmai National Monument in 1918, several additions have enlarged the unit to its present size. As of 2008, the boundaries of Katmai National Park and Preserve encompassed about 4.1 million acres (approximately 6,396 square miles) (Table 25-7), making it the fifth largest national park unit in the nation. Most of this acreage (4,021,409 acres or approximately 6,283.5 square miles) is federally owned, but 50,684 acres (approximately 79.2 square miles) are publicly owned (but not federally) and 21,146 acres (approximately 33 square miles) are privately owned (Table 25-7).

Most visitors access the park and preserve by traveling to King Salmon, west of the park, by commercial airline and then traveling into the park by floatplane or small plane. Alternatively, air taxi services based at Anchorage, Homer, or other regional and local airports fly to destinations in the park and preserve. It is also possible to travel by small boat up the Naknek River from King Salmon to Lake Camp, Brooks Camp, Naknek Lake, and other water-accessible destinations. It is also practical to access destinations in the preserve by small plane from Iliamna.

The NPS administers Katmai NP&P from its headquarters in King Salmon, outside the park proper. The U.S. Fish and Wildlife Service operates the nearby King Salmon Visitor Center, which offers information and exhibits about Katmai NP&P and the rest of the Katmai region. There is also a log-cabin visitor center and a ranger station at Brooks Camp, which are open seasonally. The public campground near Brooks Camp (with 18 campsites) is the only improved camping area in the park. There are no improved trails apart from a couple of short trails by Brooks Camp.

Brooks Camp and the overlook for the Valley of Ten Thousand Smokes are by far the most popular visitor destinations in the park. Under an NPS concession, Katmailand, Inc., operates Brooks Lodge near Brooks Falls by Naknek Lake and two other remote lodges at Grosvenor and Kulik lakes. Brooks Lodge operates the shuttle bus over the park road to the overlook for the Valley of Ten Thousand Smokes, about 23 miles away. Otherwise, here are few privately owned recreation facilities in the NP&P. There are four other remote lodges on private inholdings in the park near Nonvianuk and Battle lakes and the Naknek River.

The outstanding recreational attractions of Katmai NP&P include the following:

- Many prime brown bear-viewing sites, where bears are drawn to the park's rich red-salmon runs, most notably near Brooks Camp (Brooks Falls, Brooks River), in the preserve (Funnel Creek, Moraine Creek, Nanuktuk Creek), and along the Cook Inlet coast (Hallo Bay, Geographic Bay, Swikshak Lagoon).
- World-class sportfishing for trophy-size rainbow trout and other species near Brooks Camp (Brooks Lake, Brooks River) and at other many other locations (American Creek, Grosvenor Lake, Hardscrabble Creek, Kamishak Creek, Lake Coville complex, Naknek River, and Naknek Lake—the largest lake in the national park system). (Sportfishing activity is further described in Section 25.6.4.)
- The Valley of Ten Thousand Smokes and five active volcanoes (Mt. Katmai, Mt. Martin, Trident, Novarupta, and Mt. Mageik) in the southeast sector of the park.
- Opportunities for sightseeing, flight-seeing, wildlife viewing, and nature photography.
- Kayak and canoe routes, most notably the 86-mile-long Savonoski Loop out of Brooks Camp.
- Thousands of square miles of remote wilderness land and waters, highly productive fresh-water fish and bear habitat, and rugged mountains.
- Brooks River National Historic Landmark and Archeological District, a site of human occupancy dating back to 2500 B.C., and Amalik Bay National Historic Landmark and Archeological District on the western Cook Inlet coast, where traces of human use date back 7,000 years.

All of Katmai National Park and Preserve is open to sportfishing, subject to ADF&G regulations. Katmai National Park is closed to hunting and trapping, but Katmai National Preserve is open to both, subject to federal and ADF&G regulations. Under ANILCA, the preserve, but not the park, may also be used for traditional subsistence activities, including fishing and hunting. (Sportfishing and big game hunting are further described in Sections 25.6.4 and 25.6.5, respectively.)

According to published NPS data, Katmai NP&P reported 68,630 recreational visits in 2006 (Table 25-8). (Park officials believe that the visitor statistics undercounted the actual number of visits.) In 2006, there were 7,430 overnight stays, divided among lodges (4,096), campground campers (2,873), and backcountry campers (461). The visitor data show a general decline in recreational visits from 2000 through 2005, until an increase in 2006. Visitation patterns are very seasonal (Table 25-9). During the 7-year period from 2000 through 2006, on average, July was the peak month, accounting for 44 percent of average annual visits. The park is open year-round, but the four months of June through September together account, on average, for 98 percent of all visits in 2000 through 2006.

In 2006, Katmai NP&P ranked 241st of 359 NPS park units in its number of recreational visits (NPS, 2007d). The number of recreational visits to Katmai NP&P trailed the numbers for other park units in Alaska that are popular destinations for out-of-state visitors. In 2006, Katmai NP&P accounted for 2.8 percent of recreational visits and 2.3 percent of recreational visitor days for national parks in Alaska (Table 25-4).

25.6.3.3 Alagnak Wild River

The Alagnak River originates in Kukaklek Lake in Katmai National Preserve, and the upstream section of the wild river abuts the preserve (Figure 25-10). The Alagnak Wild River consists of a 67-mile-long river corridor that contains 30,665 acres (approximately 47.9 square miles) (NPS, 2008). Approximately 93 percent (28,400 acres or approximately 44.4 square miles) of the land in the corridor is federally owned. The balance is mostly privately owned Native allotments, with a few other private inholdings.

The Alagnak Wild River begins several miles downstream of the outlet of Kukaklek Lake, and then flows generally westward. The lower section consists of an upland corridor that borders the river along its snaking route toward Kvichak Bay. The Nonvianuk River, which also originates in Katmai National Preserve, is a major tributary to the Alagnak. The Alagnak River empties into Kvichak Bay, some 20 miles north of the mouth of the Naknek River, but the last 12 miles of the Alagnak River are outside the designated wild river corridor. (The NPS Alagnak Wild River website [NPS, 2007a] provides further information about the Alagnak Wild River.) The Alagnak River is outside any drainage downstream of the Pebble Deposit and transportation study area.

Part of the Alagnak River was designated a wild river by ANILCA in 1980. From its headquarters in King Salmon, the NPS manages the Alagnak Wild River under the National Wild and Scenic Rivers Act. The management intent for the river is as follows (NPS, 2006):

- Protect and enhance the river as a dynamic ecosystem by maintaining its free-flowing nature and preserving water quality.
- Preserve the outstanding natural value of the river, including its natural channels and flow, its naturally occurring fish and wildlife populations, its cultural resources, and its peaceful and scenic character, for the benefit and enjoyment of future generations.
- Preserve the outstanding subsistence and recreational values of the river that are compatible with the other values for which the river is designated.

Hunting and sportfishing, consistent with state regulations, are permitted in the wild river corridor. The U.S. Fish and Wildlife Service operates the nearby King Salmon Visitor Center. The center offers information and exhibits about Katmai NP&P and the Alagnak Wild River and the rest of the Katmai region.

NPS has not published visitor statistics for the Alagnak Wild River. There are no public recreational improvements or road access to the Alagnak Wild River corridor, which is usually accessed by floatplane from King Salmon or Iliamna. Five remote, private recreational lodges are situated along the wild river corridor. These remote lodges are typically reached by floatplane; riverboats or floatplanes may take lodge clients to even more remote spots for daily fishing or sightseeing trips.

Popular recreational activities include fly-in sportfishing, hunting, river rafting, wildlife viewing, and backcountry camping. (Sportfishing and big game hunting activities in the study area are further described in Sections 25.6.4 and 25.6.5, respectively.) The Alagnak River is the most productive fly-in sport fishery in southwest Alaska, and the Alagnak Wild River corridor is one of the region's most popular destinations. (Several other popular sportfishing destinations in the Alagnak River drainage

[Battle River, Funnel Creek, Kukaklek River, Little Kulik Creek, Kulik Lake, Kulik River, Nonvianuk Lake, Nonvianuk River, and Moraine Creek] are upstream of the wild river corridor in Katmai NP&P.)

Apart from its contemporary popularity for recreational use, the Alagnak River corridor holds cultural and archeological resources that reflect perhaps 9,000 years of human habitation. These resources include the artifacts of several small settlements, some of which were abandoned within living memory (NPS, 2006). Today, the Alagnak Wild River is open for traditional subsistence uses and remains an important subsistence food-harvest area.

25.6.3.4 Recreation Activities and Services in NPS Units

The NPS requires commercial operators in national park units to obtain an NPS commercial use authorization (CUA) for each type of service they offer in each park unit. Table 25-10 summarizes the number of CUAs obtained for each type of service in each of the study-area park units in 2007. These numbers suggest the relative popularity of the various recreational opportunities in each park unit and the level of demand for related commercial services. Most operators obtain several CUAs and offer a variety of services, so each CUA does not necessarily represent a separate operator.

As would be expected from the number of recorded visits, Katmai NP&P has the largest number of CUAs with 330, followed by Lake Clark NP&P with 204, and Alagnak Wild River with 83. Overall, the most commonly offered services are sportfishing (133 CUAs) and bear viewing (120 CUAs), followed by air taxi services (81 CUAs), and photography guides (68 CUAs). The profile of CUAs for each park unit reflects the unit's distinctive assets.

The number of CUAs by type of service for Lake Clark NP&P suggests that sportfishing and bear viewing are among the most popular recreational activities, along with photography, boat trips, and hiking/walking tours. The number of operators providing transportation services in Lake Clark NP&P for big game and/or other hunting (about the same as for Katmai NP&P, more than for the Alagnak Wild River) suggests that hunting also is a popular activity. The low number of operators supporting backcountry activities such as backpacking, kayak tours, mountaineering, or winter activities suggests relatively less participation in those activities.

In Katmai NP&P, bear viewing and sportfishing are by far the most commonly offered commercial services, followed by air taxis, photography, hiking/walking tours, boat trips, backpacking trips, and big game/other hunting transporter services. Only a few operators offer kayak tours or services for mountaineering or winter activities.

Fewer operators are authorized to operate in Alagnak Wild River than in the Lake Clark and Katmai NP&Ps. The profile of services offered tips heavily toward sportfishing. Bear viewing, boat trips, and photography are also commonly offered.

The NPS records the permanent business addresses of businesses holding CUAs. This information indicates where the businesses are headquartered (Table 25-11). Overall, more than half of the CUAs are held by businesses based outside of the Bristol Bay region, either elsewhere in Alaska (52 percent) or outside of Alaska (7 percent). (A single business may have more than one CUA, so the number of CUAs is not representative of the number of businesses.) About equal proportions of the total CUAs are held by businesses based in the Bristol Bay Borough (21 percent) and in the Lake & Peninsula Borough (20

percent). Businesses based in the Bristol Bay Borough, mainly in King Salmon, hold the largest percentages of the in-region CUAs for Katmai NP&P and the Alagnak Wild River. For Lake Clark NP&P, businesses based in the Lake and Peninsula Borough hold the largest number of in-region CUAs.

The NPS commissions an annual report that estimates the effects of visitor spending and NPS payrolls on the local economies of communities near most national park units. An economic model is applied to NPS's annual visitor statistics and NPS payroll data for each park unit to develop estimates of economic impacts. Several qualifications apply to the estimates. NPS visitor statistics tend to understate the numbers of visitors by an unknown degree. The model, which uses generalized economic factors, is prone to misrepresent economic impacts on small, isolated local economies. Given those caveats, the estimates should be regarded only as informed guesstimates of the relative scale of local economic impacts associated with Lake Clark and Katmai NP&Ps. (Because there are no visitor statistics for Alagnak Wild River, there are no estimates of economic impacts there.)

The 2006 annual report (Stynes, 2007) estimates that non-local visitors to Lake Clark NP&P spent $352,000 in 2006 (Table 25-12). These visitor expenditures generated an estimated seven jobs, including seasonal and part-time jobs, and a total of $141,000 in personal income. The NPS payroll supported an additional 37 jobs and a total of $2,202,000 in personal income (Table 25-13). Non-local visitors to Katmai NP&P spent an estimated $3,316,000, generating 66 jobs and $1,151,000 in personal income. The NPS payroll for Katmai NP&P supported an additional 56 jobs and $2,943,000 in personal income. Together, these two park units accounted for 3 to 5 percent of the total visitor spending, jobs, and personal income attributed to all national park units in Alaska.

25.6.3.5 Bureau of Land Management Bay Resource Management Plan

The Bureau of Land Management is responsible for management of unencumbered federal lands in the regional study area that are not managed by NPS or other federal agencies. The BLM has prepared the *Bay Proposed Resource Management Plan and Final Environmental Impact Statement* (BLM, 2007). The purpose of the RMP is to provide a comprehensive land use plan for management of BLM-managed public lands and resources in the subject planning area. The Bay planning area covers southwest Alaska from the eastern Bristol Bay drainage divide to Kuskokwim Bay (Figure 25-11). Within the land use study area, most unencumbered federal lands are in the Iliamna West, Kvichak, Alagnak, and Yellow Creek planning blocks, west and southwest of western Iliamna Lake (Figures 25-12 and 25-13). The closest of these tracts is 30 miles or more from the Pebble Deposit. There is also a small, remote, unencumbered upland tract in the Iliamna East planning block west of Lake Clark, approximately 25 miles northeast of the Pebble Deposit (Figure 25-14). Additionally, the state or ANCSA corporations, or both, have selected numerous unconveyed tracts in the Iliamna East block. If these selections are relinquished, they would revert to BLM management. (BLM is interim manager for unconveyed, unrelinquished ANCSA Native corporation land selections [Figure 25-11]. As interim manager, BLM is required to seek and consider comments from the appropriate Native corporation for any authorization to use Native-selected lands. RMP recommendations for management of ANCSA selections would be implemented only upon relinquishment of the selections to the federal government.)

At the time the RMP was prepared, the unencumbered lands remaining under BLM's management consisted of lands not incorporated into national parks or wild rivers, not conveyed to or selected by the State of Alaska or ANCSA regional or villages corporations, not claimed as Native allotments, not at settlement sites, and not subject to other valid claims. That is, they consisted of the federal lands left after

other parties had chosen the prime lands available for settlement, traditional uses, economic potential, habitat and other natural values, and recreational values.

At the conclusion of the administrative planning process, BLM's preferred alternative under the RMP was Alternative D. Unlike some land use plans, the RMP's Alternative D does not designate tracts for specific uses. Generally, the RMP contemplates multiple uses for these federal lands, but with appropriate protection measures. The RMP's pertinent features for recreational resources and uses are summarized here (BLM, 2007).

- The Kvichak, Iliamna West, and Alagnak planning blocks are open to exploration for and development of leasable and locatable mineral resources.
- The State of Alaska continues to manage fish and wildlife resources on BLM lands in accordance with the existing Memorandum of Agreement between the state and BLM.
- Federal agencies are required to consult with the Secretary of Commerce (under Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation Act) on all actions or proposed actions that may adversely affect essential fish habitat (EFH). EFH is defined as those waters or substrate necessary to fish for spawning, breeding, feeding, or growth to maturity and can include fresh and saltwater habitats. For Alaska, freshwater EFH includes all streams, lakes, ponds, wetlands, and other waterbodies that have been historically accessible to salmon.
- All unencumbered BLM-managed lands and selected lands, until they are conveyed, are to be managed for semi-primitive motorized use (i.e., use by specialized off-highway vehicles).

The planning process considered but did not finally propose any additional designations under the Wild and Scenic Rivers Act or designation of any "areas of critical environmental concern" in the regional study area.

25.6.4 Sportfishing

The sportfishing study area (Figure 25-1) is extraordinarily rich in freshwater sport fish and attractive wilderness fishing destinations. In a typical year, over 15,000 sportfishers make about 35,000 fishing trips in the region, spend about 70,000 days fishing, and catch 400,000 fish (ADF&G SFD, n.d.[a]). Apart from the recreational pleasure it gives, sportfishing also supports a substantial recreation-based economy that includes air taxi services, lodges, guides, outfitters and suppliers, and other recreation-related businesses in and outside the region.

Sportfishing is a very popular recreational activity almost everywhere in Alaska. Many local residents, non-local Alaskans, and out-of-state visitors participate. The sportfishing study area encompasses an estimated 26,223 square miles (approximately 16,789,120 acres) (Table 25-14) and many hundreds of streams and lakes in seven major drainages. An explanation of the area's freshwater sportfishing resources requires a familiarity with the geography of the major river systems and drainages in the area. The study area falls within three management areas (Areas R, S, and T) of ADF&G's 25 fisheries management areas (Figure 25-15). In each of these three management areas, a major study-area river system (the Naknek, Kvichak, and Nushagak river systems) discharges into Bristol Bay. (The sportfishing study area does not include the freshwater drainages and salt waters of the lower Alaskan Peninsula or Aleutian Islands in Area R or the Togiak and Wood River drainages in Area T. These excluded drainages

are part of the larger Bristol Bay Basin but are far from the watersheds that include the Pebble Deposit and transportation study area.) Each river system sustains many popular freshwater sportfishing destinations. These management areas also include some offshore waters, but saltwater sportfishing activity in the study area is very minor. These three major river systems are subdivided into seven separate drainages, as defined by the United States Geological Survey (USGS; Figure 25-16 and Table 25-14).

- **The Naknek River system** (4,044 square miles or approximately 2,588,160 acres) in area) is a single USGS drainage and is part of Area R. It includes most of the lakes and rivers that drain the western and central lowlands of Katmai NP&P and the southern part of the sportfishing study area. (Area R also includes the lower Alaska Peninsula and Aleutian Islands, which are outside of the study area.)
- **The Kvichak River system** (9,444 square miles or approximately 6,044,160 acres) comprises Area S. It is located in the middle to northeastern parts of the study area. It is composed of the Iliamna Lake drainage (4,488 square miles or approximately2,872,320 acres) and the Lake Clark drainage (3,529 square miles or approximately 2,258,560 acres), along with their tributaries, and the Alagnak River drainage (1,427 square miles or approximately 913,280 acres).
- **The Nushagak River system** is in Area T. The portion of the Nushagak system that is within the sportfishing study area (12,735 square miles or approximately 8,150,400 acres) includes the Nushagak River and its tributaries (including the Mulchatna River) upstream of the Nushagak's confluence with the Wood River near Dillingham. Three drainages in Area T are within the study area: the Upper Nushagak drainage (5,012 square miles or approximately 3,207,680 acres), the Lower Nushagak drainage (3,430 square miles or approximately 2,195,200 acres), and the Mulchatna drainage (4,293 square miles or approximately 2,747,520 acres). (Area T also includes the Wood and Togiak drainages, which are outside the study area.)

The seven drainages in these three river systems have different geographical relationships to the Pebble Deposit and transportation study area (Figure 25-16). Parts of three drainages (Lake Iliamna, Mulchatna, and Lower Nushagak) are downstream of the Pebble Deposit. Four drainages (Lake Clark, Alagnak, Upper Nushagak, and Naknek) are hydrologically distinct from the Pebble Deposit.

The area of the Pebble Deposit and the transportation corridor study area crosses the headwaters of tributaries to the Iliamna Lake and Mulchatna drainages. Upper Talarik Creek, near the Pebble Deposit, drains into Iliamna Lake. The transportation corridor study area traverses a mostly inland route north of Iliamna Lake between the Pebble Deposit and the eastern Bristol Bay drainage divide, crossing numerous streams that flow into Iliamna Lake. Iliamna Lake flows into the Kvichak River, which discharges into Kvichak Bay. The south and north forks of the Koktuli River flow into the Mulchatna River, which flows into the Nushagak River, which flows into Nushagak Bay. Thus, the Koktuli River and the parts of the Mulchatna and Nushagak rivers that are downstream of the Koktuli-Mulchatna confluence all are downstream of the Pebble Deposit.

The Lake Clark drainage flows into Iliamna Lake near Iliamna via the Newhalen River; the Lake Clark drainage is not directly upstream or downstream of the Pebble Deposit. The Alagnak, Naknek, and Upper Nushagak drainages also are neither upstream nor downstream of the vicinity of the Pebble Deposit or the transportation corridor study area.

25.6.4.1 ADF&G Sportfishing Data

ADF&G's Sport Fish Division (SFD) is the source of the data used in this chapter to describe, quantify, locate, and map sportfishing activity in the study area. ADF&G collects and publishes data on annual sportfishing participation, catch, and harvest (ADF&G SFD, n.d.[a] and n.d.[b]). ADF&G relies on these data for management and regulation of Alaska's sport fisheries and for other planning and administrative purposes.

ADF&G collects raw survey data by means of a voluntary mail-back survey form mailed to a large statistical sample of all sportfishing licensees, both Alaska residents and nonresidents. In 2004, for example, 20,868 respondents returned surveys (Jennings et al., 2007). ADF&G has collected these data since 1977. The procedures for data collection and analysis are well tested, well documented, and statistically rigorous (as described in Jennings et al., 2007). Because ADF&G has followed consistent data-collection and -analysis procedures for many years, the data are well suited for historical trend analysis and for geographic comparisons. For those purposes, ADF&G's quantitative data are impartial and preferable to impressionistic or anecdotal reports. Of course, firsthand information from knowledgeable people is useful to verify, interpret, and supplement the survey data.

ADF&G's published survey results provide estimates of the number of anglers, number of angler trips, number of angler days fished, and the catch and harvest,[4] both total and by species. The reports provide statewide estimates, estimates for each of the 25 management areas, and estimates for some major subareas within the management areas. Some of this information is posted on ADF&G's website (ADF&G SFD, n.d.[a]) before publication of the annual printed reports.

The annual survey method aggregates individual survey reports for freshwater species by stream segments or waterbodies, not spot locations. ADF&G gives the following guidelines for evaluating the reliability of its sample-based survey's annual estimates for specific locations (ADF&G, 2005):

- Estimates based on fewer than 12 responses at a given site should not be used except to document that sportfishing occurred.
- Estimates based on 12 to 29 responses can be useful in indicating relative orders of magnitude and for assessing long-term trends.
- Estimates based on 30 or more responses are generally useable.

For ADF&G's published documents, annual data are usually aggregated into just a few general locations. Annual data for locations with fewer than 12 responses, and for some locations with 12 or more responses, are combined into or with a larger fishery unit. This procedure necessarily limits the geographic detail of the published annual sportfishing data.

The currently published ADF&G reports and website data are supplemented by 7 years (1999 through 2005) of more geographically detailed, unpublished annual survey data compiled for individual stream segments and freshwater lakes in the regional study area (ADF&G SFD, various). As with the published

4. "Catch" includes all fish caught; "harvest" includes only fish caught and kept. This distinction is crucial in the study area, since most sportfishing there is "catch and release," that is, most fish caught are returned alive to the waters in which they were caught.

data, ADF&G aggregates and assigns individual survey responses to stream segments or waterbodies. Some major rivers—e.g., the Naknek and Nushagak rivers—are divided into several segments. Thus, the terms "stream segments" and "waterbodies" do not represent points on a map, but rather, general locations. The unpublished annual data for these smaller geographic units are usually based on few responses, often fewer than 12; thus, the data are not as statistically reliable as the aggregate data for entire management areas or major subareas.

The following process was used to enhance the usefulness of the unpublished data for mapping the geographic patterns of sportfishing in the regional and central study areas. The annual data for 1999 through 2005 for all the stream segments and waterbodies identified by ADF&G were aggregated. The aggregate data were then screened according to the ADF&G's statistical guidelines. During this seven-year period, 46 locations in the sportfishing study area totaled 12 or more survey responses. The estimates and rankings for these more popular locations are statistically most reliable; therefore, only those locations were retained for the geographic analysis and are shown on the maps developed for this baseline study.

The remaining 48 locations that totaled fewer than 12 survey responses over the same seven-year period were assigned to an "other" category of unspecified location in their drainage and management areas. Those locations are listed below by drainage (ADF&G SFD, various):

- Naknek River Drainage (Area R):

  Big Creek, Grosvenor Stream, Hammersley Lake, Idavain Creek, Lake Grosvenor, Margot Creek, Other Naknek Drainage Streams (Pauls Creek, Pike Lake, Rainbow River).

- Kvichak River Drainages (Area S):
  - Alagnak Drainage: Battle Lake, Kaskanak Creek, Kukaklek Lake, Nanutuk Creek.
  - Iliamna Lake Drainage: Alexcy Creek, Alexcy Lake, Bear Creek, Char Lake, Chekok Creek, Chinkelyes Creek, Dream Creek, Kokhanok Bay, Kokhanok Lake, Kokhanok River, Knutson Creek, Long Lake, Pike Lakes, Schoolhouse Lake, Tommy Creek.
  - Lake Clark Drainage: Caribou Lakes, Chulitna River, Kijik Lake, Koksetna River, Lachbuna Lake , Little Kijik River, Tanalian River, Tazimina Lakes.
- Nushagak/Mulchatna Drainages (Area T):
  - Upper Nushagak Drainage: Chichitnok River.
  - Lower Nushagak Drainage: Iowithla River, Kokwok River, Portage Creek.
  - Mulchatna Drainage: Chilchitna River, Fish Trap Lake, Old Man Creek, Other Lakes, Snipe Lake, Springway Creek, Turquoise Lake.

The number of survey responses for these locations was sufficient to document that some sportfishing occurred, but insufficient to estimate the level of sportfishing participation or catch. That other locations were not cited in any survey responses does not show that no sportfishing occurred there, but only that those locations were probably not highly popular. In any case, the less popular locations, individually and as a group, represented only a small fraction of the total sportfishing participation and catch in the sportfishing study area.

ADF&G's *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes—Southwestern Region, Effective June 1, 2007* (Johnson and Weiss, 2007) and the associated atlas (ADF&G SFD, 2007) were used to map the locations of sportfishing activity for this chapter. The catalog and atlas identify and map the anadromous waters that ADF&G has identified as important for spawning, rearing, and migration of anadromous fish species, as well as the species that occur there. Information on anadromous waters from ADF&G's fish distribution database (FDD) is mapped on 1:250,000-scale USGS quadrangle maps, which are available for the entire sportfishing study area (Iliamna, Mt. Katmai, Lake Clark, Naknek, Dillingham, Kenai, and Taylor Mts. quadrangles). Further, the FDD information for both anadromous waters and the anadromous fish species they host is mapped on 1:63,360-scale USGS quadrangle maps, which area available for the central study area (maps Iliamna C-2 through Iliamna C-8 and Iliamna D-2 through Iliamna D-8) and for select other quadrangles in the regional study area. (Example maps at each scale are reproduced as Figures 25-17 and 25-18. Similar maps for the rest of the regional and central study areas can be found at ADF&G SFD, 2007.)

25.6.4.2 Sportfishing Study Area

The sportfishing study area contains four percent of Alaska's land area, but less than one percent of its population. This area is world-renowned for the high quality of its freshwater sportfishing habitat and resources and for the wilderness quality of its sportfishing experience. Most of its prime sportfishing destinations are isolated from regional and local airports and local settlements, are inaccessible by road, and are costly and time-consuming to reach. Most can be reached only by small plane and/or riverboat. Notwithstanding the cost in time and money needed to reach its fishing destinations, the area attracts sportfishers from faraway places and hosts a disproportionate share of Alaska's sportfishing activity.

Comparison of sportfishing data for Areas R, S, and T to statewide figures helps put the scale of the study area's sport fishery in statewide perspective. In 1999 through 2005, Management Areas R, S, and T combined, accounted for approximately 5 percent of statewide angler days fished, 3 to 4 percent of statewide total anglers, and 4 percent of statewide total fishing trips (Table 25-15). For comparison, the state's most popular fishing area, the Kenai Peninsula (Area P), accounted for one-third of all statewide sportfishing activity. Of the 25 management areas, Area R ranked 14th in number of angler days fished, Area S ranked 20th, and Area T ranked 18th. (Because of the geographical format in which certain ADF&G data are published, some sportfishing data cannot be disaggregated to the study area. Consequently, the figures for the study area are slightly inflated. Still, the figures are broadly representative for statewide comparisons.)

The sport fishery in Areas R, S, and T differed from statewide norms in several respects. As a group, these three management areas had the following characteristics:

- Attractive to nonresident (of Alaska) sportfishers. In 2004, 88 percent of sportfishers in these management areas came from outside Alaska, compared to 56 percent of statewide sportfishers (Table 25-16).
- Primarily a freshwater fishery. Freshwater sportfishing accounted for approximately 90 percent of all sportfishing angler days, anglers, and trips in these areas in 1999 through 2005 (compare Tables 25-17 and 25-15). Moreover, most of the saltwater sportfishing in Areas R, S, and T took place offshore of the Aleutian Islands or the Alaska Peninsula, both of which are outside the regional study area. There are no directly comparable statewide figures, but saltwater fishing

accounted for 42 percent of the total statewide catch in 2004 (Jennings, et al., 2007), which suggests the degree to which the sportfishing study area tips toward freshwater sportfishing.

- Weighted toward the premium species prized by freshwater sportfishers. In 1999 through 2005, the drainages in the sportfishing study area accounted for 18.2 percent of the statewide rainbow trout catch, 13.2 percent of Arctic grayling (hereafter, grayling), 16.6 percent of king salmon, and 6.9 percent of Dolly Varden (Table 25-18).
- Primarily a catch-and-release fishery. In 2004, more than 90 percent of the catch in Areas R, S, and T was released; less than 9 percent was retained as harvest for consumption. The corresponding statewide figures were 76 percent released and 24 percent harvested (Jennings et al., 2007).

ADF&G publishes data on the annual angler days, harvest, and catch for 25 different sport fish and shellfish species (http://www.sf.adfg.state.ak.us/statewide/participationandharvest/index.cfm). ADF&G regards angler days fished, which takes account of the number of anglers and sportfishing trips, as the best single overall measure of sportfishing activity. Because sportfishing in the study area is primarily catch-and-release, as noted above, the catch (which includes both released fish and kept fish) better measures the success of sportfishers in this area. The catch for the six species that comprise most (88 percent) of the catch (rainbow trout, grayling, king salmon, sockeye salmon, Dolly Varden/arctic char, and coho salmon) are separately ranked and mapped in this chapter.

Table 25-19 reports the average annual sportfishing effort (angler days fished) and total catch for 46 waterbodies in the sportfishing study area during 1999 through 2005. (Because sportfishers often target and catch multiple species on a daily outing, it is not feasible to calculate the catch per angler day for individual species.) Figure 25-19 maps the same data. Overall, the region-wide average annual effort totaled 68,987 angler days fished and 397,296 fish caught. The Naknek drainage, with 33.1 percent of angler days in the study area, was the most popular drainage. The Iliamna Lake drainage (19.7 percent) and the Alagnak drainage (15.3 percent) were the next most popular sportfishing destinations, followed by the Upper Nushagak (11.3 percent) and Lower Nushagak (10.6 percent) drainages. The Mulchatna (5.3 percent) and Lake Clark (4.6 percent) drainages were the least frequently visited drainages.

Table 25-18 is a tabular "map" of the freshwater sport fishery in the study area drainages, by species, during 1999 through 2005. It shows how many of each species were caught in each river system and drainage, as well as what proportion of the total catch in the study area was represented by each species. Table 25-20 lists and Figures 25-20 through 25-25 map the average annual catch for 1999 through 2005 for rainbow trout, grayling, king salmon, sockeye salmon, Dolly Varden, and coho salmon at the 46 locations in the sportfishing study area.

Several features stand out in the geographic pattern of the overall sport fishery:

- Kvichak River system accounted for nearly half (47.3 percent) of the total catch in the study area, accruing from the Alagnak (21.8 percent), Iliamna Lake (22.0 percent), and Lake Clark (3.5 percent) drainages.
- The Nushagak system accounted for 30.8 percent of the total catch, accruing from its Upper Nushagak (14.0 percent), Lower Nushagak (11.0 percent), and Mulchatna (5.8 percent) drainages.
- The Naknek River system accounted for 21.9 percent of the total catch in the study area.

- When the total catch is related to size of drainage area (Table 25-14), the Alagnak drainage was by far the most productive drainage, and the Lake Clark and Mulchatna drainages were the least productive.

The profile of species caught varies widely by river system and drainage (Table 25-18), as described below by species in order by highest to lowest catch:

- Rainbow trout (36 percent of total catch in the study area). The Kvichak River system (with 61 percent) dominated the catch of this species, with its Alagnak and Iliamna Lake drainages each accounting for 30 percent of the regional catch.
- Grayling (14 percent). The Nushagak River system contributed more than half (54 percent) of the grayling catch, with the Upper Nushagak drainage alone contributing 33 percent of the regional catch.
- King Salmon (almost 13 percent). The Nushagak River system accounted for 76 percent of the king salmon catch in the region, with over half (52 percent) of the region's catch of that species coming from the Lower Nushagak drainage.
- Sockeye salmon (over 10 percent). The Kvichak River system contributed the largest proportion (68 percent) of the sockeye salmon catch in the region, with its Iliamna Lake drainage alone contributing 42 percent.
- Dolly Varden (9 percent). The Naknek River system contributed more than a third (36 percent) of the regional catch.
- Coho salmon (6 percent). The Naknek River system contributed the largest share (39 percent) of the regional catch.
- Chum salmon, pink salmon, northern pike, whitefish, and lake trout together contributed the balance of 12 percent of the catch.

The sportfishing study area accounts for a disproportionate share of the statewide catch of rainbow trout (over 18 percent), king salmon (nearly 17 percent), and Arctic grayling (13 percent).

Table 25-19 ranks each location in terms of angler days and catch, and shows the average catch per angler day. The sportfishing effort and catch were concentrated at relatively few locations in the study area. The top five (by number of angler days) of the 46 locations—Naknek River 1 (downstream from Rapids Camp), Alagnak River, Naknek River 2 (upstream from Rapids Camp), Kvichak River, Nushagak River 2 (sonar site to outlet of Mulchatna River)—together accounted for nearly half of all sportfishing effort (47.7 percent) and catch (41.6 percent) reported for the study area from 1999 through 2005. The 13 most popular locations together contributed about 75 percent of angler days and catch. Based on average annual catch, the Alagnak and Kvichak rivers stood out as the most productive individual locations.

Because the sample sizes for the individual locations vary widely, the figures given for "catch per angler day" should be regarded as only suggestive of the rate of sportfishing success at individual locations. Also, the total catch figures aggregate different species, some of which (e.g., rainbow trout) are more highly valued as sport fish than others (e.g., chum salmon). For these reasons, sportfishing effort measured by angler days is generally a better measure of the overall value of streams and lakes as

sportfishing destinations than is catch; however, as stated previously, catch is a better measure of sportfishing success.

In 1999 through 2005, the overall trend in annual angler days was more or less flat, but several of the individual drainages showed decided upward or downward trends (Table 25-21 and Figure 25-26). In particular, the sportfishing effort for the Naknek, Iliamna Lake, and Lake Clark drainages dropped to a low for the period in 2005. On the other hand, the sportfishing effort for the Alagnak and Lower Nushagak drainages rose to a peak for the period in 2005 (the data for the Lower Nushagak for 1999 through 2001 appear incomplete). The figures for the Upper Nushagak and Mulchatna drainages did not show a decisive trend.

Over the same period, the cyclical nature of salmon runs obscured any trends in the annual catch, both overall and for individual drainages (Table 25-22 and Figure 25-27). Even so, it is noted that the annual catch for the Naknek, Iliamna Lake, and Mulchatna drainages reached a low for the period in 2005. At the same time, the annual catch for the Alagnak drainage reached a peak for the period.

25.6.4.3 Central Study Area

ADF&G reported sportfishing survey data from 12 or more survey responses for six locations in or partially in the central study area. Four locations—Newhalen River, Iliamna River, Sixmile Lake, and Upper Talarik Creek—are wholly in the central study area (Figure 25-19). Two other locations are only partly in the central study area: Iliamna Lake (only the northeast nearshore waters are in the central study area) and the Koktuli River (only the north and south forks are in the central study area). The sportfishing data for those two entire locations are included here, with the result that the ADF&G sportfishing data overstate the figures for the central study area.

ADF&G received some survey responses for eight other locations in the central study area: Alexcy Creek, Alexcy Lake, and Bear Creek, which drain into the Newhalen River north of Iliamna; Schoolhouse Lake at Iliamna; Chekok and Knutson creeks, which drain across the transportation corridor study area into Iliamna Lake; and Chinkelyes Creek and Long Lake, which drain across the transportation corridor study area and ultimately into Pile Bay. None of these locations received the 12 survey responses needed for a useful sample; therefore, the survey data for these locations have been aggregated here as "other locations." The sparseness of survey responses for these locations, and the lack of responses for other locations in the central study area, allow an inference that the level of sportfishing activity at those locations is relatively low.

The average annual angler days and average annual catch for 1999 through 2005 for the central study area are tallied in Table 25-23. The central study area as a whole accounted for 8.4 percent of the angler days and 7.4 percent of the catch in the regional study area. The sport fishery for the six locations in the central study area is primarily a catch-and-release fishery; in 1999 through 2005, only about 16 percent of the total catch was retained as harvest, mostly sockeye salmon caught on the Newhalen and Iliamna rivers.

The level of sportfishing activity varied widely among the six locations. The Newhalen River, which is accessible from Iliamna, Newhalen, and Nondalton, and several nearby lodges, was by far the most popular location during the study period. It accounted for nearly half (45 percent) of the angler days fished in the central study area and ranked ninth in the regional study area. Iliamna Lake accounted for another 26 percent (although it is not known what percent was actually in the central study area), and the

Iliamna River and Sixmile Lake each contributed approximately 10 percent. The two locations nearest the Pebble Deposit supported 7 percent (Koktuli River) and 1 percent (Upper Talarik Creek) of angler days fished. In the regional study area, Koktuli River ranked about midway in annual average angler days, and Upper Talarik Creek ranked near the bottom.

The Newhalen River was also the most productive location; it accounted for half of the total catch in the central study area and ranked tenth in catch in the regional study area. Iliamna Lake and Iliamna River contributed around 16 to 17 percent each. The Koktuli River (10 percent), Sixmile Lake (4 percent) and Upper Talarik Creek (2 percent) yielded smaller catches. Again, the Koktuli River ranked about midway in annual average catch for the regional study area, and Upper Talarik Creek ranked near the bottom.

The profile of species caught also varied widely by location. Six species—sockeye salmon, rainbow trout, grayling, Dolly Varden, coho salmon, and king salmon—comprised nearly 95 percent of the central study area's catch in 1999 through 2005. Table 25-24 tabulates the average annual catch for each of these species, by location. The overall geographic pattern of the catch by species and location is illustrated by Figure 25-28 (rainbow trout, grayling, and Dolly Varden) and Figure 25-29 (sockeye, king, and coho salmon).

The highlights of the catch data for 1999 through 2005 for the central study area are summarized below, by species, from most frequently caught to least caught:

- Sockeye salmon (average annual catch 9,127 fish). The Newhalen River accounted for two-thirds of the sockeye salmon catch. Iliamna Lake and the Iliamna River also contributed substantially to the catch. The contribution of the Koktuli River was modest, that of Sixmile Lake was small, and that of Upper Talarik Creek was negligible.
- Rainbow trout (average annual catch 7,197). The Newhalen River was the most productive location for rainbow trout, followed by the Iliamna River and Iliamna Lake. Those three locations contributed over 80 percent of the rainbow trout catch, with the balance shared fairly evenly among Upper Talarik Creek, the Koktuli River, and Sixmile Lake.
- Grayling (average annual catch 6,056). The Newhalen River contributed over two-thirds of the grayling catch. Upper Talarik Creek was the least productive grayling location, yielding less than one percent of the total.
- Dolly Varden (average annual catch 3,987). The Iliamna River dominated the Dolly Varden catch, contributing more than half the catch. The Newhalen River, Koktuli River, and Iliamna Lake contributed most of the balance. Sixmile Lake and Upper Talarik Creek together contributed less than 2 percent of the Dolly Varden catch.
- Coho salmon (average annual catch 848). The Newhalen River yielded almost half the coho salmon catch, with Iliamna Lake and the Koktuli River contributing almost all of the balance. A few coho were caught on Upper Talarik Creek, and none were caught on the Iliamna River or in Sixmile Lake.
- King salmon (average annual catch 412). The Koktuli River contributed the great majority (87 percent) of the king salmon catch.

In summary, during 1999 through 2005, the most frequently caught species in the central study area were sockeye salmon and rainbow trout, followed by grayling and Dolly Varden. The catch of coho and king salmon was minimal, with no reported catch of those species from the Iliamna River or Sixmile Lake. The Newhalen River had the highest catch of rainbow trout, grayling, sockeye salmon, and coho salmon. The Iliamna River yielded more than half the Dolly Varden catch, and the Koktuli River had almost all the king salmon catch. For the two locations nearest the Pebble Deposit, the Koktuli River accounted for 10 percent of the central study area's total catch and had a relatively high yield of king salmon, while Upper Talarik Creek contributed just over 2 percent of the overall catch, ranking at or near the bottom in the central study area for all individual species.

Examination of annual data for the central study area locations shows a sharp overall decline in sportfishing activity and catch between 1999 and 2005 (Table 25-25 and Figures 25-30 and 25-31). The extent of the decline over this period is somewhat overstated, because an atypically high sockeye salmon return in 1999 drew an unusually high level of angler activity, particularly to the Newhalen River. Additionally, ADF&G staff advised that the 1999 data for Sixmile Lake were anomalous (Jennings, pers. comm., 2007). Still, while annual local populations of (and fishing effort for) cyclical species such as salmon may fluctuate widely, the overall multiyear pattern suggests that there has been genuine fall-off in local sportfishing in the central study area. The total number of angler days fell from 11,743 in 1999 to 2,996 in 2005, a 74 percent drop. The 2005 level was less than in any other year in the 7-year period. The total annual catch fell from 56,586 in 1999 to 19,400 in 2005, a 66 percent drop. The 2005 catch for every major species was below average for the period, with the greatest drops in the catch of grayling, sockeye salmon, and rainbow trout. The fishing effort and catch dropped substantially for the two most popular and productive locations: angler days fished and total catch, respectively, were down 80 percent and 77 percent for the Newhalen River and 43 percent and 29 percent for Iliamna Lake. The annual sample sizes (number of responses) for the other locations were not sufficiently large for a similar trend analysis.

25.6.5 Hunting

25.6.5.1 Background

Big game hunting is another major use of the regional study area's resources. (The level of nonsubsistence waterfowl hunting is limited both throughout Alaska [USFWS, 2007] and in the hunting study area [Figure 25-1] [Rothe, pers. comm., 2008]; therefore, waterfowl hunting is not included in this discussion of hunting. Almost all hunting or trapping of small game and furbearers is done by local residents for subsistence or cash income [Butler, 2007c; Woolington, 2007c] and so is not treated here. Subsistence use is discussed in Chapter 23). Like sportfishing, it supports a variety of support-sector businesses such as air taxi services, lodges, guides, and outfitters, both in and outside the region.

ADF&G's Division of Wildlife Conservation (DWC) manages and regulates big game hunting in Alaska. For wildlife management, ADF&G divides the state into 26 game management units (GMUs; Figure 25-32). Some GMUs are subdivided into smaller sub-units, which may be further subdivided into uniform coding units (UCUs), which usually correspond with minor drainage areas. Each UCU is identified by a unique code composed of the designations for the game management unit/unit/uniform coding unit, for example, GMU 9/Unit B/UCU 0101 or, more simply, GMU 9B-0101. The big game hunting study area comprises 23,283 square miles (approximately 14,901,120 acres) in parts of two GMUs: GMU 9 and GMU 17 (Figures 25-33 and 25-34, respectively).

ADF&G regulates several types of hunts. The type of hunting relevant to this baseline study is the general-season hunt, which is open to most people. Under Alaska's wildlife regulations, general-season hunts for big game include some subsistence hunting. ADF&G also regulates several types of restricted hunts by permit (drawing permits, registration permits, Tier II subsistence permits), which are not covered in this baseline study.[5]

ADF&G regulations (ADF&G, 2007) determine who (Alaskan residents only, or residents and nonresidents, or nonresidents only) may hunt which species, where, and when. (For example, nonresidents of Alaska hunting brown bear must be accompanied in the field by an Alaska-licensed guide or by an Alaskan resident, 19 years or older, who is within the second degree of kindred to the hunter. Non-U.S. citizens hunting any big game must be accompanied in the field by an Alaska-licensed guide.) The detailed regulations are revised annually in response to dynamic wildlife-management circumstances. It is not practical to describe fully the regulations that apply to the hunting study area, but some key features are noted below.

- ADF&G's regulatory year and related annual hunt data generally runs from July 1 through June 30. (For simplicity, in this chapter the regulatory year for hunting is referred to by its beginning year; for example, the regulatory year beginning July 1, 2000, and ending June 30, 2001, is denoted herein as 2000.)
- ADF&G classifies 12 species as big game: black bear, brown bear, bison, caribou, Dall sheep, Sitka black-tailed deer, elk, mountain goat, moose, musk ox, wolf, and wolverine. Of these, caribou, moose, and brown bear are the main species of interest for big game hunting in the study area.
- In 2007, the open season for caribou ran from August through mid-March for Alaska residents and for only the first two weeks of September for nonresidents of Alaska. For moose, the open season for residents extended roughly from late August to mid-September and from mid-December to mid-January, with nonresidents restricted to early September. For brown bear, GMU 9 had a spring and a fall season (GMU 9 is closed in even-numbered years), while GMU 17's open season extended from September through May. These open seasons are typical of recent years for those GMUs; however, seasonal and other restrictions may be adjusted from year-to-year according to management goals.
- Generally, state lands are open for hunting as allowed by regulation. Other parts of the study area are wholly or partly closed to hunting. Lake Clark and Katmai national parks are closed to hunting, except that local residents may carry on traditional subsistence activities. The national preserves and the Alagnak Wild River are open to hunting under ADF&G regulation. The ANCSA regional and village Native corporations are the primary private landowners in the area. They control personal access to and use of their lands for hunting, which must be conducted under ADF&G's regulations. The Bristol Bay Native (regional) Corporation's surface-land selection opportunities were limited to existing cemeteries and historical places; otherwise, it does not own surface lands. Its village corporations do own and manage extensive surface lands. The individual village corporations set their own policies for access to their lands for sportfishing or hunting. For example, Choggiung, Ltd., a merger of the Dillingham and Portage Creek

5. ADF&G's hunting regulations (ADF&G, 2007) do not use the terms "recreational hunting" or "sport hunting," as ADF&G regards those terms as inappropriate to characterize big game hunting in Alaska.

ANCSA village corporations, actively manages recreational activity on its lands by a permit system.

25.6.5.2 Data Sources

ADF&G collects information on general-season hunts of caribou and moose by means of a harvest ticket that all hunters must complete and return to ADF&G. The harvest tickets record, among other information, hunter residency, hunt location and success, means of transportation to the hunt location, and commercial services used. Brown bear hunters must report some of the same information about successful hunts to an ADF&G representative. ADF&G compiles annual hunt data from the harvest tickets by sub-unit, and publishes or posts on its website several summary data reports (ADF&G DWC, n.d.[a] and n.d.[b]; ADF&G DWC, n.d.[d] and n.d.[e]). These annual reports document harvests and, for caribou and moose, hunting activity for each species by sub-unit. Depending on the species, the reports may also break down harvest data by hunter residency status (local resident, non-local Alaska resident, non-Alaska resident), hunter success, and means of transportation to the hunt area.

The four GMU sub-units that are wholly or partly in the regional study area for hunting typically cover very large geographic areas (Figures 25-33 and 25-34). One sub-unit (GMU 9B) is entirely within the study area. The three other sub-units (GMUs 9C, 17B, 17C) extend beyond the study area. The study area encompasses 40 UCUs in the four sub-units (Figure 25-35):

- Unit 9B—all 16 UCUs, an estimated 7,050 square miles (approximately 4,512,000 acres).
- Unit 9C—10 of 13 UCUs, an estimated 5,806 square miles (approximately 3,715,840 acres).
- Unit 17B—8 of 11 UCUs, an estimated 7,289 square miles (approximately 4,664,960 acres).
- Unit 17C—6 of 9 UCUs, an estimated 3,138 square miles (approximately 2,008,320 acres).

Hunting data for the sub-units are useful for big-picture analysis, but the gross size of the sub-units and their boundaries not coinciding with the study area boundaries mean that sub-unit-level data tell little about the geographic pattern of hunting and harvests in the regional study area and even less about the central study area. In order to develop a more finely tuned picture of hunting in both study areas, unpublished hunt data were obtained from ADF&G for the 40 study-area UCUs, for the three most hunted big game species (caribou, moose, and brown bear) for 2000 through 2005 (ADF&G DWC, various). The study area for hunting was subdivided to match UCU boundaries from ADF&G maps (ADF&G DWC, n.d.[f]). The UCU-level data were then used to develop a series of detailed maps, with associated tables, showing the geographic pattern, by species, of hunting activity, the relative popularity, and productivity of individual UCUs for 2000 through 2005 (Figures 25-35 through 25-43). (Because harvest tickets are sometime unclear about hunt locations, some hunting activity cannot be assigned to specific UCUs and may be assigned to an unspecified location in the sub-unit. As a result, data for some UCUs may be under-reported to an unknown extent.)

The reported harvest was few or none in some years or for some UCUs or for some species. Also, in GMU 9, brown bears are hunted only in odd-numbered years. In order to enhance the sometimes-sparse database and to compensate for unrepresentative year-to-year variations, 6 years (2000 through 2005) of data on hunting activity and harvests were aggregated to develop the UCU-level tabulations and maps (Figures 25-35 through 25-43).

The ADF&G data showed a steep decline over the past decade in the caribou hunting activity and harvest in the regional and central study areas, and a modest drop in moose hunting. The brown bear harvest was stable.

Table 25-26 gives the average annual harvests of brown bear, caribou, and moose for the hunting and central study areas (with comparison to the statewide averages) during 2000 through 2005. Beyond the three major big game species, there was also some hunting for black bear, Dall sheep, and wolves. Modest annual harvests were reported for these species for 2000 through 2005 for GMUs 9B, 9C, 17B, and 17C. For these years, the average annual harvests of these species for these four sub-units combined, including the territory outside the study area, were as follows (Table 25-27):

- 17 black bear or less than one percent of the statewide total.
- 2 Dall sheep or less than one percent of the statewide total.
- 159 wolves or 11 percent of the statewide total.

Because much of the territory in these sub-units is outside the regional study area, these numbers overstate the harvests of black bear and wolves for the hunting study area. UCU-level data were obtained and reviewed for Dall sheep, but not for black bear or wolves. In 2000 through 2005, 44 hunters harvested 10 Dall sheep all in UCUs south and east of Lake Clark (ADF&G DWC, various).

There was no harvest reported for bison, deer, elk, mountain goat, musk ox, or wolverine.

25.6.5.3 Caribou

Caribou are the most heavily hunted and harvested big game species in the hunting study area. Two migratory caribou herds—the Mulchatna Herd and Alaska Peninsula North Herd—range there. The larger Mulchatna Herd seasonally occupies an expansive area in the Nushagak and Mulchatna drainages north and west of Iliamna Lake. The smaller Alaska Peninsula North Herd ranges through the northern and west-central Alaska Peninsula. Both herds have declined in population from the early or mid-1990s through 2006 (Table 25-28). After growing from 90,000 in 1991 to 200,000 by 1996, the Mulchatna Herd shrank steadily to 45,000 by 2006. The smaller Alaska Peninsula North Herd numbered 17,500 in 1991 and thereafter declined steadily to 2,500 by 2005.[6] The populations and seasonal migration patterns of both herds have varied widely in past decades. ADF&G's management objectives for the Mulchatna Herd are to maintain a population of 100,000 to 150,000, managed for maximum hunting opportunity (Woolington, 2007a). The management objective for the Alaska Peninsula North herd is to attain a stable population of 12,000 to 15,000 caribou (Butler, 2007b).

Both herds have yielded steeply reduced harvests from 2000 through 2005. During that time, their combined harvest fell from 9,684 to 2,179 (Table 25-29), a drop of more than 75 percent. The Mulchatna Herd harvest dropped from 9,588 in 2000 to 2,175 in 2005. In 2000, the Mulchatna Herd harvest ranked second in Alaska after the Western Arctic Herd; by 2005, the Mulchatna harvest had fallen to fourth after the Teshekpuk and Nelchina herds, as well as the Western Arctic Herd (ADF&G DWC, n.d.[a] and

6. Additional information on big game wildlife populations and habitats may be found in ADF&G management reports for caribou (ADF&G DWC, 2007b), moose (ADF&G DWC, 2006), and brown bear (ADF&G DWC, 2007a), and in *Alaska's Wildlife and Habitat* (ADF&G, various).

n.d.[b]). The annual harvest for the Alaska Peninsula North Herd fluctuated between about 100 and about 200 from 2000 through 2004, with an abrupt drop to only four caribou in 2005.

The harvest figures for the general-season hunt do not include the unreported harvest, which may be substantial, or harvest from restricted permit hunts. ADF&G puts the unreported harvest of the Mulchatna Herd at 1,500 to 2,500 caribou annually from 2001 through 2005, with a caution that this figure is only an estimate (Woolington, 2007a). ADF&G attributes most of this unreported harvest to local and non-local Alaska residents. Although the harvest-ticket data understate the actual total harvest, the data and maps presented in this chapter do reflect the geographic distribution of the reported general-season hunt activity and harvest.

Consistent with the recent downward trend of caribou harvests during the early 2000s, the average number of hunters active in the four sub-units within which the hunting study area is situated fell by almost half, from 3,615 in 2000 to 1,936 in 2005 (Table 25-30). During the same period, the number of hunter days dropped by 55 percent, from 20,196 to 9,156. Big game hunting for caribou in the study area is typically a multi-day outing. From 2000 through 2005, the average hunter spent 5.3 days on a caribou hunting trip (ADF&G DWC, n.d.[d]).

Figure 25-35 maps and tabulates the total number of caribou hunters and number of caribou harvested for each of the 40 UCUs in the hunting study area for the six years from 2000 through 2005. (There may be numerical discrepancies between the mapped data for the UCUs and the data for the GMU sub-units, because some harvest tickets do not clearly specify hunt locations. In addition, the GMU sub-units include UCUs that are outside the study area and which the UCU-level data do not include.) On the figure, the most popular (as measured by number of hunters) and most productive (as measured by number of caribou harvested) UCUs are highlighted. (Because of the spatial and visual nature of the detailed information represented in Figure 25-35, it is practical only to stress the highlights here. Readers are urged to examine this and similar figures to see the spatial relationships represented therein.)

From 1998 through 2006, the caribou harvest in the hunting study area declined (Table 25-31 and Figure 25-44). In addition, from 2000 through 2005, the hunting study area's 40 UCUs accounted for a slowly declining share of the statewide annual caribou harvest—from 5.1 in 2000 percent to 3.7 percent in 2005—with a plummet to 1.2 percent in 2006. Several factors have contributed to the harvest decline. As already noted, both caribou herds that use the hunting study area substantially declined in size (Table 25-28). The range of the Mulchatna Herd shifted north and west, away from the study area, with the result that fewer caribou were harvested there. Finally, with declining harvest opportunities in the study area, some hunters have shifted their harvest effort elsewhere.

Generally, the most popular and productive UCUs in the hunting study area were in the Mulchatna drainage—particularly the Chilikadrotna, Koktuli, Mulchatna, and Stuyahok river areas, and, to a lesser extent, part of the Kvichak drainage. UCU 17B-0201 alone accounted for one-fifth of all hunting activity and harvest in the study area for 2000 through 2005. None of the UCUs in the eastern or southern part of the study area registered substantial caribou hunting activity or harvest (Figure 25-35). The hunting effort in the two national preserves, in which hunting is permitted but which are outside the prime caribou range, was relatively light.

The UCUs vary widely in area. The largest, UCU 9C-0601, is estimated at 2,534 square miles (approximately 1,621,760 acres), the smallest, UCU 9C-0401, at 57 square miles (approximately 36,480

acres). For that reason, the absolute numbers for hunting activity and harvests distort the relative intensity of hunting interest and success for differently sized UCUs. In order to get a truer picture of hunter interest, the density of hunter activity (number of hunters/area) for each UCU was calculated, ranked, and tabulated. Figure 25-36 portrays the hunter density for caribou. For 2000 through 2005, the three UCUs in or partly in the central study area and nearest the Pebble Deposit, as well as most accessible from Iliamna and Newhalen, ranked first (9B-0401), fourth (9B-0302), and fifth (17B-0201) in hunter density among UCUs in the hunting study area.

The UCUs partly or wholly in the central study area accounted for 31 percent of the caribou harvest in the hunting study area during 2000 through 2005 (Table 25-32). Most of the harvest took place in UCU 17B-0201, most of which lies outside the central study area (Figure 25-37). The two UCUs (9B-0302 and 9B-0401) nearest the settlements of Iliamna, Newhalen, and Nondalton and the Pebble Deposit also yielded relatively large caribou harvests at the beginning of this period (Table 25-33). The caribou harvest in the other four UCUs was very minor.

Annual harvests for the years 1998 through 2006 for the UCUs partly or wholly in the central study area were individually tabulated (Table 25-33) and charted (Figure 25-45). After 1999, the total annual caribou harvest for these seven UCUs declined steeply. It dropped from a high of 1,053 in 1999 to 262 in 2005, and then fell abruptly to 74 in 2006. Overall, the annual harvest dropped by 93 percent over that period. The greatest drop occurred in the three most productive UCUs—9B-0302 and 9B-0401, north and west of Iliamna and Newhalen, and UCU 17B-0201, west of the Pebble Deposit. The combined harvest in those three UCUs dropped by 94 percent, from 913 caribou in 1999 to 59 in 2006. This local trend may stem from several factors: a decline in the size of the Mulchatna Herd, changing seasonal migration patterns away from the central study area, and a shift in hunting activity to other more promising areas.

Most caribou hunters in the hunting study area are Alaskans. In 2005, approximately two-thirds of caribou hunters in the four GMU sub-units that overlap the study area were Alaska residents and one-third were nonresidents (Table 25-34). The Alaska residents had higher success rates than the nonresidents; three-quarters of resident hunters harvested a caribou compared to only about one-half of nonresident hunters. Presumably, these figures are indicative of caribou hunter residency and success in the study area. Consistent with the remote, roadless, wilderness geography of the study area, airplanes are the most common means by which hunters reach their hunt area. In 2005, 73 percent of hunters traveled by airplane, 16 percent by snowmobile, and 7 percent by boat (Table 25-35).

By regulation, the open season for hunting caribou varies by GMU sub-unit and hunter residency status. Hunting activity is highly seasonal. From 2000 through 2004, typically 65 percent to 80+ percent of the Mulchatna Herd harvest occurred in August and September (but in 2005, the figure was 47 percent) (Woolington, 2007a). The harvest of the smaller Alaska Peninsula North Herd was spread more evenly through the year (Butler, 2007b).

25.6.5.4 Moose

The moose population throughout GMU 17 has grown in numbers and range in recent decades (Woolington, 2006). The moose population in GMU 9 has been stable and relatively low in numbers (Butler, 2006). Moose concentrate along several river corridors and other suitable habitat throughout the region, but particularly in the Mulchatna/Nushagak drainages. Overall, the moose harvest in the hunting study area reached an all-time high during the 1990s. (Recent management reports noted that rising

caribou populations and hunting effort increased hunting pressure from combination hunts for moose and caribou [Woolington, 2006, 2008]). Currently, ADF&G's management objectives focus on maintenance of an adequate population and management of hunting levels consistent with maintaining a sustainable population.

In the hunting study area, moose hunting and harvests are heavily concentrated in a few UCUs along several drainages with superior moose habitat, such as the Nushagak, Mulchatna, Koktuli, Stuyahok, Chilikadrotna, and Naknek drainages. The most popular and productive UCUs for moose hunters are in the Nushagak, Mulchatna, and Naknek drainages, in the western and southwestern part of the study area (Figures 25-38 and 25-39). From 2000 through 2005, UCU 17-0501, east of Dillingham, accounted for one-quarter of all moose hunting activity and harvest in the hunting study area (Table 25-32). As with caribou, there was relatively little moose hunting or harvest in the eastern part of the study area. From 2000 through 2005, the hunting study area yielded an annual average harvest of 285 moose (Table 25-32) or about 4 percent of the average annual statewide harvest for the same period (Table 25-36). The total moose harvest for the hunting study area dropped by almost half in that period and dropped even more from 1999 through 2006 (Table 25-36 and Figure 25-46).

A larger proportion of moose hunters in the GMU sub-units for the hunting study area in 2005 were Alaska residents (56 percent) than were nonresidents (43 percent; Table 25-37). The two groups had similar success rates of about 29 percent. Moose hunters spent an average of seven days on a hunting trip (ADF&G DWC, n.d.[d]). As with caribou hunters, most moose hunters (64 percent) in 2005 traveled to their hunt area by airplane (Table 25-38). Another substantial share (25 percent) traveled by boat, and a few by all-terrain vehicle or snowmobile. From 2000 through 2005, over 90 percent of the annual moose harvest occurred in September (Woolington, 2008).

In 2000 through 2005, the moose harvest for the seven UCUs overlapped by the central study area averaged 8 percent of the moose harvest for the larger hunting study area and less than 1 percent of the statewide harvest (Table 25-26). During that period, UCU 17B-0201 accounted for two-thirds of the hunting activity and harvest for moose, but most of that UCU is outside the central study area (Table 25-39 and Figure 25-40). The second most-hunted and -productive UCU was 9B-0304, at the eastern end of the central study area, but its yield was small. Two UCUs wholly within the central study area (9B-0401 and 9B-0303) supported a low level of hunting and harvest. Overall, the moose harvest has trended irregularly downward since 1998. It dropped by more than half from 1998 through 2006, with the most pronounced drop in UCU 17B-0201 (Figure 25-47). The overall decline may be attributable partly to reduced moose populations in GMU 17B (Woolington, 2008) and partly to decreased hunting effort in GMU 9B (Butler, 2006).

25.6.5.5 Brown Bear

Accurate comprehensive estimates of total brown bear populations are difficult to obtain (Butler, 2007a; Woolington, 2007b); therefore, numerical estimates should be viewed as very approximate.

The Alaska Peninsula is home to the state's largest population of brown bears. (A recent survey documented over 2,000 brown bears just in Katmai National Park [NPS, 2007b].) This peninsula has supported guided brown bear hunting since the 1960s. There are known concentrations of brown bears here, particularly in the salmon-rich drainages in GMU 9C (brown bear viewing is a major attraction at several sites in Katmai National Park, but brown bear hunting is restricted there) and, to a lesser extent,

GMU 9B. The Nushagak and Mulchatna drainages (GMUs 17B and 17C) are thought to support smaller but still substantial populations, with seasonal concentrations in major salmon-spawning areas in the Nushagak and Mulchatna river systems. ADF&G wildlife managers have noted increased hunting pressures in both GMU 9 and GMU 17 (Butler, 2007a; Woolington, 2007b).

From 2000 through 2005, the combined brown bear harvest for the UCUs in the hunting study area averaged 111 annually (higher in odd-numbered years, lower in even-numbered years) or about 7 percent of the statewide harvest. The UCUs with the highest brown bear harvests were south and east of Iliamna Lake and in the Mulchatna and Upper Nushagak drainages west and north of the central study area (Figure 25-41 and Table 25-32). The UCUs with the highest harvest densities included several on the perimeter of Iliamna Lake, two bordering the Naknek River, and three in the Nushagak Drainage (Figure 25-42). In 1996 through 2006, the hunting study area supported a modest and stable harvest of brown bears (Table 25-40 and Figure 25-48). (The year-to-year harvest fluctuations seen in the table and figure stem largely from alternate-year hunting restrictions in some areas.)

During the same period, the harvest in the UCUs overlapped by the central study area averaged 30 brown bears annually or about 1.9 percent of the statewide harvest. UCU 17B-0201 had the highest overall harvest (72 bears), but that UCU is mostly outside the central study area (Figure 25-43). Only one UCU wholly within the central study area (9B-0304) was among the more productive UCUs, and it had by far the highest harvest among the four UCUs within the central study area.

25.6.6 Recreation Lodges

The regional study area's recreational lodges are central to much of its wilderness-oriented sportfishing, big game hunting, and other outdoor recreational activities. The recreation lodges serve as bases for those enjoying nearby recreational opportunities and/or traveling by floatplane or boat to more distant recreational opportunities in the region. The number, location, and mode of operation of the lodges and the recreational activities the lodges support are vital aspects of recreation across the regional study area.

A comprehensive inventory of recreational lodges in the study area was compiled in 2006 through 2008 (Table 25-41) and their locations were mapped (Figure 25-49). The inventory was compiled from many sources, including State of Alaska business licenses; NPS commercial authorization permits for Lake Clark and Katmai NP&Ps and the Alagnak Wild River; NPS publications (NPS 2006a, 2007f); website searches for recreational lodges in the study area; local telephone directories; and local informants.

Two important qualifications apply to the inventory. First, it includes a wide range of lodge facilities, from high-end deluxe lodges with extensive amenities to rustic semipermanent seasonal platform-tent camps with just essential improvements and few amenities. The inventory does not include unimproved transient camp facilities. Second, the inventory includes some lodges that may not currently be open for business as recreation lodges. For example, several lodges in Iliamna, in an area where sportfishing activity has fallen off in recent years, are leased by the Pebble Partnership as local quarters for its workforce. Lodges are typically owner-operated. In a given year or season, some listed lodges may be shuttered for personal, financial, or other reasons, but with the prospect of re-opening at some future date.

The inventory identified and mapped 73 lodges in the sportfishing study area (Table 25-41 and Figure 25-49). All the lodges are located on or near streams or lakes. Beyond that, the lodge locations are of two general sorts, either less or more remote. The less remote lodges are settlement-based. They have access

to scheduled air service and other support services and, perhaps, nearby recreational assets. The clusters of lodges in Iliamna, Port Alsworth, and King Salmon are examples of the less remote sort of lodges. Most lodges, however, are situated at more remote locations, accessible only by floatplane or boat, and near prime sportfishing grounds and other recreational assets. An example is the group of lodges by Intricate Bay northeast of Kokhanok on the south shore of Iliamna Lake. Many lodges are strung along highly productive waterways such as the Alagnak, Kvichak, and Nushagak rivers. Others are located on remote lakeshores, such as several in Katmai and Lake Clark NP&Ps.

Table 25-41 and Figure 25-49 group the region's lodges by ADF&G sportfishing management areas and USGS drainages, just as the sportfishing locations are grouped and mapped. This grouping helps correlate the lodge and sportfishing locations. Almost two-thirds of the lodges were located in Area S (45 lodges or 62 percent), with around half of those in the Iliamna Lake drainage (22 lodges) and the rest about evenly split between the Lake Clark (13) and Alagnak River (10) drainages (Table 25-42). Seventeen lodges were located in Area T's three drainages—Upper Nushagak River (5), Lower Nushagak River (9), and Mulchatna River (3)—and 11 were located in the Naknek River drainage of Area R.

In terms of political jurisdictions, 48 of the mapped lodges are located in the Lake and Peninsula Borough, nine are in the Bristol Bay Borough, and 16 are in the Dillingham Census Area, which does not have an incorporated borough (that is, regional) government.

The lodges (and sportfishing locations) can also be sorted generally according to their geographic relationship to the vicinity of the Pebble Deposit and the transportation corridor study area.

- 32 lodges are situated in drainages wholly or partly downstream of the Pebble Deposit and transportation study area, namely the Iliamna Lake, Mulchatna River (part), and Lower Nushagak River drainages.
- 13 lodges are situated in the Lake Clark drainage, which is upstream of the Pebble transportation study area.
- 28 lodges are located in drainages that are separate from the Pebble Deposit and transportation study area, namely the Naknek River, Alagnak River, Upper Mulchatna River, and Upper Nushagak River drainages.

Most lodges operate seasonally and are primarily geared to the sportfishing season, from June through September, when weather and sportfishing conditions are most favorable for fishers and other recreationists. Some lodges also cater to big game hunters. The lodges provide a base of operations and perhaps transportation, guiding, and other support services for hunters during hunting season. Some lodges located in settlements may accommodate guests and travelers in the off-season.

As previously noted, lodges vary widely in the quality of accommodations and in the transportation and other services they provide their clients. Many lodge-based sportfishing and hunting operations target national and international markets. Because travel to the lodges requires a substantial outlay of time and money, the lodges offer multi-day packages, typically weekly packages. Table 25-43 gives examples of 2008 rates for a cross-section of sportfishing lodges. Depending on the quality and variety of services offered, the rate for a 6 to 7 day sportfishing trip may range from around $3,500 to $8,000 or more per person. Some lodges in the study area also offer similarly-priced packages or options for guided and

unguided river float and float-fishing trips; fly-out wildlife viewing, sightseeing, and photography; and/or hunting and backcountry wilderness trips.

The high-end lodge packages typically include professional guide services, daily fly-outs to prime remote fishing locations, fishing gear, and fish cleaning, packaging, and freezing. As suits their mode of operation, they may also include or offer separate flight-seeing trips, bear and other wildlife viewing, photography trips, river boats, float trips, and other recreational activities. All this is in addition to accommodations and food service. Several lodges also operate charter flight services, and many maintain their own planes and boats to provide transportation services to clients. The low-end lodges typically offer simpler facilities and include fewer services in their packages.

As a group, the lodges employ many seasonal workers and consume substantial stores of fuel, foodstuffs, and other supplies for their operations. Several factors, however, diminish their contribution to the local economies. The lodges are largely staffed by non-local or (mostly) non-Alaska-resident service workers who are relatively low-paid. This limits the lodges' contribution to local-resident earnings. Most supplies are purchased directly from non-local sources, thus limiting the boost lodge purchases give to local suppliers. Moreover, most of the lodges are owned by nonresidents of the region, so the profits of proprietorship do not accrue to the local residents or economy.

25.7 Summary

This chapter inventories, describes, quantifies and maps outdoor recreational resources and recreational activities in the Bristol Bay drainages study area.

Much of the study area is distant from the vicinity of the Pebble Deposit and the transportation corridor study area. In practice, the regional study area was flexibly defined to fit the most relevant and available geographic databases for land use (22,526 square miles or approximately 14,416,640 acres), sportfishing (26,283 square miles or approximately 16,821,120 acres), and big game hunting (23,283 square miles or approximately 14,901,120 acres). A smaller central study area was also defined for more detailed description; it includes the local drainages in the vicinity of the Pebble Deposit and the transportation corridor study area.

The study area is sparsely populated and developed, with state and federal governments being the largest landowners. It is mostly wilderness or near wilderness. Outside the few small settlements, subsistence and recreation are the principal human uses of the region's resources. Approximately 12,945 square miles (approximately 8,284,800 acres) or 57 percent of the land use study area are managed primarily for recreation-related purposes. This includes the three national park units, totaling 11,697 square miles (approximately 7,486,080 acres), and 1,248 square miles (approximately 798,720 acres) of state lands managed for recreation under the BBAP and NMRRMP. Recreation and related support services are important contributors to some local economies.

The regional study area's thousands of square miles of remote wilderness possess abundant and varied natural attractions. These include three national park units and other federal and state recreation lands, mountain ranges with several active volcanoes and the Valley of Ten Thousand Smokes, the largest lakes in Alaska (Iliamna Lake) and in the national park system (Naknek Lake), the world's most productive wild salmon habitat, world-class sportfishing, one of the state's largest caribou herds, brown bear and other wildlife viewing opportunities, and opportunities for backcountry recreation. These attractions

support a wide variety of outdoor recreational activities, depending on the season. In 2006, the NPS reported 68,630 recreational visits to Katmai NP&P. The same year, Lake Clark NP&P was one of the least visited units in the national park system, with 5,320 recreational visits.

The sportfishing study area is abundant in freshwater sportfishing resources and wilderness fishing destinations. In a typical year, over 15,000 sportfishers make about 35,000 fishing trips in the region, spend about 70,000 days fishing, and catch some 400,000 fish. Regionally, the primary target species are rainbow trout, grayling, and king salmon. In the central study area, sockeye salmon and rainbow trout are the most frequently caught species. The sportfishing activity and catch in the central study area declined during the study period. Sportfishing supports a recreation-based economy that includes air taxi services, lodges, guides, outfitters and suppliers, and other recreation-related businesses both in and outside the study area.

Big game hunting is another major use of the study area's resources. ADF&G's Division of Wildlife Conservation manages and regulates big game hunting in Alaska. The main species of interest for big game hunting in the hunting study area are caribou, moose, and brown bear. Caribou were numerically the most commonly hunted and harvested big game animal in the study area during the study period, but the area also accounted for a substantial share of the statewide brown bear harvest. The hunting effort and harvest for caribou and moose in the central study area fell during the study period. Like sportfishing, big game hunting supports a variety of businesses such as air taxi services, lodges, guides, and outfitters, in and outside the region.

The regional study area's recreational lodges are central to much of its wilderness-oriented sportfishing, big game hunting, and other outdoor recreational activities. Recreational lodges serve as bases for those enjoying nearby recreational opportunities and/or traveling by floatplane or boat to more distant recreational opportunities in the region.

Seventy-three lodges were identified in the sportfishing study area and mapped. Forty-five were situated in the Iliamna Lake, Lake Clark, and Alagnak River drainages; 17 were in the Nushagak/Mulchatna drainages; and 11 were in the Naknek River drainage. All these lodges are located on or near streams or lakes. Some lodges are settlement-based, for example, at Iliamna, Port Alsworth, or Naknek, where they have access to scheduled air service and other support services and, perhaps, nearby recreational assets. Most lodges, however, are situated at more remote locations, accessible only by floatplane or boat and near prime sportfishing grounds and other recreational assets.

This geographic relationship of lodges to the vicinity of the Pebble Deposit and transportation corridor study area can be summarized as follows:

- 32 lodges are situated in drainages wholly or partly downstream of the Pebble Deposit or transportation study area, namely the Iliamna Lake, Mulchatna River (part), and Lower Nushagak River drainages.
- 13 lodges are situated in the Lake Clark drainage, which is upstream of the Pebble transportation study area vicinity.
- 28 lodges are located in drainages that are separate from the Pebble Deposit and transportation corridor study area, namely the Naknek River, Alagnak River, Upper Mulchatna River, and Upper Nushagak River drainages.

Most lodges operate seasonally and are primarily geared to the sportfishing season, from June through September, when weather and sportfishing conditions are most favorable for fishers and other recreationists. Some lodges also cater to big game hunters. Most lodges are owned by nonresidents of the region. As a group, the lodges employ mostly non-local seasonal workers and import most of their fuel, foodstuffs, and other supplies. As a result, the lodges' contribution to resident earnings and local economies is limited.

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TABLES

TABLE 25-1
State-owned and State-selected Upland Acreage and Recreational Land Use Designations, Regions 7 through 11, Bristol Bay Area Plan

BBAP Region [a]	State-owned and State-selected Uplands (acres)	Recreational Designations	
		Rd (acres)	Rp (acres)
Region 7, Upper Mulchatna and Upper Hoholitna	1,606,959	157,126	2,062
Region 8, Lake Clark, Newhalen	71,779	7,680	0
Region 9, Eastern Iliamna Lake	690,646	22,101	0
Region 10, Western Iliamna Lake, Kvichak	823,566	360,946	3,281
Region 11, Bristol Bay Borough Area	395,824[b]	0	0
Total	**3,588,774**	**547,853**	**5,343**

Notes:

a. BBAP Region 6, Nushagak/Mulchatna, encompasses over 4.3 million acres of state lands, most of which are outside the land use study area. The part of Region 6 within the study area is covered by the NMRRMP and is discussed under that plan.

b. Does not include some tidelands on Kvichak Bay.

c. Six hundred forty acres equal one square mile.

Rd = Public Recreation and Tourism–Dispersed

Rp = Public Recreation and Tourism–Public Use Site

Source: ADNR, 2005a.

TABLE 25-2
Management Intent for Management Units Designated for Recreation under the Bristol Bay Area Plan, Central Study Area

Unit # Name LUD / Acres	Management Intent	Resources, Uses, Additional Information
R06-28 PU28/Koktuli River Rp / 161	This unit is designated Public Recreation and Tourism-Public Use Site (Rp) and is to be managed for public recreation and retained in public ownership. . . . Conveyance of the unit to the Lake and Peninsula Borough is appropriate with the stipulation that the unit remain in public ownership as a Public Use Site.	Unit consists of a wheeled plane landing area on the Koktuli River 1 mile downstream from the confluence of the north and south forks. The unit is part of a land selection by the Lake and Peninsula Borough under its municipal entitlement.
R06-29 PU29/Koktuli River Rp / 82	This unit is designated Public Recreation and Tourism-Public Use Site (Rp) and is to be managed for public recreation and retained in public ownership.	Unit consists of a campsite on the Koktuli River at the confluence of the north and south forks. It is identified in the Nushagak & Mulchatna Rivers Recreation Management Plan, April 2005, as a public use site (PU29).
R06-30 Corridor Upper Koktuli River Rd / 20,636	This unit, which consists of the navigable portions of the Upper Koktuli River and its adjoining uplands as depicted in Map O-2, is designated Public Recreation and Tourism-Dispersed (Rd). Except for those areas that may be conveyed under the Municipal Entitlement program, unit is to be retained by the state and managed to maintain the recreational uses of the Koktuli River and the adjoining upland corridor, its fish and wildlife resources, and public recreation values. The management requirements of the Nushagak & Mulchatna Rivers Recreation Management Plan (RRMP) are to be followed by [A]DNR in the granting of authorizations related to certain types of recreational uses and structures. See the Management Intent and Management Guidelines in the RRMP for Management Unit 17. . . . In general, authorizations should not be issued for nonrecreational uses that are incompatible with the management intent of this unit and the management objectives of the RRMP. Oil, gas, and mineral exploration and development are considered appropriate if consistent with these management objectives or if in the best interest of the state.	This unit consists of the uplands corridor adjacent to either side of a portion of the Koktuli River. Its outer boundary corresponds to that of Management Unit 17 of the Nushagak & Mulchatna Rivers Recreation Management Plan (RRMP). The width of the corridor, adjacent to the streams, varies, and may be up to four miles wide, measured from each side of the river system. Vegetation consists of lichen tundra and low and tall shrublands. The river is cataloged as an anadromous fish stream. Moose over-winter in the area and caribou use the area as a calving ground. The unit is partly affected by MCO 393. This corridor does not include the specific public use sites identified in the RRMP. These are specific, individual units. The unit contains a land selection by the Lake and Peninsula Borough under the Municipal Entitlement program.
R06-31 PU30/Koktuli River Rp / 491	This unit is designated Public Recreation and Tourism-Public Use Site (Rp) and is to be managed for public recreation and tourism. The unit is to be retained in public ownership. . . . Conveyance of the unit to the Lake and Peninsula Borough is appropriate with the stipulation that the unit remain in public ownership as a Public Use Site.	This unit consists of a floatplane landing area on unnamed lake 1 mile south of the upper Koktuli River and campsite on the Koktuli River, connected by a trail. The unit is part of a land selection by the Lake and Peninsula Borough under its municipal entitlement.

Unit # Name LUD / Acres	Management Intent	Resources, Uses, Additional Information
R06-32 PU31/Upper Koktuli River Rp / 241	This unit is designated Public Recreation and Tourism-Public Use Site (Rp) and is to be managed for public recreation and retained in state ownership. . . . Conveyance of the unit to the Lake and Peninsula Borough is not appropriate since the preponderance of land surrounding the unit is designated Minerals (Mi).	This unit consists of a floatplane landing area on unnamed lake on the south side of the upper Koktuli River 2.5 miles northeast of Sharp Mountain. It is identified in the Nushagak & Mulchatna Rivers Recreation Management Plan, April 2005, as a public use site (PU31). The unit is part of a land selection by the Lake and Peninsula Borough under its municipal entitlement.
R09-06 Iliamna Lake Islands Rd / 19,833	These units are designated Public Recreation and Tourism-Dispersed, are to be managed for dispersed public recreation purposes, and retained by the state.	This unit consists of over 10 islands in Lake Iliamna, all of which are vacant and undeveloped. They are of varying size, the largest being Tangle, Flat, and Porcupine Islands in the eastern part of Lake Iliamna.
R10-03 Iliamna Lake NW Rd / 171,321	This unit is to be retained in state ownership and managed to maintain the recreational values and uses of this large area, although mineral exploration and development are considered appropriate within the unit. Such uses are to maintain the recreational values of this area to the maximum extent practicable. [A]DNR authorizations shall consider siting requirements that avoid or minimize impacts to principal recreational use areas. Such authorizations shall also ensure that impacts to anadromous streams and tundra swan concentrations are minimized and are consistent with the requirements for such uses in Chapter 2. The Bristol Bay transportation corridor transects the unit; the actual position of the road alignment has yet to be determined. No authorizations or disposals should be considered that are within or near the corridor until the road alignment is known, or without consultation with the ADOT/PF.	This large unit is situated on the northwest side of Iliamna Lake that includes the Lower Talarik Creek and Kaskanak Creek drainages. It contains many anadromous fish streams and raptor nesting areas; Lower Talarik Creek is noteworthy for its outstanding trout fishing. The recreational values of the unit are considered to be very high and are primarily related to sport fishing. An area of tundra swan concentration occurs in the central part of the unit. The area also has significant mineral potential, indicated by the proximity to the Pebble Copper deposit and other nearby prospects. The unit is partly affected by MCO 393.

Content excerpted from ADNR, 2005a.

Notes:

a. Six hundred forty acres equal one square mile.

LUD = land use designation

Rd = Public Recreation and Tourism–Dispersed

Rp = Public Recreation and Tourism–Public Use Site

TABLE 25-3
Land Ownership, Lake Clark National Park and Preserve, 2008

	Federal (acres)	Other Public (acres)	Private (acres)	Total (acres)
Park	2,226,809	0	392,924	**2,619,733**
Preserve	1,211,160	13,384	199,132	**1,421,676**
Total	**3,437,969**	**13,384**	**592,056**	**4,041,409**

Source: NPS, 2008.

Note:

a. Six hundred forty acres equal one square mile.

TABLE 25-4
Recreational Visits and Visitor Days, National Park Units in Alaska, 2006

	Recreational Visits		Recreational Visitor Days [a]	
National Park Unit	**Number**	**Percent**	**Number**	**Percent**
Klondike Gold Rush NHP Alaska	903,079	36.5%	309,087	18.8%
Denali NP&P	415,935	16.8%	515,973	31.3%
Glacier Bay NP&P	413,382	16.7%	432,500	26.3%
Sitka NHP	331,393	13.4%	16,989	1.0%
Kenai Fjords Nat. Park	251,630	10.2%	69,505	4.2%
Katmai NP&P	68,630	2.8%	38,532	2.3%
Wrangell-St. Elias NP&P	50,336	2.0%	192,954	11.7%
Yukon-Charley Rivers Nat. Pres.	12,083	0.5%	51,458	3.1%
Gates of the Arctic NP&P	9,982	0.4%	12,465	0.8%
Lake Clark NP&P	5,320	0.2%	3,939	0.2%
Noatak Nat. Pres.	3,272	0.1%	2,225	0.1%
Kobuk Valley Nat. Park	3,005	0.1%	571	0.0%
Cape Krusenstern Nat. Monument	2,598	0.1%	371	0.0%
Bering Land Bridge Nat. Pres.	1,265	0.1%	316	0.0%
Aniakchak Nat. Monument & Pres.	60	0.0%	635	0.0%
Total	**2,471,970**	**100.0%**	**1,647,521**	**100.0%**

Notes:

a. A visitor day must be no less than 12 hours.

Nat. = National

NHP = National Historic Park

NP&P = National Park and Preserve

Pres. = Preserve

Source: NPS, 2007d.

TABLE 25-5
Annual Recreational Visits and Backcountry Campers, Lake Clark NP&P, 2000-2006

Year	Recreational Visits	Backcountry Campers
2000	6,493	2,009
2001	4,397	2,338
2002	4,325	2,350
2003	4,505	1,970
2004	4,906	2,000
2005	5,408	1,960
2006	5,320	1,665
Annual Average	**5,051**	**2,042**

Source: NPS, various.

TABLE 25-6
Average Monthly Recreational Visits, Lake Clark NP&P, 2000-2006

Month	Average Number of Visits	Percent of Annual Average
January	166	3.3%
February	159	3.1%
March	163	3.2%
April	152	3.0%
May	224	4.4%
June	945	18.7%
July	911	18.0%
August	872	17.3%
September	935	18.5%
October	218	4.3%
November	146	2.9%
December	160	3.2%
Annual Average	**5,051**	**100.0%**

Source: NPS, various.

TABLE 25-7
Land Ownership, Katmai National Park and Preserve, 2008

	Federal (acres)	Other Public (acres)	Private (acres)	Total (acres)
Park	3,611,719	50,172	12,649	**3,674,540**
Preserve	409,690	512	8,497	**418,699**
Total	**4,021,409**	**50,684**	**21,146**	**4,093,239**

Source: NPS, 2008.

Note:

a. Six hundred forty acres equal one square mile.

TABLE 25-8
Annual Recreational Visits and Overnight Stays, Katmai National Park and Preserve, 2000-2006

		Number of Overnight Stays				
Year	Recreational Visits	In Lodging	Tent Campers [a]	Backcountry Campers	Misc. Overnight Stays	Total
2000	71,389	3,908	3,084	21,231	259	**28,482**
2001	67,038	3,501	2,315	20,903	134	**26,853**
2002	59,025	4,040	2,315	21,186	134	**27,675**
2003	51,589	3,775	2,043	345	0	**6,163**
2004	56,787	3,899	2,521	316	0	**6,736**
2005	54,274	4,216	2,881	653	0	**7,750**
2006	68,630	4,096	2,873	461	0	**7,430**
Annual Average	**61,247**	**3,919**	**2,576**	(b)	(b)	(b)

Notes:

a. Tent campers in NPS campgrounds.

b. Because of changes in reporting practices for backcountry and miscellaneous campers beginning in 2003, annual averages were not calculated for those categories or for total overnight stays.

Source: NPS, various.

TABLE 25-9
Average Monthly Recreational Visits, Katmai NP&P, 2000-2006

Month	Average Number of Visits	Percent of Annual Average
January	148	0.2%
February	179	0.3%
March	164	0.3%
April	178	0.3%
May	185	0.3%
June	9,671	15.8%
July	26,758	43.7%
August	14,676	24.0%
September	8,815	14.4%
October	169	0.3%
November	130	0.2%
December	175	0.3%
Annual Average	**61,247**	**100.0%**

Source: NPS, various.

TABLE 25-10
Commercial Use Authorizations by Type, Lake Clark and Katmai NP&Ps and Alagnak Wild River, 2007

Type of Commercial Use Authorization	Lake Clark [a]	Katmai [a]	Alagnak [a]	Total [a]
Air taxi	35	39	7	**81**
Backpacking/camping overnight	10	22	7	**39**
Bear viewing	33	72	15	**120**
Big game/hunt transporter	19	17	7	**43**
Boat trip/charter boat	22	29	12	**63**
Hiking/walking tour	21	36	0	**57**
Kayak tour	4	5	0	**9**
Mountaineering	1	1	0	**2**
Photography	22	38	8	**68**
Sportfishing	36	70	27	**133**
Winter activity	1	1	0	**2**
Total	**204**	**330**	**83**	**617**

Notes:

a. Most operators obtain commercial use authorizations for multiple services, sometimes in several park units; thus, each authorization may not represent a separate operator.

Source: NPS, 2007e.

TABLE 25-11
Commercial Use Authorizations by Business Location, Lake Clark and Katmai NP&Ps and Alagnak Wild River, 2007

Business Location	Lake Clark [a]	Katmai [a]	Alagnak [a]	Total [a]
Lake & Peninsula Borough	62	47	14	**123**
Bristol Bay Borough	15	81	33	**129**
Elsewhere in Alaska	119	176	27	**322**
Outside Alaska	8	26	9	**43**
Total	**204**	**330**	**83**	**617**

Notes:

a. Most operators obtain commercial use authorizations for multiple services, sometimes in several park units; thus, each authorization may not represent a separate operator.

Source: NPS, 2007e.

TABLE 25-12
Estimated Visitor Spending and Economic Effects, Katmai and Lake Clark NP&Ps and Statewide, 2006

		Visitor Spending		Effects of Non-local-visitor Spending		
	Recreational Visits	All Visitors	Non-local Visitors	Jobs [a]	Personal Income	Value Added
Lake Clark	5,320	$369,000	$352,000	7	$141,000	$217,000
Katmai [b]	68,690	$3,461,000	$3,316,000	66	$1,151,000	$1,780,000
Alaska	2,471,970	N/A	$112,029,000	2,242	$41,254,000	N/A

Notes:

a. Includes seasonal and part-time jobs.

b. Includes Aniakchak National Monument and Preserve.

N/A = not available.

Source: Stynes, 2007.

TABLE 25-13
Estimated Local [a] NPS Payroll and Local Effects, Katmai and Lake Clark NP&Ps and Statewide, 2006

	NPS Payroll		Local Effects of NPS Payroll [c]		
	Salaries	Jobs [b]	Total Jobs	Personal Income	Value Added
Lake Clark	$1,434,811	24	37	$2,202,000	$2,518,000
Katmai [d]	$2,088,014	39	56	$2,943,000	$3,256,000
Alaska	$53,748,000	1,026	3,268	$95,002,000	N/A

Notes:

a. "Local" is defined as a 50-mile radius around each park.

b. Includes seasonal and part-time jobs.

c. NPS payrolls plus local jobs, personal income, and value added generated by NPS payrolls.

d. Includes Aniakchak National Monument and Preserve.

N/A = not available.

Source: Stynes, 2007.

TABLE 25-14
Area of River Systems and Drainages, Sportfishing Study Area

River System or Drainage [a]	Area (square miles)
Naknek River System (part of Area R [b])	**4,044**
Kvichak River System (Area S [b])	**9,444**
Alagnak Drainage	1,427
Iliamna Lake Drainage	4,488
Lake Clark Drainage	3,529
Nushagak River System (part of Area T [b])	**12,735**
Upper Nushagak Drainage	5,012
Lower Nushagak Drainage	3,430
Mulchatna Drainage	4,293
Total	**26,223**

Notes:

a. As defined by the U.S. Geological Survey.

b. Alaska Department of Fish and Game management areas.

c. One square mile equals 640 acres

Source: USGS and NRCS, n.d.

TABLE 25-15
Freshwater Sportfishing Average Annual Angler Days, Anglers, and Trips; Management Areas R, S, and T; 1999-2005

Area	Average Annual Angler Days [a]		Average Annual Anglers [a]		Average Annual Trips [a]	
	Number	Percent of Statewide	Number	Percent of Statewide	Number	Percent of Statewide
Area R	44,200 [b]	1.8%	7,794	1.2%	25,900	1.8%
Area S	28,593 [c]	1.2%	6,037	1.0%	14,220	1.0%
Area T	41,765 [b]	1.7%	7,556	1.2%	18,331	1.3%
Areas R, S, and T Total	**114,558**	**4.8%**	**21,387**	**3.4%**	**58,451**	**4.1%**
Statewide Total	2,400,469	100.0%	633,562	100.0%	1,423,014	100.0%

Notes:

a. The numbers given represent the entire management areas, not just the portions in the sportfishing study area.

b. The number of freshwater angler days for the parts of Areas R and T in the sportfishing study area were 22,851 for the Naknek River system (52 percent of total for Area R) and 18,752 for the Nushagak River system (45 percent of total for Area T). Corresponding figures for the numbers of anglers and trips for the parts of Areas R and T in the sportfishing study area are not available.

c. Data here differ from data shown in Table 22-19 because the data originate from different sources.

Sources: ADF&G SFD, n.d.[a] and various.

TABLE 25-16
Numbers of Sportfishers by Residency Status; Management Areas R, S, and T and Statewide; 2004

Residency	Areas R, S, and T [a]		Statewide	
	Number	Percent	Number	Percent
Alaska Residents [b]	2,592	12.3%	213,813	44.2%
Nonresidents	18,464	87.7%	270,453	55.8%
Total	**21,056**	**100.0%**	**484,266**	**100.0%**

Notes:

a. These numbers represent the entire management areas, not just the portions in the sportfishing study area.

b. Alaska residents are defined as anglers who qualify for an Alaska-resident sportfishing license. A large but uncounted share of sportfishers in this category is composed of Alaska residents from outside the specified management areas.

Source: Jennings et al., 2007.

TABLE 25-17
Saltwater Sportfishing Average Annual Angler Days, Anglers, and Trips; Management Areas R, S, and T; 1999-2005

Area	Average Annual Angler Days [a]	Average Annual Anglers [a]	Average Annual Trips [a]
Area R [b]	9,411	1,917	5,603
Area S	226	129	101
Area T	705	212	422
Total	**10,342**	**2,258**	**6,126**

Notes:

a. These numbers represent the entire management areas, not just the portions in the sportfishing study area.

b. Almost all saltwater fishing in Area R takes place offshore of the lower Alaska Peninsula and the Aleutian Islands.

Sources: ADF&G SFD, n.d.[a].

TABLE 25-18
Freshwater Sportfishing Average Annual Catch, by Species and Drainage, 1999-2005

Area	Rainbow Trout		Grayling		King Salmon		Sockeye Salmon		Dolly Varden		Coho salmon	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Naknek R. System	**39,411**	**27.4%**	**2,710**	**4.9%**	**7,820**	**15.7%**	**9,370**	**22.5%**	**13,022**	**36.3%**	**9,079**	**39.4%**
Kvichak R. System	**87,113**	**60.6%**	**22,553**	**41.1%**	**4,142**	**8.3%**	**28,334**	**67.9%**	**9,562**	**26.6%**	**6,458**	**28.0%**
Alagnak Drainage	42,699	29.7%	3,483	6.3%	3,697	7.4%	9,694	23.2%	2,288	6.4%	3,095	13.4%
Iliamna Lk Drainage	42,884	29.9%	10,849	19.8%	434	0.9%	17,502	42.0%	6,478	18.1%	3,190	13.8%
Lk Clark Drainage	1,530	1.1%	8,221	15.0%	11	0.0%	1,138	2.7%	796	2.2%	173	0.8%
Nushagak R. System	**17,117**	**11.9%**	**29,614**	**54.0%**	**37,995**	**76.1%**	**4,011**	**9.6%**	**13,301**	**37.1%**	**7,516**	**32.6%**
Upper Nushagak	10,311	7.2%	18,159	33.1%	8,874	17.8%	1,697	4.1%	8,702	24.2%	3,297	14.3%
Lower Nushagak	2,381	1.7%	4,761	8.7%	25,927	51.9%	554	1.3%	1,563	4.4%	2,777	12.0%
Mulchatna Drainage	4,425	3.1%	6,694	12.2%	3,194	6.4%	1,760	4.2%	3,036	8.5%	1,442	6.3%
TOTAL	**143,641**	**100.0%**	**54,877**	**100.0%**	**49,957**	**100.0%**	**41,715**	**100.0%**	**35,885**	**100.0%**	**23,053**	**100.0%**
% of Total for All Species	36.2%		13.8%		12.6%		10.5%		9.0%		5.8%	
% of Statewide Species Catch	18.2%		13.2%		16.6%		6.1%		6.9%		3.9%	

Area	Other Species [a]		Total	
	Number	Percent	Number	Percent
Naknek R. System	**5,567**	**11.6%**	**86,979**	**21.9%**
Kvichak R. System	**29,638**	**61.5%**	**187,800**	**47.3%**
Alagnak Drainage	21,731	45.1%	86,686	21.8%
Iliamna Lk Drainage	6,049	12.6%	87,387	22.0%
Lk Clark Drainage	1,858	3.9%	13,727	3.5%
Nushagak R. System	**12,962**	**26.9%**	**122,516**	**30.8%**
Upper Nushagak	4,756	9.9%	55,795	14.0%
Lower Nushagak	5,850	12.1%	43,813	11.0%
Mulchatna Drainage	2,356	4.9%	22,908	5.8%
TOTAL	**48,167**	**100.0%**	**397,295**	**100.0%**
% of Total for All Species	12.1%		100.0%	
% of Statewide Species Catch	5.0%		9.3%	

Notes:

a. Other species include chum salmon, pink salmon, northern pike, whitefish, and lake trout.

Source: ADF&G SFD, various and n.d.[b].

TABLE 25-19
Freshwater Sportfishing Average Annual Angler Days and Catch, by Location, Sportfishing Study Area, 1999-2005

Location	Average Annual Angler Days		Average Annual Catch		Average Catch per Angler Day
	Number	Rank	Number	Rank	
NAKNEK RIVER DRAINAGE, AREA R (part)					
American Creek	929	19	12,575	15	13.5
Brooks Lake	336	27	1,150	36	3.4
Brooks River	2,649	7	15,550	9	5.9
Grosvenor Lake/Lake Coville Complex	130	38	939	39	7.2
Hardscrabble Creek	86	44	1,689	28	19.6
King Salmon Creek	284	30	631	40	2.2
Naknek Lake	320	28	949	38	3.0
Naknek Lake, Bay of Islands	654	21	1,841	26	2.8
Naknek River (1) (downstream from Rapids Camp including tributaries)	9,434	1	19,169	7	2.0
Naknek River (2) (Rapids Camp upstream to Naknek Lake, including tributaries)	6,413	3	26,909	4	4.2
Naknek River (3) and Tributaries	1,305	16	4,060	20	3.1
Other locations [a]	311	N/A	1,518	N/A	4.9
NAKNEK TOTAL	**22,851**	**N/A**	**86,980**	**N/A**	**3.8**
KVICHAK RIVER DRAINAGES, AREA S					
Alagnak Drainage					
Alagnak River	7,142	2	57,832	1	8.1
Battle River	305	29	1,244	34	4.1
Funnel Creek	89	42	598	42	6.7
Kukaklek River	118	39	1,295	33	11.0
Kulik Lake	220	33	1,605	29	7.3
Kulik River	1,068	18	12,798	13	12.0
Little Kulik	66	46	559	43	8.5
Moraine Creek	1,154	17	8,423	17	7.3
Nonvianuk Lake	136	37	405	44	3.0
Nonvianuk River	149	35	1,469	31	9.9
Other locations [a]	121	N/A	458	N/A	3.8
Subtotal	**10,568**	**N/A**	**86,686**	**N/A**	**8.2**

Location	Average Annual Angler Days		Average Annual Catch		Average Catch per Angler Day
	Number	Rank	Number	Rank	
Iliamna Lake Drainage					
Copper River	2,125	13	21,469	6	10.1
Gibraltar Lake	279	31	1,586	30	5.7
Gibraltar River	148	36	1,378	32	9.3
Iliamna Lake	1,457	15	4,878	18	3.3
Iliamna River	619	23	4,721	19	7.6
Kvichak River	5,371	4	33,232	2	6.2
Lower Talarik Creek	671	20	3,582	22	5.3
Newhalen River	2,566	9	14,570	10	5.7
Upper Talarik Creek	79	45	619	41	7.8
Other locations [a]	295	N/A	1,352	N/A	4.6
Subtotal	**13,610**	**N/A**	**87,387**	**N/A**	**6.4**
Lake Clark Drainage					
Kijik River	109	40	1,083	37	9.9
Kontrashibuna Lake	92	41	179	45	1.9
Lake Clark	2,008	14	8,539	16	4.3
Sixmile Lake	578	24	1,215	35	2.1
Tazimina River	220	34	1,749	27	8.0
Other locations [a]	199	N/A	962	N/A	4.8
Subtotal	**3,206**	**N/A**	**13,727**	**N/A**	**4.3**
KVICHAK TOTAL	**27,384**	**N/A**	**187,800**	**N/A**	**6.9**
NUSHAGAK/MULCHATNA DRAINAGES, AREA T (part)					
Upper Nushagak Drainage					
King Salmon River	338	26	3,670	21	10.9
Nushagak River System (4) (including Harris Creek, King Salmon R.)	2,498	10	15,749	8	6.3
Nushagak River (3) (upstream from mouth of Mulchatna River)	2,747	6	22,241	5	8.1
Tikchik-Nuyakuk Drainage	2,202	11	14,048	11	6.4
Other locations [a]	23	N/A	87	N/A	3.8
Subtotal	**7,808**	**N/A**	**55,795**	**N/A**	**7.1**
Lower Nushagak Drainage					
Nushagak River (1) (Black Point upstream to sonar site)	2,626	8	12,780	14	4.9
Nushagak River (2) (sonar site to outlet of Mulchatna)	4,537	5	27,950	3	6.2
Other locations [a]	158	N/A	3,083	N/A	19.5
Subtotal	**7,321**	**N/A**	**43,813**	**N/A**	**6.0**

Location	Average Annual Angler Days		Average Annual Catch		Average Catch per Angler Day
	Number	Rank	Number	Rank	
Mulchatna Drainage					
Chilikadrotna River	643	22	3,134	23	4.9
Koktuli River	417	25	2,981	24	7.1
Mulchatna River	2,175	12	13,792	12	6.3
Stuyahok River	246	32	2,758	25	11.2
Twin Lakes	89	43	139	46	1.6
Other locations [a]	53	N/A	104	N/A	1.9
Subtotal	**3,623**	**N/A**	**22,908**	**N/A**	**6.3**
NUSHAGAK/MULCHATNA TOTAL	**18,752**	**N/A**	**122,516**	**N/A**	**6.5**
TOTAL, ALL LOCATIONS	**68,987**	**N/A**	**397,296**	**N/A**	**5.8**

Notes:

a. For other locations, see list of locations with fewer than 12 survey responses in Section 25.7.4.1.

N/A = not applicable.

Source: ADF&G SFD, various.

TABLE 25-20
Freshwater Sportfishing Average Annual Catch, by Species, Sportfishing Study Area, 1999-2005

Location	Rainbow Trout	Grayling	King Salmon	Sockeye Salmon	Dolly Varden	Coho Salmon	Other Species [a]	Total [b]
NAKNEK RIVER DRAINAGE								
American Creek	5,255	176	0	731	6,248	58	107	**12,575**
Brooks Lake	520	8	5	448	75	10	84	**1,150**
Brooks River	10,681	254	2	3,511	489	390	224	**15,550**
Grosvenor Lake/Lake Coville Complex	403	0	0	15	483	0	38	**939**
Hardscrabble Creek	182	0	0	60	1,422	0	26	**1,689**
King Salmon Creek	208	58	47	24	186	107	2	**631**
Naknek Lake	348	85	1	181	77	155	101	**949**
Naknek Lake - Bay of Islands	905	19	6	195	317	41	358	**1,841**
Naknek River (downstream from Rapids Camp incl. tributaries)	3,960	393	5,530	1,314	853	4,917	2,203	**19,169**
Naknek River (Rapids Camp upstream to Naknek Lake, incl. tributaries)	14,701	1,481	1,620	2,594	1,841	2,672	1,999	**26,909**
Naknek River and Tributaries	1,714	153	526	244	593	609	221	**4,060**
Other locations [c]	534	83	83	53	438	120	206	**1,518**
NAKNEK DRAINAGE TOTAL	**39,411**	**2,710**	**7,820**	**9,370**	**13,022**	**9,079**	**5,569**	**86,980**
KVICHAK RIVER DRAINAGE								
Alagnak Drainage								
Alagnak River	18,241	2,474	3,679	7,702	1,531	2,918	21,286	**57,832**
Battle River	762	275	0	185	17	0	4	**1,244**
Funnel Creek	520	4	0	36	39	0	0	**598**
Kukaklek River	973	26	0	216	25	0	56	**1,295**
Kulik Lake	1,024	131	0	208	144	6	92	**1,605**
Kulik River	11,661	112	7	606	249	90	74	**12,798**
Little Kulik	440	11	0	28	78	2	0	**559**
Moraine Creek	7,115	392	0	604	149	74	89	**8,423**
Nonvianuk Lake	350	10	0	12	27	0	7	**405**

Location	Rainbow Trout	Grayling	King Salmon	Sockeye Salmon	Dolly Varden	Coho Salmon	Other Species [a]	Total [b]
Nonvianuk River	1,329	47	11	15	15	5	46	**1,469**
Other locations [c]	284	1	0	82	14	0	77	**458**
Subtotal	**42,699**	**3,483**	**3,697**	**9,694**	**2,288**	**3,095**	**21,731**	**86,686**
Iliamna Lake Drainage								
Copper River	16,944	346	12	2,002	1,568	252	345	**21,469**
Gibraltar Lake	1,076	20	0	301	64	0	126	**1,586**
Gibraltar River	1,217	57	0	68	6	21	9	**1,378**
Iliamna Lake	1,446	404	43	1,611	556	249	569	**4,878**
Iliamna River	1,508	216	0	861	2,128	0	8	**4,721**
Kvichak River	13,879	5,098	368	6,378	1,271	2,091	4,147	**33,232**
Lower Talarik Creek	2,775	323	0	151	110	125	99	**3,582**
Newhalen River	2,936	4,187	11	5,963	727	416	329	**14,570**
Upper Talarik Creek	518	51	0	10	11	28	0	**619**
Other locations [c]	585	147	0	157	37	8	417	**1,352**
Subtotal	**42,884**	**10,849**	**434**	**17,502**	**6,478**	**3,190**	**6,049**	**87,387**
Lake Clark Drainage								
Kijik River	37	845	0	184	3	11	2	**1,083**
Kontrashibuna Lake	3	81	0	9	52	0	33	**179**
Lake Clark	565	5,013	7	712	502	160	1,581	**8,539**
Sixmile Lake	316	598	0	101	50	0	150	**1,215**
Tazimina River	584	989	4	85	85	2	2	**1,749**
Other locations [c]	25	695	0	47	104	0	90	**962**
Subtotal	**1,530**	**8,221**	**11**	**1,138**	**796**	**173**	**1,858**	**13,727**
KVICHAK DRAINAGE TOTAL	**87,113**	**22,553**	**4,142**	**28,334**	**9,562**	**6,458**	**29,638**	**187,800**
NUSHAGAK/MULCHATNA DRAINAGE								
Upper Nushagak Drainage								
King Salmon River	706	1,848	131	52	733	64	136	**3,670**
Nushagak River System (incl. Harris Creek, King Salmon R.)	2,605	3,381	5,219	504	1,910	888	1,242	**15,749**

Location	Rainbow Trout	Grayling	King Salmon	Sockeye Salmon	Dolly Varden	Coho Salmon	Other Species [a]	Total [b]
Nushagak River-upstream from mouth of Mulchatna River	4,667	7,432	2,854	609	3,382	1,629	1,669	**22,241**
Tikchik-Nuyakuk Drainage	2,329	5,446	670	532	2,667	697	1,707	**14,048**
Other locations [c]	4	52	0	0	10	19	2	**87**
Subtotal	**10,311**	**18,159**	**8,874**	**1,697**	**8,702**	**3,297**	**4,756**	**55,795**
Lower Nushagak Drainage								
Nushagak River - Black Point upstream to Sonar Site	278	423	9,480	186	220	640	1,552	**12,780**
Nushagak River - Sonar Site to Outlet of Mulchatna	1,402	2,471	16,354	368	1,269	1,872	4,214	**27,950**
Other locations [c]	701	1,867	93	0	74	265	84	**3,083**
Subtotal	**2,381**	**4,761**	**25,927**	**554**	**1,563**	**2,777**	**5,850**	**43,813**
Mulchatna Drainage								
Chilikadrotna River	831	1,394	75	88	434	187	125	**3,134**
Koktuli River	400	600	357	439	501	155	528	**2,981**
Mulchatna River	2,598	3,170	2,702	1,173	1,559	1,023	1,567	**13,792**
Stuyahok River	592	1,419	60	54	495	77	61	**2,758**
Twin Lakes	0	53	0	0	22	0	64	**139**
Other locations [c]	4	58	0	6	25	0	11	**104**
Subtotal	**4,425**	**6,694**	**3,194**	**1,760**	**3,036**	**1,442**	**2,356**	**22,908**
NUSHAGAK/MULCHATNA TOTAL	**17,117**	**29,614**	**37,995**	**4,011**	**13,301**	**7,516**	**12,962**	**122,516**
TOTAL, ALL LOCATIONS	**143,641**	**54,877**	**49,957**	**41,715**	**35,885**	**23,053**	**48,167**	**397,296**

Notes:

a. Other species include chum salmon, pink salmon, northern pike, whitefish, and lake trout.

b. From Table 25-19. The values in each row may not add up exactly to the total shown because of rounding.

c. For other locations, see list of locations with fewer than 12 survey responses in Section 25.7.4.1.

Source: ADF&G SFD, various.

TABLE 25-21
Annual Angler Days by Drainage, Sportfishing Study Area, 1999-2005

	Naknek	Iliamna Lake	Alagnak	Upper Nushagak	Lower Nushagak	Mulchatna	Lake Clark	Annual Total
1999	25,444	17,676	8,981	8,577	349	5,057	6,911	**72,995**
2000	29,087	17,337	10,623	8,483	0	4,445	2,306	**72,281**
2001	20,176	15,911	8,576	10,144	137	3,787	4,450	**63,181**
2002	24,401	12,242	10,614	5,790	9,344	2,807	2,183	**67,381**
2003	18,823	11,512	9,988	7,309	11,958	3,706	1,535	**64,831**
2004	26,066	10,506	11,268	8,396	13,372	2,507	3,620	**75,735**
2005	15,958	10,079	13,932	5,963	16,088	3,071	1,444	**66,535**
Annual Average	**22,851**	**13,609**	**10,569**	**7,809**	**7,321**	**3,626**	**3,207**	**68,991**

Source: ADF&G SFD, various.

TABLE 25-22
Annual Freshwater Catch by Drainage, Sportfishing Study Area, 1999-2005

	Naknek	Iliamna Lake	Alagnak	Upper Nushagak	Lower Nushagak	Mulchatna	Lake Clark	Annual Total
1999	68,850	111,007	60,769	68,521	1,684	30,939	18,772	**360,542**
2000	96,747	89,459	59,114	48,438	0	29,722	16,109	**339,589**
2001	85,753	73,434	51,025	60,642	9	20,331	13,583	**304,777**
2002	116,180	108,222	104,343	42,196	51,699	18,135	11,193	**451,968**
2003	73,998	85,560	87,905	49,579	82,949	24,568	8,406	**412,965**
2004	105,089	84,451	121,378	73,386	102,100	22,524	18,572	**527,500**
2005	62,252	59,567	122,265	47,807	68,253	14,165	9,463	**383,772**
Annual Average	**86,981**	**87,386**	**86,686**	**55,796**	**43,813**	**22,912**	**13,728**	**397,302**

Source: ADF&G SFD, various.

TABLE 25-23
Average Annual Sportfishing Effort and Catch by Location, Central Study Area, 1999-2005

Location	Average Annual Angler Days		Average Annual Catch	
	Number	Regional Study Area Rank	Number	Regional Study Area Rank
Newhalen River	2,566	9	14,570	10
Iliamna Lake [a]	1,457	15	4,878	18
Iliamna River	619	23	4,721	19
Sixmile Lake	578	24	1,215	35
Koktuli River [a]	417	25	2,981	24
Upper Talarik Creek	79	45	619	41
Other locations [b]	68	N/A	425	N/A
Central Study Area Total	**5,784**	**N/A**	**29,409**	**N/A**
Central Study Area as Percent of Regional Study Area	8.4%		7.4%	

Notes:

a. Averages given here are for entire location, not just the portion within the central study area.

b. Other locations are Alexcy Creek, Alexcy Lake, Bear Creek, Schoolhouse Lake, Chekok Creek, Knutson Creek, Chinkelyes Creek, and Long Lake.

N/A = not applicable

Source: ADF&G SFD, various.

TABLE 25-24
Average Annual Catch by Location and Species, Central Study Area, 1999-2005

Location	Sockeye	Rainbow	Grayling	Dolly Varden	Coho	King	Other Species [a]	All Species
Newhalen River	5,963	2,936	4,187	727	416	11	329	**14,570**
Iliamna Lake [b]	1,611	1,446	404	556	249	43	569	**4,878**
Iliamna River	861	1,508	216	2,128	0	0	8	**4,721**
Sixmile Lake	101	316	598	50	0	0	150	**1,215**
Koktuli River [b]	439	400	600	501	155	357	528	**2,981**
Upper Talarik Creek	10	518	51	11	28	0	0	**619**
Other locations [c]	141	74	0	13	0	0	197	**425**
All Locations	**9,127**	**7,197**	**6,056**	**3,987**	**848**	**412**	**1,781**	**29,409**

Notes:

a. Other species include chum salmon, pink salmon, northern pike, whitefish, and lake trout.

b. Averages given here are for entire location, not just the portion within the central study area.

c. Other locations are Alexcy Creek, Alexcy Lake, Bear Creek, Schoolhouse Lake, Chekok Creek, Knutson Creek, Chinkelyes Creek, and Long Lake.

Source: ADF&G SFD, various.

TABLE 25-25
Annual Freshwater Angler Days and Catch by Species and Location, Central Study Area, 1999-2005

Location/Year	Responses [a]	Angler days	Catch (Number of Fish)							
			Rainbow trout	Grayling	Dolly Varden	Sockeye Salmon	King Salmon	Coho Salmon	Other Species [b]	Total Catch
Newhalen River										
1999	81	5,178	7,178	12,729	1,731	13,296	0	782	359	**36,075**
2000	67	3,063	3,848	5,007	1,085	7,685	0	147	58	**17,830**
2001	36	3,337	1,271	5,261	929	5,234	0	493	771	**13,959**
2002	25	1,556	2,175	1,671	562	4,415	12	92	107	**9,034**
2003	25	1,959	1,414	1,135	117	2,865	0	381	206	**6,118**
2004	33	1,842	2,720	1,648	203	4,714	67	1,005	276	**10,633**
2005	21	1,029	1,945	1,855	463	3,533	0	15	529	**8,340**
Annual Average	**288**	**2,566**	**2,936**	**4,187**	**727**	**5,963**	**11**	**416**	**329**	**14,570**
Iliamna Lake [c]										
1999	32	2,153	1,072	221	272	1,858	0	49	577	**4,049**
2000	29	1,666	2,668	326	736	1,184	0	431	62	**5,407**
2001	33	1,871	1,435	896	1,310	2,644	0	343	1,233	**7,861**
2002	23	1,157	1,000	300	180	1,937	76	120	980	**4,593**
2003	15	718	2,393	1,070	301	405	72	415	615	**5,271**
2004	19	1,398	786	16	800	1,915	0	91	477	**4,085**
2005	15	1,234	768	0	294	1,333	154	292	36	**2,877**
Annual Average	**166**	**1,457**	**1,446**	**404**	**556**	**1,611**	**43**	**249**	**569**	**4,878**

Location/Year	Responses [a]	Angler days	Catch (Number of Fish)							
			Rainbow trout	Grayling	Dolly Varden	Sockeye Salmon	King Salmon	Coho Salmon	Other Species [b]	Total Catch
Iliamna River										
1999	5	284	281	1,129	132	928	0	0	0	**2,470**
2000	11	1,013	3,891	50	3,773	145	0	0	41	**7,900**
2001	10	1,108	889	0	607	2,511	0	0	0	**4,007**
2002	11	1,018	2,560	9	8,888	507	0	0	0	**11,964**
2003	5	149	311	0	171	406	0	0	14	**902**
2004	5	382	811	325	83	361	0	0	0	**1,580**
2005	6	381	1,813	0	1,245	1,166	0	0	0	**4,224**
Annual Average	**53**	**619**	**1,508**	**216**	**2,128**	**861**	**0**	**0**	**8**	**4,721**
Sixmile Lake										
1999	3	3,201	1,661	3,729	335	625	0	0	83	**6,433**
2000	0	0	0	0	0	0	0	0	0	**0**
2001	3	96	42	9	0	39	0	0	95	**185**
2002	2	146	40	219	0	0	0	0	44	**303**
2003	1	25	0	0	0	24	0	0	0	**24**
2004	3	579	467	227	13	22	0	0	830	**1,559**
2005	0	0	0	0	0	0	0	0	0	**0**
Annual Average	**12**	**578**	**316**	**598**	**50**	**101**	**0**	**0**	**150**	**1,215**
Koktuli River [c]										
1999	6	853	402	766	79	1,397	1,735	159	2,317	**6,855**
2000	6	894	260	703	139	584	175	0	253	**2,114**
2001	5	345	556	490	430	122	184	240	64	**2,086**
2002	2	143	86	0	89	116	41	0	0	**332**
2003	3	358	984	1,549	1,789	597	251	23	586	**5,779**
2004	2	125	220	91	327	260	66	225	474	**1,663**
2005	2	202	290	603	657	0	50	438	0	**2,038**
Annual Average	**26**	**417**	**400**	**600**	**501**	**439**	**357**	**155**	**528**	**2,981**

Location/Year	Responses [a]	Angler days	Catch (Number of Fish)							
			Rainbow trout	Grayling	Dolly Varden	Sockeye Salmon	King Salmon	Coho Salmon	Other Species [b]	Total Catch
Upper Talarik Creek										
1999	2	33	318	147	0	0	0	0	0	**465**
2000	3	58	373	0	0	0	0	126	0	**499**
2001	5	91	628	191	32	0	0	0	0	**851**
2002	1	67	323	0	0	0	0	0	0	**323**
2003	2	30	243	0	0	0	0	0	0	**243**
2004	4	197	995	0	48	0	0	68	0	**1,111**
2005	3	74	747	22	0	73	0	0	0	**842**
Annual Average	**20**	**79**	**518**	**51**	**11**	**10**	**0**	**28**	**0**	**619**
Other locations [d]										
1999	2	41	0	0	11	53	0	0	175	**239**
2000	1	13	0	0	0	0	0	0	38	**38**
2001	1	102	139	0	22	61	0	0	0	**222**
2002	0	0	0	0	0	0	0	0	0	**0**
2003	2	28	74	0	0	91	0	0	21	**186**
2004	4	213	84	0	57	785	0	0	286	**1,212**
2005	3	76	218	0	0	0	0	0	861	**1,079**
Annual Average	**13**	**68**	**74**	**0**	**13**	**141**	**0**	**0**	**197**	**425**
All Locations										
1999	131	11,743	10,912	18,721	2,560	18,157	1,735	990	3,511	**56,586**
2000	117	6,707	11,040	6,086	5,733	9,598	175	704	452	**33,788**
2001	93	6,950	4,960	6,847	3,330	10,611	184	1,076	2,163	**29,171**
2002	64	4,087	6,184	2,199	9,719	6,975	129	212	1,131	**26,549**
2003	53	3,267	5,419	3,754	2,378	4,388	323	819	1,442	**18,523**
2004	70	4,736	6,083	2,307	1,531	8,057	133	1,389	2,343	**21,843**
2005	50	2,996	5,781	2,480	2,659	6,105	204	745	1,426	**19,400**
Annual Average	**578**	**5,784**	**7,197**	**6,056**	**3,987**	**9,127**	**412**	**848**	**1,781**	**29,409**

Notes:

a. Values given in “annual average” rows in this column are totals for all years combined, not averages.

b. Other species include pink salmon, chum salmon, northern pike, whitefish, and lake trout.

c. Averages given here are for entire location, not just the portion within the central study area.

d. Other locations are Alexcy Creek, Alexcy Lake, Bear Creek, Schoolhouse Lake, Chekok Creek, Knutson Creek, Chinkelyes Creek, and Long Lake.

Source: ADF&G SFD, various.

TABLE 25-26
Average Annual Harvest for Brown Bear, Caribou, and Moose; Regional Hunting Study Area, Central Study Area, and Statewide; 2000-2005

	Central Study Area		Regional Hunting Study Area [a]		Statewide
	Number	Percent of Statewide	Number	Percent of Statewide	Number
Brown Bear	30	1.9%	111	7.0%	1,597
Caribou	388	1.4%	1,241	4.4%	28,532
Moose	24	0.3%	285	4.1%	6,927

Notes:

a. Does not include a minor part of the harvest that was not attributable to a specific UCU.

Source: ADF&G DWC, n.d.[a], n.d.[b], and various.

TABLE 25-27
Average Annual Harvest for Black Bear, Dall Sheep, and Wolf; GMUs 9B and C, GMUs 17B and C, and Statewide; 2000-2005

	GMUs 9B and 9C		GMUs 17B and 17C		Statewide
	Number	Percent of Statewide	Number	Percent of Statewide	Number
Black bear	6	0.2%	11	0.4%	2,552
Dall sheep	2	0.2%	0	0.0%	890
Wolf	79	5.5%	80	5.6%	1,430

Source: ADF&G DWC, n.d.[a] and n.d.[b].

TABLE 25-28
Estimated Population Size, Mulchatna and Alaska Peninsula North Caribou Herds, 1991-2006

Year	Mulchatna Herd	Alaska Peninsula North Herd
1991	90,000	17,000
1992	115,000	17,500
1993	150,000	16,000
1994	180,000	12,500
1995	190,000	12,000
1996	200,000	12,000
1997	N/A	10,000
1998	N/A	9,200
1999	175,000	8,600
2000	N/A	7,200
2001	N/A	6,300
2002	147,000	6,600
2003	N/A	N/A
2004	85,000	3,400
2005	N/A	2,500
2006	45,000	N/A

Notes:
N/A = not available.
Source: Butler, 2007a; Woolington, 2007a.

TABLE 25-29
Annual Reported Harvest, Mulchatna and Alaska Peninsula North Caribou Herds, 2000-2005

Year	Mulchatna Herd	Alaska Peninsula North Herd	Total
2000	9,588	96	9,684
2001	9,319	165	9,484
2002	5,043	118	5,161
2003	2,592	212	2,814
2004	2,299	113	2,412
2005	2,175	4	2,179

Source: ADF&G, DWC, n.d.[e].

TABLE 25-30
Total Hunters, Total Days Hunted, and Average Days Hunted; GMUs 9B, 9C, 17B, and 17C; 2000-2005

Year	Total Hunters	Today Days Hunted	Average Days Hunted
2000	3,615	20,196	5.6
2001	3,172	16,847	5.3
2002	2,697	15,751	5.8
2003	2,534	12,241	4.8
2004	2,332	11,825	5.1
2005	1,936	9,156	4.7

Source: ADF&G DWC, n.d.[d].

TABLE 25-31
Annual Reported Caribou Harvest, Hunting Study Area and Statewide, 1998-2006

Year	Central Study Area	Other UCUs in Hunting Study Area [a]				Total	Statewide
		09B	09C	17B	17C		
1998	944	255	295	679	253	**2,426**	N/A
1999	1,053	194	67	689	205	**2,208**	N/A
2000	612	172	42	583	262	**1,671**	32,794
2001	503	310	103	610	138	**1,664**	33,616
2002	399	120	19	408	123	**1,069**	27,935
2003	256	218	69	334	217	**1,094**	24,297
2004	298	128	88	268	204	**986**	26,177
2005	261	117	114	194	283	**969**	26,370
2006	78	77	8	70	79	**312**	26,182

Notes:

a. Includes only UCUs in the larger hunting study area but wholly outside the central study area (see Table 25-32).

N/A = not available.

Source: ADF&G DWC, various.

TABLE 25-32
Total Number of Hunters and Harvest of Caribou and Moose, and Harvest of Brown Bear, by UCU, Hunting Study Area, 2000-2005

	Caribou		Moose		Brown Bear
UCU [a]	**Hunters**	**Harvest**	**Hunters**	**Harvest**	**Harvest**
Central Study Area [b]					
09B-0203	90	66	45	17	11
09B-0302	533	435	32	8	18
09B-0303	42	31	15	7	9
09B-0304	8	3	66	17	62
09B-0401	420	255	36	4	8
09B-0601	55	26	18	0	0
17B-0201	1,893	1,510	397	92	72
Subtotal	**3,041**	**2,326**	**609**	**145**	**180**
% of Regional Total	30.9%	31.2%	13.4%	8.5%	27.0%
Balance of 9B [c]					
09B-0101	90	78	21	5	2
09B-0201	450	409	73	29	1
09B-0202	346	287	23	11	2
09B-0301	166	141	135	53	56
09B-0501	1	0	16	5	0
09B-0602	61	40	83	18	3
09B-0603	72	43	25	5	5
09B-0701	87	58	39	10	3
09B-0702	15	6	38	12	2
09B-0801	2	2	1	1	0
Subtotal	**1,290**	**1,064**	**454**	**149**	**74**
Balance of 9C [c]					
09C-0401	1	0	0	0	0
09C-0501	0	0	0	0	0
09C-0601	12	10	7	1	1
09C-0602	16	10	156	48	22
09C-0603	39	21	34	4	8
09C-0604	191	93	246	70	42
09C-0605	200	134	25	4	23
09C-0701	186	137	70	28	10
09C-0702	5	0	40	9	7
09C-0703	59	30	28	10	81
Subtotal	**709**	**435**	**606**	**174**	**194**

	Caribou		Moose		Brown Bear
UCU [a]	**Hunters**	**Harvest**	**Hunters**	**Harvest**	**Harvest**
Balance of 17B [c]					
17B-0101	750	610	180	79	2
17B-0202	398	324	48	25	51
17B-0203	758	516	206	50	24
17B-0204	384	340	47	12	6
17B-0301	339	217	82	58	28
17B-0302	231	199	174	77	24
17B-0303	273	188	191	63	34
Subtotal	**3,133**	**2,394**	**928**	**364**	**169**
Balance of 17C [c]					
17C-0301	135	88	74	27	3
17C-0501	465	292	1,136	491	4
17C-0601	200	162	121	80	18
17C-0701	133	85	278	138	17
17C-0801	384	301	214	90	5
17C-0901	340	301	111	54	3
Subtotal	**1,657**	**1,229**	**1,934**	**880**	**50**
Regional Total	**9,830**	**7,448**	**4,531**	**1,712**	**667**

Notes:

a. Includes only UCUs in hunting study area.

b. Includes UCUs partly or wholly in the central study area.

c. Includes UCUs in the hunting study area but wholly outside the central study area.

Source: ADF&G DWC, various.

TABLE 25-33
Annual Reported Caribou Harvest by UCU, Central Study Area, 1998-2006

	UCU [a]							
Year	**9B-0203**	**9B-0302**	**9B-0303**	**9B-0304**	**9B-0401**	**9B-0601**	**17B-0201**	**Total**
1998	20	124	41	7	332	47	373	**944**
1999	29	195	60	14	248	37	470	**1,053**
2000	9	100	7	1	86	4	405	**612**
2001	31	70	13	2	57	15	315	**503**
2002	5	62	5	0	23	4	300	**399**
2003	6	68	2	0	26	0	154	**256**
2004	7	45	3	0	33	3	207	**298**
2005	8	90	3	0	30	3	128	**262**
2006	12	8	3	0	10	0	41	**74**
Annual average	**14**	**85**	**15**	**3**	**94**	**13**	**266**	**489**
UCU Harvest as Percent of Total Harvest	2.9%	17.3%	3.1%	0.5%	19.2%	2.6%	54.4%	**100.0%**

Notes:

a. Most of UCUs 9B-0203, 9B-0601, and 17B-0201, and nearly half of 9B-0302 are outside the central study area, so values given overstate the harvest in the central study area.

Source: ADF&G DWC, n.d.[d].

TABLE 25-34
Caribou Hunting Effort and Harvest Success by Hunter Residency Status; GMUs 9B, 9C, 17B, and 17C; 2005

	Successful		Unsuccessful		Total	
Residency Status	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Alaska resident	986	74%	330	51%	1,316	67%
Non-Alaska resident	326	25%	315	48%	641	32%
Residency unknown	14	1%	9	1%	23	1%
Total	**1,326**	**100%**	**654**	**100%**	**1,980**	**100%**

Source: ADF&G DWC, n.d.[d].

TABLE 25-35
Caribou Hunter Means of Transportation; GMUs 9B, 9C, 17B, and 17C; 2005

	9B	9C	17B	17C	Total	Percent
Airplane	385	17	941	93	1,436	73%
Snowmobile	39	9	13	256	317	16%
Boat	13	6	48	73	140	7%
All-terrain Vehicle	21	14	0	14	49	2%
Other	13	0	16	9	38	2%
Total	**471**	**46**	**1,018**	**445**	**1,980**	**100**

Source: ADF&G DWC, n.d.[d].

TABLE 25-36
Annual Reported Moose Harvest, Hunting Study Area and Statewide, 1996-2006

		Other UCUs in Hunting Study Area [a]					
Year	Central Study Area	09B	09C	17B	17C	Total	Statewide
1996	46	39	53	88	23	**249**	N/A
1997	39	44	49	63	17	**212**	N/A
1998	31	33	22	68	21	**175**	N/A
1999	33	48	50	75	19	**225**	N/A
2000	40	26	24	83	23	**196**	7,050
2001	30	30	27	66	28	**181**	6,573
2002	16	23	38	65	30	**172**	6,954
2003	17	26	36	62	31	**172**	6,804
2004	23	24	24	55	28	**154**	6,754
2005	19	20	25	33	27	**124**	7,427
2006	15	15	18	32	21	**101**	7,337

Notes:

a. Includes only UCUs in the larger hunting study area but wholly outside the central study area (see Table 25-32).

N/A = not available.

Source: Source: ADF&G DWC, various and n.d.[d].

TABLE 25-37
Moose Hunting Effort and Harvest Success by Hunter Residency Status; GMUs 9B, 9C, 17B, and 17C; 2005

	Successful [a]		Unsuccessful		Total	
Residency	**Number**	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Alaska resident	97	56%	240	56%	337	56%
Non-Alaska resident	74	43%	181	43%	255	43%
Residency unknown	2	1%	4	1%	6	1%
Total	**173**	**100%**	**425**	**100%**	**598**	**100%**

Notes:

a. Successful hunts comprised 29 percent of total hunts for Alaska resident hunters (97 of 337) and also for non-residents hunters (74 of 255).

Source: ADF&G DWC, n.d.[d].

TABLE 25-38
Moose Hunter Means of Transportation; GMUs 9B, 9C, 17B, and 17C; 2005

	9B	9C	17B	17C	Total	Percent
Airplane	74	26	222	38	**360**	64%
Snowmobile	2	8	2	3	**15**	3%
Boat	37	38	28	37	**140**	25%
All-terrain vehicle	7	16	3	3	**29**	5%
Other	7	10	1	3	**21**	3%
Total	**127**	**98**	**256**	**84**	**565**	**100%**

Source: ADF&G DWC, n.d.[d].

TABLE 25-39
Annual Reported Moose Harvest by UCU, Central Study Area, 1998-2006

	UCU [a]							
Year	**9B-0203**	**9B-0302**	**9B-0303**	**9B-0304**	**9B-0401**	**9B-0601**	**17B-0201**	**Total**
1998	0	3	1	1	2	0	24	31
1999	1	1	1	6	7	0	17	33
2000	4	2	2	2	1	0	29	40
2001	2	2	1	4	1	0	20	30
2002	4	4	0	1	0	0	7	16
2003	3	0	1	0	1	0	12	17
2004	2	0	1	4	0	0	16	23
2005	2	0	2	6	1	0	8	19
2006	1	0	0	3	2	1	8	15
Annual average	**2**	**1**	**1**	**3**	**2**	**0**	**16**	**25**
UCU Harvest as Percent of Total Harvest	8.5%	5.4%	4.0%	12.1%	6.7%	0.4%	62.9%	100.0%

Notes:

a. Most of UCUs 9B-0203, 9B-0601, and 17B-0201, and nearly half of 9B-0302 are outside the central study area, so values given overstate the harvest in the central study area.

Source: ADF&G, DWC, n.d.[d].

TABLE 25-40
Annual Reported Brown Bear Harvest, Hunting Study Area and Statewide, 1996-2006

		Other UCUs in Hunting Study Area [a]					
Year	**Central Study Area**	**09B**	**09C**	**17B**	**17C**	**Total**	**Statewide**
1996	14	7	21	12	9	**63**	N/A
1997	39	30	25	20	10	**124**	N/A
1998	17	3	16	16	2	**54**	N/A
1999	64	46	36	18	2	**166**	N/A
2000	15	1	15	27	11	**69**	1,312
2001	63	30	45	18	8	**164**	1,867
2002	22	1	13	34	10	**80**	1,130
2003	32	23	56	36	9	**156**	1,903
2004	9	1	22	13	7	**52**	1,389
2005	39	18	43	41	5	**146**	1,980
2006	10	0	12	46	2	**70**	1,230

Notes:

a. Includes only UCUs in the larger hunting study area but wholly outside the central study area (see Table 25-32).

N/A = not available.

Source: Source: ADF&G DWC, various and n.d.[d].

TABLE 25-41
Recreational Lodges by Sportfishing Management Area and Drainage, Regional Study Area, 2007

AREA R

Naknek River
- Bear Trail Lodge
- Brooks Lodge
- Crystal Creek Lodge
- Fox Bay Lodge
- Grosvenor Lodge
- King Salmon Lodge
- Last Frontier Lodge
- Northern Knights Wilderness Lodge
- Rainbow Bend Lodges
- Rapids Camp Lodge
- Salmon King Lodge

AREA S

Alagnak River
- Alagnak Lodge
- Alaska's Alagnak Wilderness Camps
- Alaska Trophy Adventures Camp
- Angler's Alibi Lodge
- Battle River Wilderness Retreat
- Branch River Lodge
- Enchanted Lake Lodge
- Katmai Lodge
- Kulik Lodge
- Royal Wolf Lodge

Iliamna Lake
- Alaska Rainbow Lodge
- Alaska Sportsman's Lodge
- Alaska's Legend Lodge
- Big Mountain Lodge
- Blueberry Island Lodge
- Bristol Bay Sportfishing Lodge

Iliamna Lake (cont.)
- Copper River Lodge
- Cusack's Alaska Lodge
- Guth's Lodge
- Iliamna Lake Lodge
- Iliaska Lodge
- Kvichak Lodge
- Lake Clark Bear Camp
- Lookout Mountain Lodge
- No See 'Um Lodge
- Ole Creek Lodge
- Rainbow Bay Lodge
- Rainbow King Lodge
- Rainbow Point Lodge
- Rainbow River Lodge
- Red Quill Lodge
- Talarik Creek Lodge

Lake Clark
- Alaska's Lake Clark Inn and Air
- Alaska's Wilderness Lodge
- Fishing Unlimited Lodge
- Great Alaska Adventure Lodge
- Island Lodge
- Koksetna Wilderness Lodge
- Lake Clark Air/The Farm Lodge
- Lake Country Lodge
- Lakeside Lodge
- Newhalen Lodge
- Osprey Island Lodge
- Stonewood Lodge
- Valhalla Lodge

AREA T

Upper Nushagak River
- Fish On Lodge
- Ketok Lodge
- Koliganek Lodge
- Royal Coachman Lodge
- Tikchik Narrows Lodge

Lower Nushagak River
- Alaska King Salmon Adventures
- Alaska's Legend Nushagak Camp
- Bristol Bay Adventures
- Nushagak Paradise Lodge
- Nushagak River Adventures
- Nushagak River Camp
- Nushagak River Fishing Lodge
- Nushagak River Lodge
- Nushagak Wilderness Lodge

Mulchatna River
- Alaska Trophy Fish Safaris
- Northern Wilderness Adventures
- Windsong Wilderness Retreat

Sources: ADCCED, n.d.; NPS, 2007d; website searches; local telephone directories; and local informants.

TABLE 25-42
Recreational Lodges by Sportfishing Management Area and Drainage, Sportfishing Study Area, 2007

Area/Drainage	Number of Lodges
Area R	
Naknek River	11
Subtotal	**11**
Area S	
Alagnak	10
Iliamna Lake	22
Lake Clark	13
Subtotal	**45**
Area T	
Lower Nushagak	9
Upper Nushagak	5
Mulchatna	3
Subtotal	**17**
TOTAL	**73**

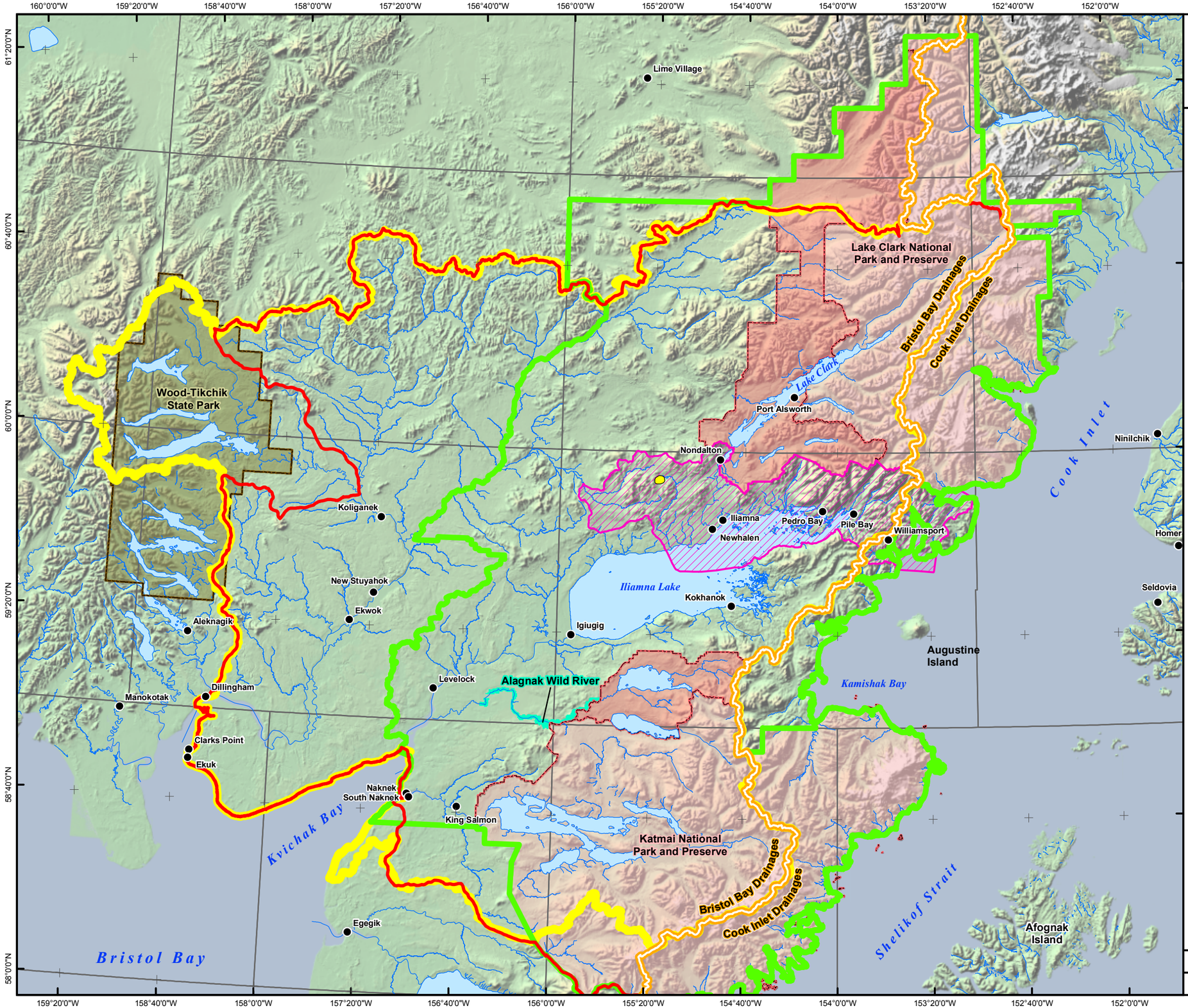
Source: Table 25-41

TABLE 25-43
Rates and Services, Selected Lodges, 2008 Season

Lodge (Location)	Days Fishing / Nights Lodging / Rate Per Person	Lodging and Services	Transportation
Alaska's Legend Nushagak Camp (Lower Nushagak)	5 / 4 / $2,799	Tent camp, meals, guides, gear, fish processing	Roundtrip from Dillingham, river boat
Alaska Sportsman's Lodge (Igiugig)	7 / 7 / $8,175 4½ / 5 / $6,175 2½ / 2 / $3,300	Cabin, meals and beverages, guides, gear, fish processing	Roundtrip from Anchorage, fly-outs
Bristol Bay Sportfishing (Iliamna)	7 / 6 / $6,950 5 / 5 / $5,950	Lodge, meals, guide, gear	Daily fly-outs, jet-boat
Fox Bay Lodge (King Salmon)	6 / 6 / $3,799	Cabin, meals, guides, gear, fish processing	River boat
Rainbow River Lodge (Copper River)	6 / 6 / $6,700	Cabin, meals, guide, gear	Roundtrip from Iliamna, daily fly-outs, boats
Royal Wolf Lodge (Katmai NP)	7 / 7 / $7,350	Lodge room, meals and beverages, guides	Roundtrip from Igiugig, daily fly-outs, boats/rafts
The Farm Lodge (Port Alsworth)	5 / 6 / $5,625	Lodge, meals, guides	Roundtrip from Anchorage, 4 fly-outs

Sources: http://www.legendlodge.com/kingsalmon.html; http://www.fishasl.com/kvichak/index.htm; http://www.bristol-bay.com/lodge.asp; http://www.foxbaylodge.com/; http://www.alaskarainbowriverlodge.com/home19; http://www.royalwolf.com/; http://www.thefarmlodge.com/.

FIGURES



THE pebble PARTNERSHIP

Figure 25-1
Recreation Study Areas
Bristol Bay Drainages

Legend

- Bristol Bay/Cook Inlet Drainages Boundary

Regional Study Area Components

- Land Use Study Area
- Big Game Hunting Study Area
- Sportfishing Study Area
- Anadromous Fish Streams
- Central Study Area
- National Park
- National Preserve
- Alagnak Wild River
- Wood-Tikchik State Park
- General Deposit Location
- Communities

Note:
The Bristol Bay/Cook Inlet drainages boundary is the eastern boundary for all Bristol Bay drainages study areas, except within the national park units

0 10 20 30 40 50 Miles

0 10 20 30 40 50 Kilometers

N

Scale 1:1,550,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

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Version: 4	Author: RDI-LS

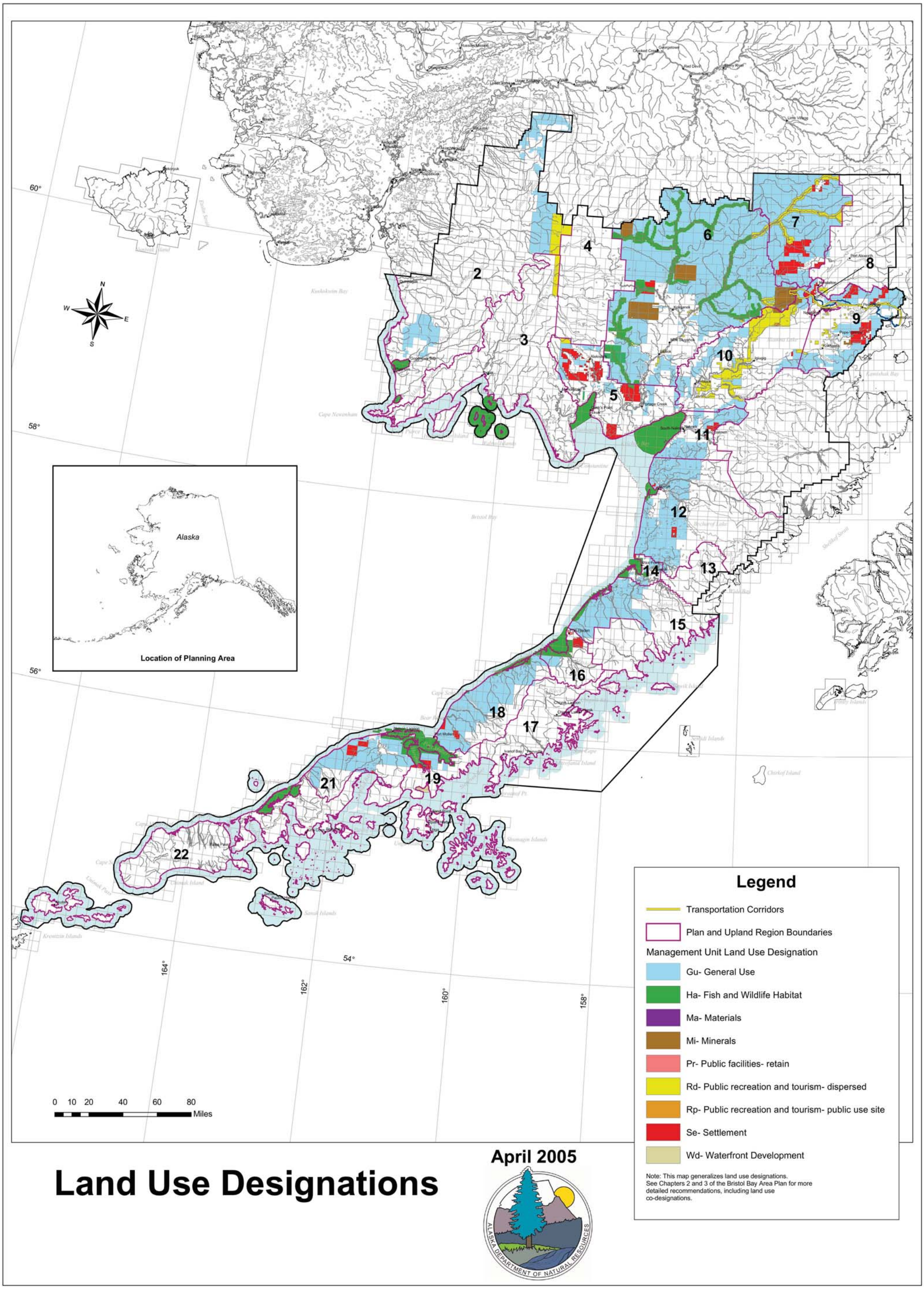
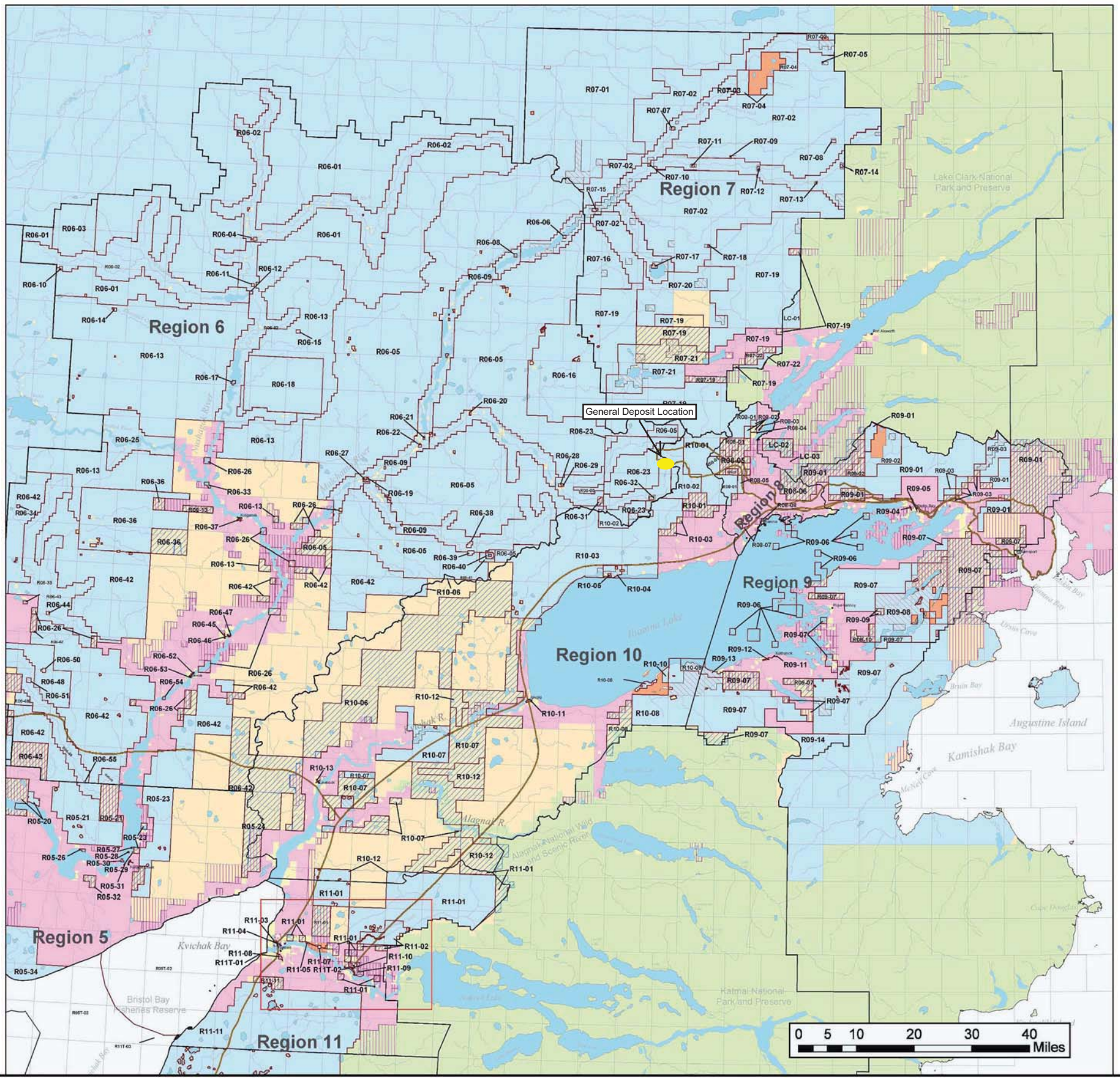


Figure 25-2, Planning Area, Bristol Bay Area Plan (ADNR, 2005a).
Note: The transportation corridors shown on figure are from the Southwest Alaska Transportation Plan.



Legend

- Transportation Corridors
- Plan & Upland Region Boundary
- Management Unit Boundary

Land Ownership

- State
- State-Owned Tidelands
- State-Selected
- National Wildlife Refuge, Park, Preserve
- BLM
- Military
- Native
- Native Selected
- Private
- Municipal Conveyed or Approved
- Municipal Selected

Management Units and Designations

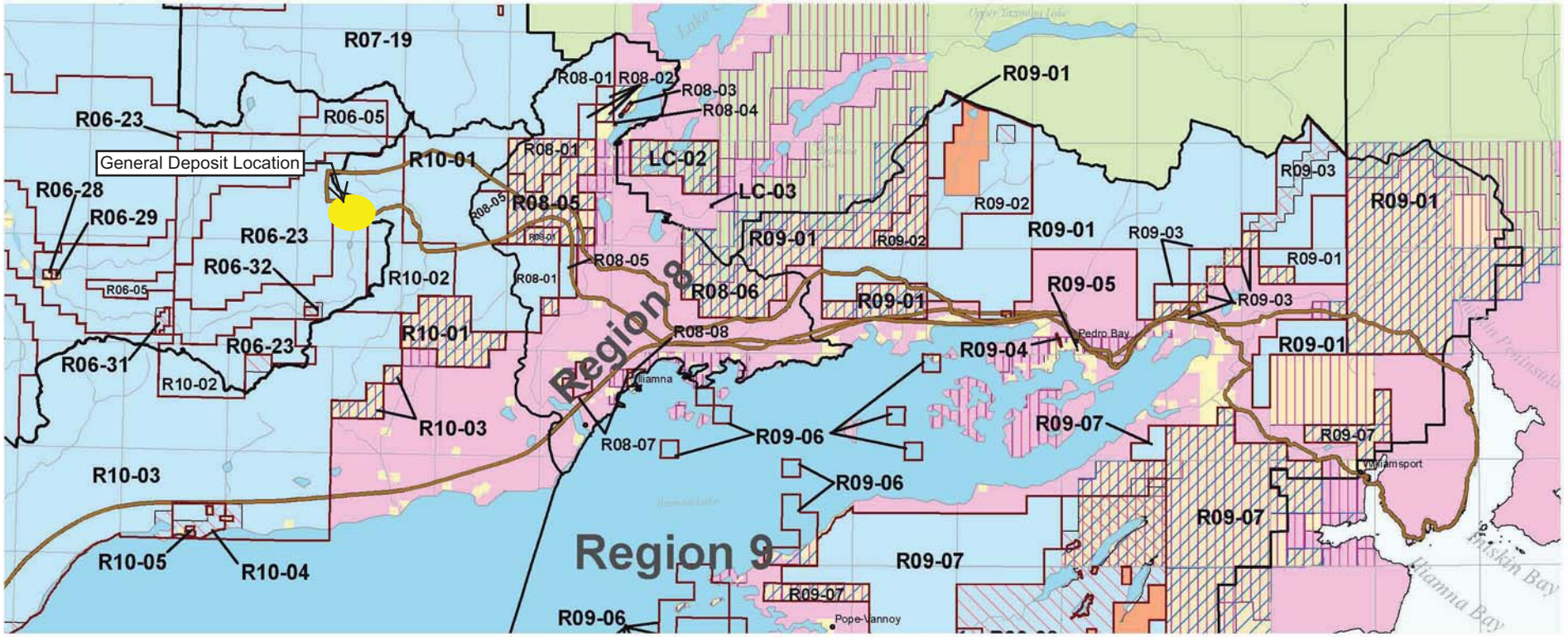
LC-01	Gu	R06-13	Gu	R06-41	Rd	R07-14	Rp	R09-12	Pr	R12-02	Se
LC-02	Rd	R06-14	Rp	R06-42	Gu	R07-15	Rp	R09-13	Rd	R12-03	Gu
LC-03	Pr	R06-15	Rp	R06-43	Rp	R07-16	Gu	R09-14	Gu	R12-04	Se
R05-20	Gu	R06-16	Gu	R06-44	Rp	R07-17	Rp	R10-01	Gu		
R05-21	Se	R06-17	Rp	R06-45	Pr	R07-18	Rp	R10-02	Mi	R05T-02	Ha,Hv
R05-22	Rd,Ha	R06-18	Mi	R06-46	Pr	R07-19	Gu	R10-03	Rd	R05T-03	Gu
R05-23	Gu	R06-19	Hr	R06-47	Ma	R07-20	Se	R10-04	Rp	R11T-01	Wd
R05-24	Gu	R06-20	Rp	R06-48	Ha	R07-21	Se	R10-05	Rp	R11T-02	Wd
R05-26	Rp	R06-21	Rp	R06-49	Rd,Ha	R07-22	Se	R10-06	Gu	R11T-03	Gu
R05-27	Rp	R06-22	Rp	R06-50	Rp	R08-01	Gu	R10-07	Rd	R12T-01	Ha
R05-28	Rp	R06-23	Mi	R06-51	Rp	R08-02	Se	R10-08	Gu	R12T-02	Ha,Hv
R05-29	Rp	R06-24	Mi	R06-52	Pr	R08-03	Pr	R10-09	Rd	R12T-03	Wd
R05-30	Rp	R06-25	Rd,Ha	R06-53	Pr	R08-04	Pr	R10-10	Se	R12T-04	Gu
R05-31	Pr	R06-26	Rd,Ha	R06-54	Rp	R08-05	Se	R10-11	Pr		
R05-32	Gu	R06-27	Rp	R06-55	Rp	R08-06	Gu	R10-12	Gu		
R05-34	Se	R06-28	Rp	R07-01	Gu	R08-07	Pr	R10-13	Pr		
R06-01	Gu	R06-29	Rp	R07-02	Gu	R08-08	Se	R11-01	Gu		
R06-02	Rd,Ha	R06-30	Rd	R07-03	Rp	R09-01	Gu	R11-02	Se		
R06-03	Mi	R06-31	Rp	R07-04	Se	R09-02	Se	R11-03	Pr		
R06-04	Rp	R06-32	Rp	R07-05	Rp	R09-03	Se	R11-04	Pr		
R06-05	Gu	R06-33	Rp	R07-06	Rd	R09-04	Pr	R11-05	Ma		
R06-06	Rp	R06-34	Rp	R07-07	Rp	R09-05	Pr	R11-06	Pr		
R06-07	Rd	R06-35	Rd,Ha	R07-08	Rp	R09-06	Rd	R11-07	Ma		
R06-08	Rp	R06-36	Mi	R07-09	Rp	R09-07	Gu	R11-08	Pr		
R06-09	Rd,Ha	R06-37	Pr	R07-10	Rp	R09-08	Se	R11-09	Pr		
R06-10	Rp	R06-38	Rp	R07-11	Rp	R09-09	Ha	R11-10	Pr		
R06-11	Rp	R06-39	Rp	R07-12	Rp	R09-10	Mi	R11-11	Gu		
R06-12	Rp	R06-40	Rp	R07-13	Rp	R09-11	Pr	R12-01	Gu		

N W E S

Bristol Bay Area Plan
April 2005

Figure 25-3, General Land Ownership and Management Units and Designations, Bristol Bay Area Plan Regions Overlapping the Land Use Study Area (ADNR, 2005a)

Notes: Figure altered to show "General Deposit Location". The transportation corridors shown on figure are from the Southwest Alaska Transportation Plan.



Legend

- Transportation Corridors
- Plan & Upland Region Boundary
- Management Unit Boundary

Land Ownership

- State
- State-Owned Tidelands
- State-Selected
- National Wildlife Refuge, Park, Preserve
- BLM
- Military
- Native
- Native Selected
- Private
- Municipal Conveyed or Approved
- Municipal Selected

Management Unit # / Name	Designation	Acres	Management Unit # / Name	Designation	Acres
R06-05 RRMP 19	Gu	1,196,780	R08-06 Roadhouse Mountain	Gu	11,622
R06-23 Pebble	Mi	48,526	R08-07 Iliamna Airport	Pr	1,203
R06-24 Pebble Streams	Mi	36,508	R08-08 Iliamna	Se	326
R06-28 PU28/Koktuli River	Rp	161	R09-01 Knutson Cr.-Three Sisters Mt.	Gu	183,905
R06-29 PU29/Koktuli River	Rp	82	R09-02 Upper Chekok Creek	Se	25,022
R06-30 Corridor Upper Koktuli River	Rd	20,636	R09-03 Pile River	Se	20,758
R06-31 PU30/Koktuli River	Rp	491	R09-04 Pedro Bay Airport	Pr	46
R06-32 PU31/Upper Koktuli River	Rp	241	R09-05 Pedro Bay School	Pr	0.92
R08-01 Groundhog Mountain	Gu	23,284	R09-06 Iliamna Lake Islands	Rd	19,833
R08-02 Nondalton	Se	2,552	R09-07 Tommy Creek/Chigmit	Gu	352,970
R08-03 Nondalton Airstrip	Pr	82	R10-01 Upper Talarik Creek	Gu	41,962
R08-04 Nondalton	Pr	1,809	R10-02 Pebble 2	Mi	25,046
R08-05 Newhalen River	Se	16,806	R10-03 Iliamna Lake NW	Rd	171,321

Note: Gu = General use; Mi = Minerals; Rd = Public recreation and tourism – Dispersed; Rp = Public recreation and tourism – public use site; Se =Settlement.

Figure 25-4, General Land Ownership and Management Units and Designations, Bristol Bay Area Plan Regions Overlapping the Central Study Area (ADNR, 2005a). Notes: Figure altered to show "General Deposit Location". The transportation corridors shown on figure are from the Southwest Alaska Transportation Plan.

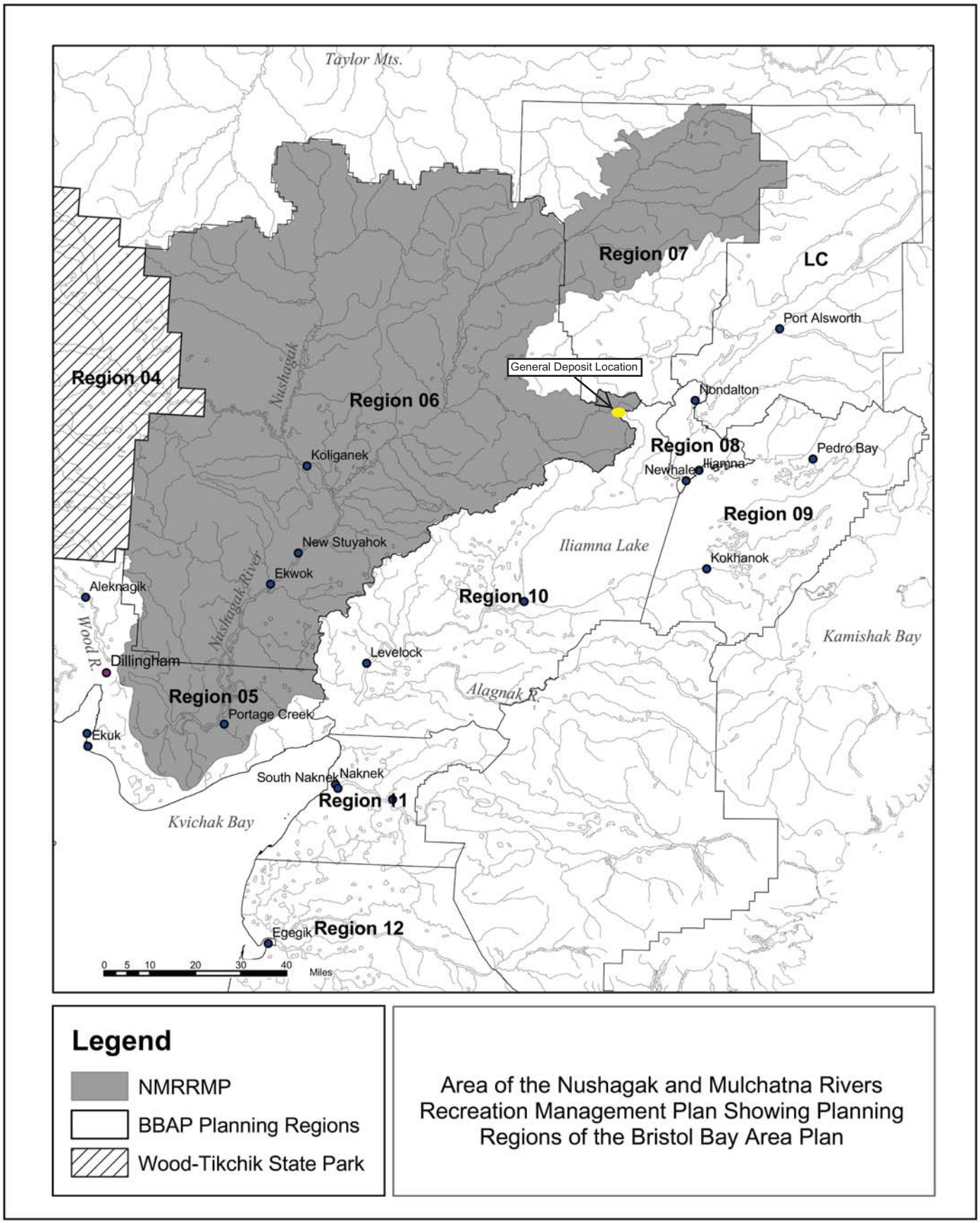


Figure 25-5, Nushagak and Mulchatna Rivers Recreation Management Plan Planning Area and Bristol Bay Area Plan Planning Regions (ADNR, 2005b). Notes: Figure altered to show "General Deposit Location".

April 2005

Nushagak and Mulchatna Rivers Recreation Management Plan

A Component of the Bristol Bay Area Plan

Plan Map 3-1

Legend

- Rivers Plan Boundary
- Management Unit Boundary
- State & state-selected land not affected by Rivers Plan**
- Public Use Sites*

*See maps in the appendix for site boundaries

Land Ownership

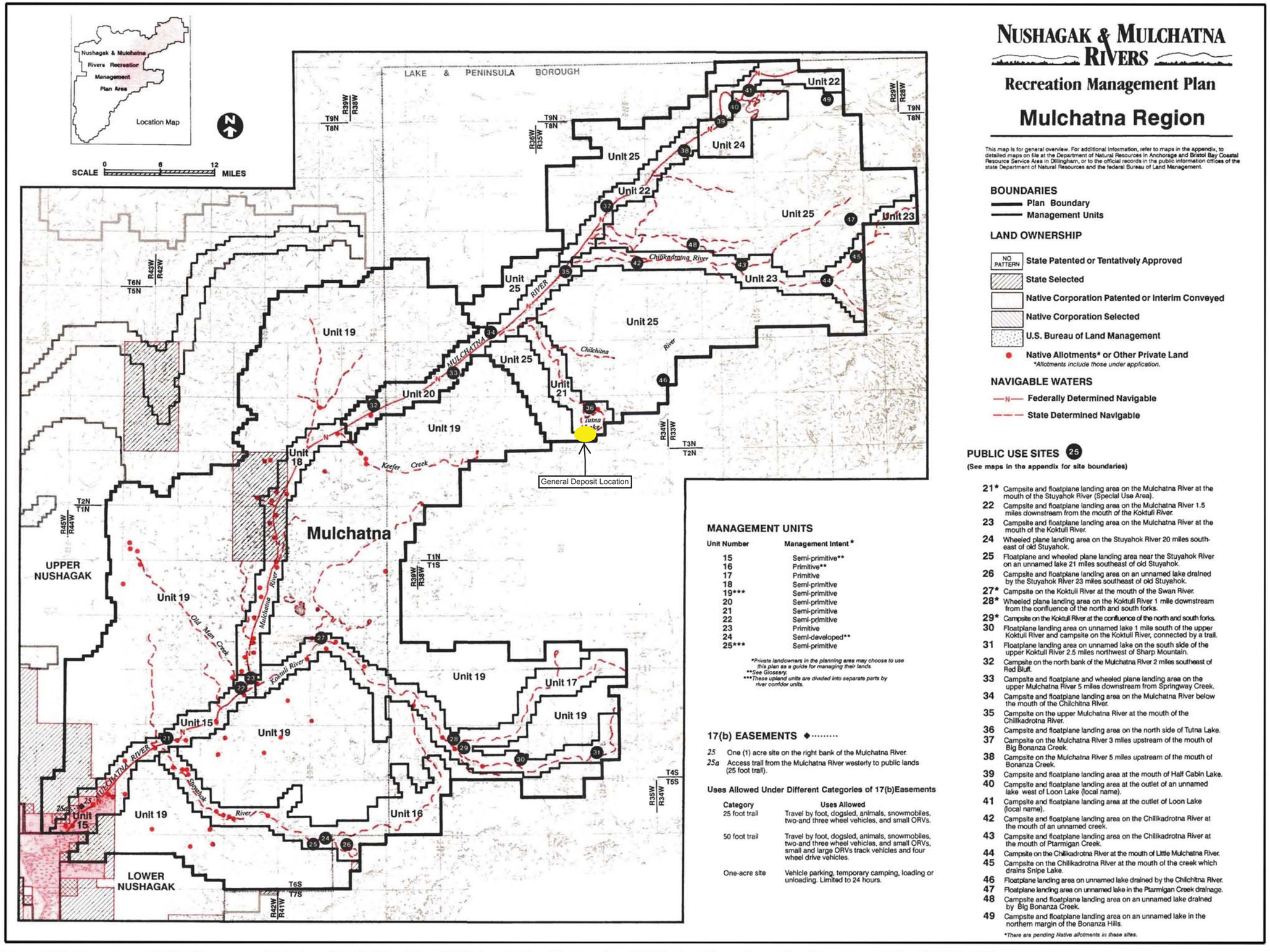
- State
- State Selected
- Municipal
- BLM
- Native
- Native Selected
- Native Allotment* or Private

* Allotments include those under application

** See Bristol Bay Area Plan for management requirements

0 3 6 12 18 24 Miles

Figure 25-6, Nushagak and Mulchatna Rivers Recreation Management Plan Management Units (ADNR, 2005b)



NUSHAGAK & MULCHATNA RIVERS

Recreation Management Plan

Mulchatna Region

This map is for general overview. For additional information, refer to maps in the appendix, to detailed maps on file at the Department of Natural Resources in Anchorage and Bristol Bay Coastal Resource Service Area in Dillingham, or to the official records in the public information offices of the state Department of Natural Resources and the federal Bureau of Land Management.

BOUNDARIES
- Plan Boundary
- Management Units

LAND OWNERSHIP
- NO PATTERN — State Patented or Tentatively Approved
- State Selected
- Native Corporation Patented or Interim Conveyed
- Native Corporation Selected
- U.S. Bureau of Land Management
- Native Allotments* or Other Private Land
  **Allotments include those under application.*

NAVIGABLE WATERS
- —N— Federally Determined Navigable
- — — State Determined Navigable

PUBLIC USE SITES (25)
(See maps in the appendix for site boundaries)

21* Campsite and floatplane landing area on the Mulchatna River at the mouth of the Stuyahok River (Special Use Area).
22 Campsite and floatplane landing area on the Mulchatna River 1.5 miles downstream from the mouth of the Koktuli River.
23 Campsite and floatplane landing area on the Mulchatna River at the mouth of the Koktuli River.
24 Wheeled plane landing area on the Stuyahok River 20 miles southeast of old Stuyahok.
25 Floatplane and wheeled plane landing area near the Stuyahok River on an unnamed lake 21 miles southeast of old Stuyahok.
26 Campsite and floatplane landing area on an unnamed lake drained by the Stuyahok River 23 miles southeast of old Stuyahok.
27* Campsite on the Koktuli River at the mouth of the Swan River.
28* Wheeled plane landing area on the Koktuli River 1 mile downstream from the confluence of the north and south forks.
29* Campsite on the Koktuli River at the confluence of the north and south forks.
30 Floatplane landing area on unnamed lake 1 mile south of the upper Koktuli River and campsite on the Koktuli River, connected by a trail.
31 Floatplane landing area on unnamed lake on the south side of the upper Koktuli River 2.5 miles northwest of Sharp Mountain.
32 Campsite on the north bank of the Mulchatna River 2 miles southeast of Red Bluff.
33 Campsite and floatplane and wheeled plane landing area on the upper Mulchatna River 5 miles downstream from Springway Creek.
34 Campsite and floatplane landing area on the Mulchatna River below the mouth of the Chilchitna River.
35 Campsite on the upper Mulchatna River at the mouth of the Chilikadrotna River.
36 Campsite and floatplane landing area on the north side of Tutna Lake.
37 Campsite on the Mulchatna River 3 miles upstream of the mouth of Big Bonanza Creek.
38 Campsite on the Mulchatna River 5 miles upstream of the mouth of Bonanza Creek.
39 Campsite and floatplane landing area at the mouth of Half Cabin Lake.
40 Campsite and floatplane landing area at the outlet of an unnamed lake west of Loon Lake (local name).
41 Campsite and floatplane landing area at the outlet of Loon Lake (local name).
42 Campsite and floatplane landing area on the Chilikadrotna River at the mouth of an unnamed creek.
43 Campsite and floatplane landing area on the Chilikadrotna River at the mouth of Ptarmigan Creek.
44 Campsite on the Chilikadrotna River at the mouth of Little Mulchatna River.
45 Campsite on the Chilikadrotna River at the mouth of the creek which drains Snipe Lake.
46 Floatplane landing area on unnamed lake drained by the Chilchitna River.
47 Floatplane landing area on unnamed lake in the Ptarmigan Creek drainage.
48 Campsite and floatplane landing area on an unnamed lake drained by Big Bonanza Creek.
49 Campsite and floatplane landing area on an unnamed lake in the northern margin of the Bonanza Hills.

**There are pending Native allotments in these sites.*

MANAGEMENT UNITS

Unit Number	Management Intent *
15	Semi-primitive**
16	Primitive**
17	Primitive
18	Semi-primitive
19***	Semi-primitive
20	Semi-primitive
21	Semi-primitive
22	Semi-primitive
23	Primitive
24	Semi-developed**
25***	Semi-primitive

**Private landowners in the planning area may choose to use this plan as a guide for managing their lands.*
***See Glossary.*
****These upland units are divided into separate parts by river corridor units.*

17(b) EASEMENTS ◆·····

25 One (1) acre site on the right bank of the Mulchatna River.
25a Access trail from the Mulchatna River westerly to public lands (25 foot trail).

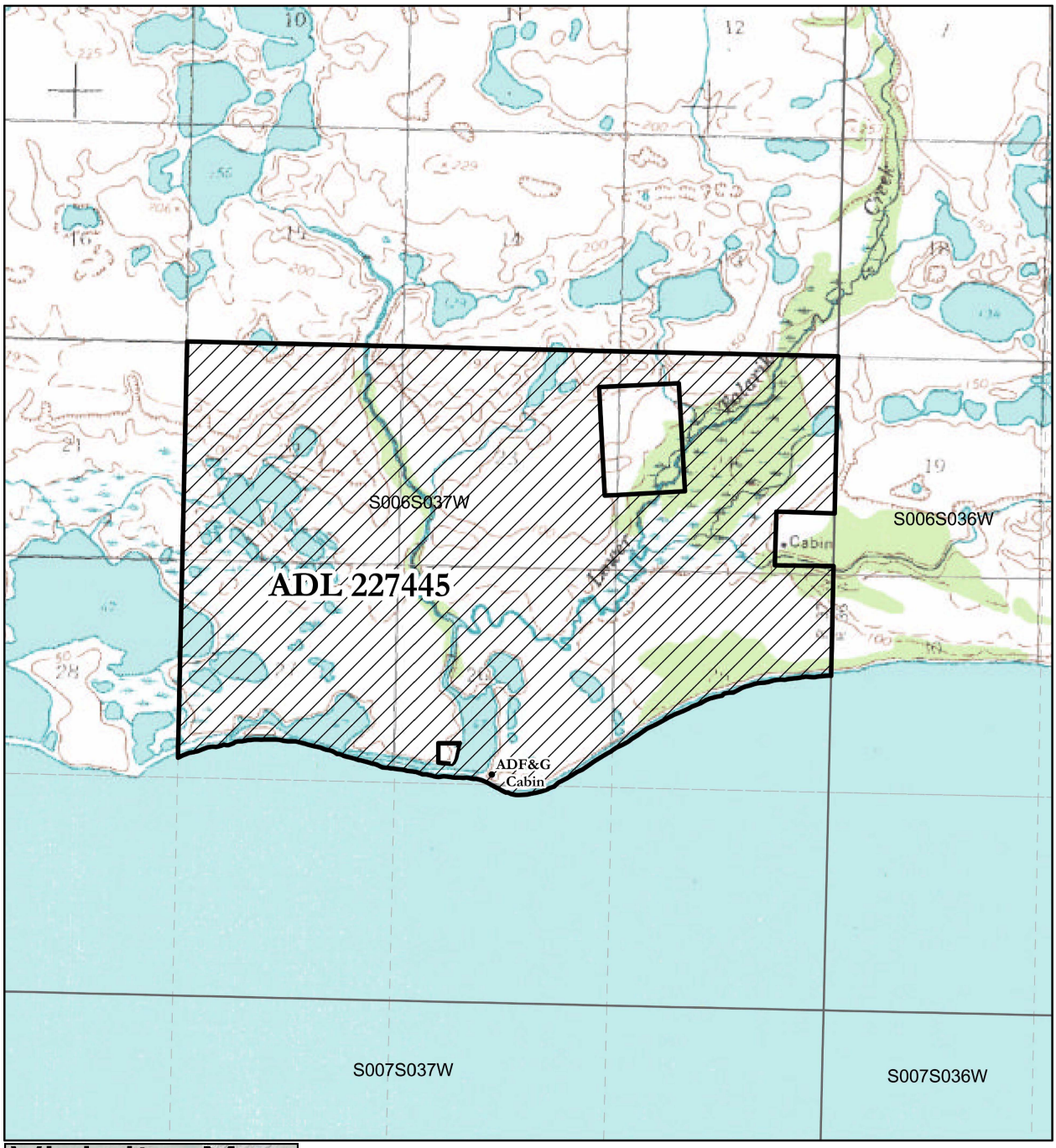
Uses Allowed Under Different Categories of 17(b)Easements

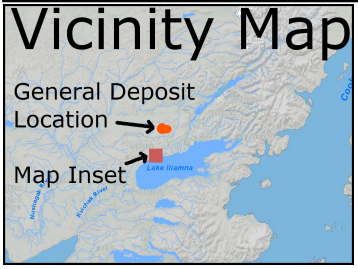
Category	Uses Allowed
25 foot trail	Travel by foot, dogsled, animals, snowmobiles, two-and three wheel vehicles, and small ORVs.
50 foot trail	Travel by foot, dogsled, animals, snowmobiles, two-and three wheel vehicles, and small ORVs, small and large ORVs track vehicles and four wheel drive vehicles.
One-acre site	Vehicle parking, temporary camping, loading or unloading. Limited to 24 hours.

Figure 25-7, Management Units, Management Intent, and Public Use Sites, Mulchatna Regions, Nushagak and Mulchatna Rivers Recreation Management Plan (ADNR et al., 1990).
Note: FIgure altered to show "General Deposit Location".

Lower Talarik Creek Special Use Area

Authorized: May 19, 1999





Legend

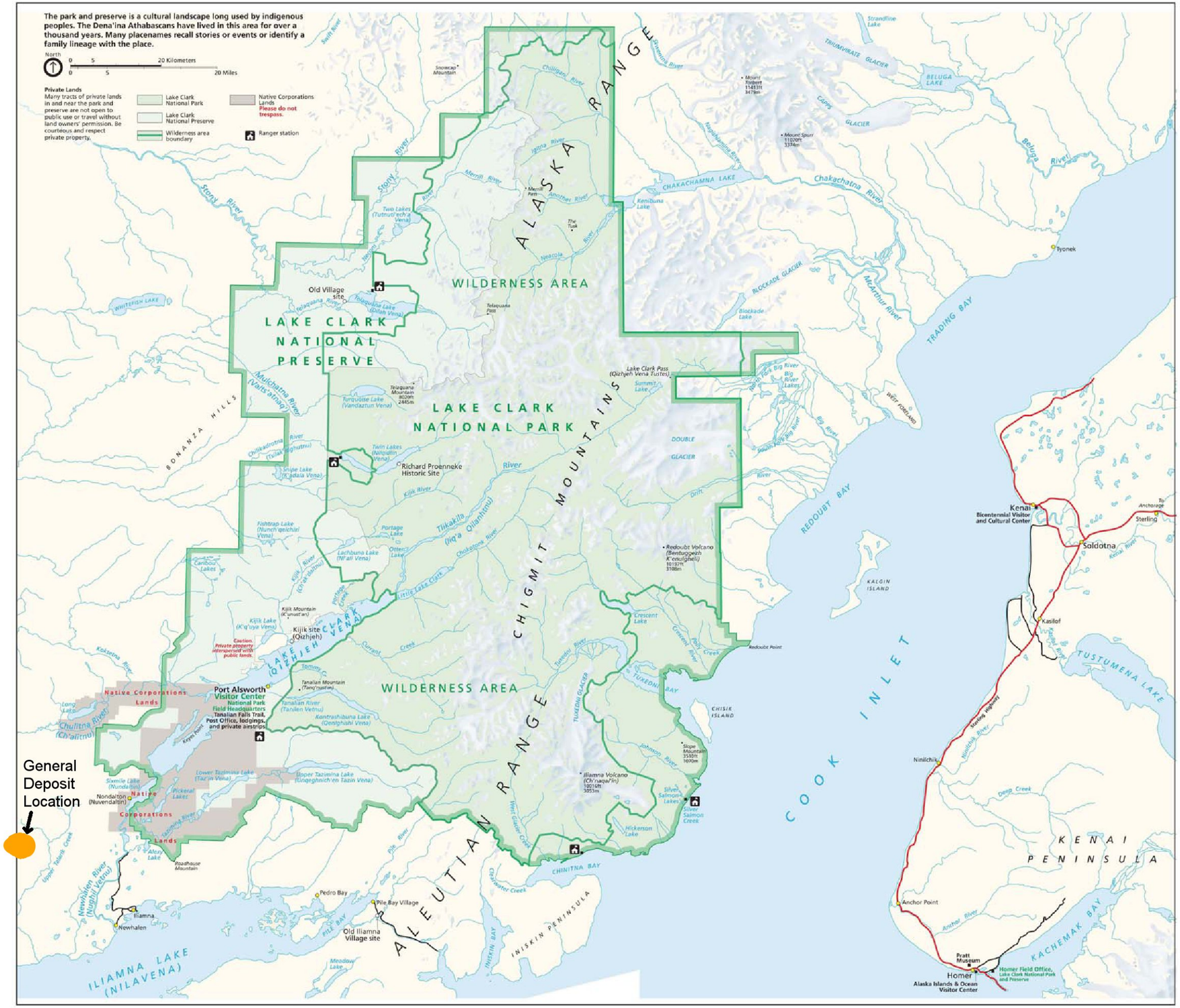
Lower Talarik Creek SUA

Map Created On October 16, 2002

Alaska Department of Natural Resources
Division of Mining, Land & Water

Figure 25-8, Lower Talarik Creek Special Use Area (ADNR, 1999).

Note: Inset Map modified to show general deposit location.



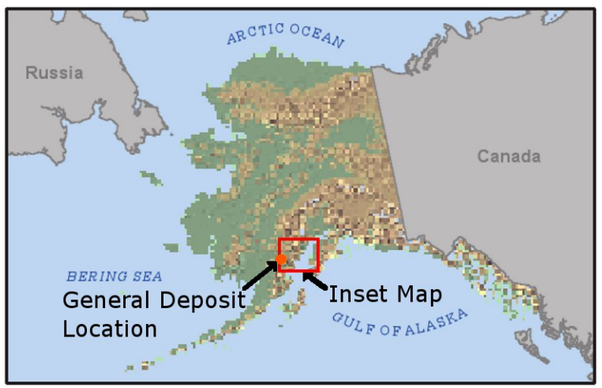


Figure 25-9, lake Clark national Park and Preserve (NPS, 2007c)
Note: General Deposit Location and Inset Map added.

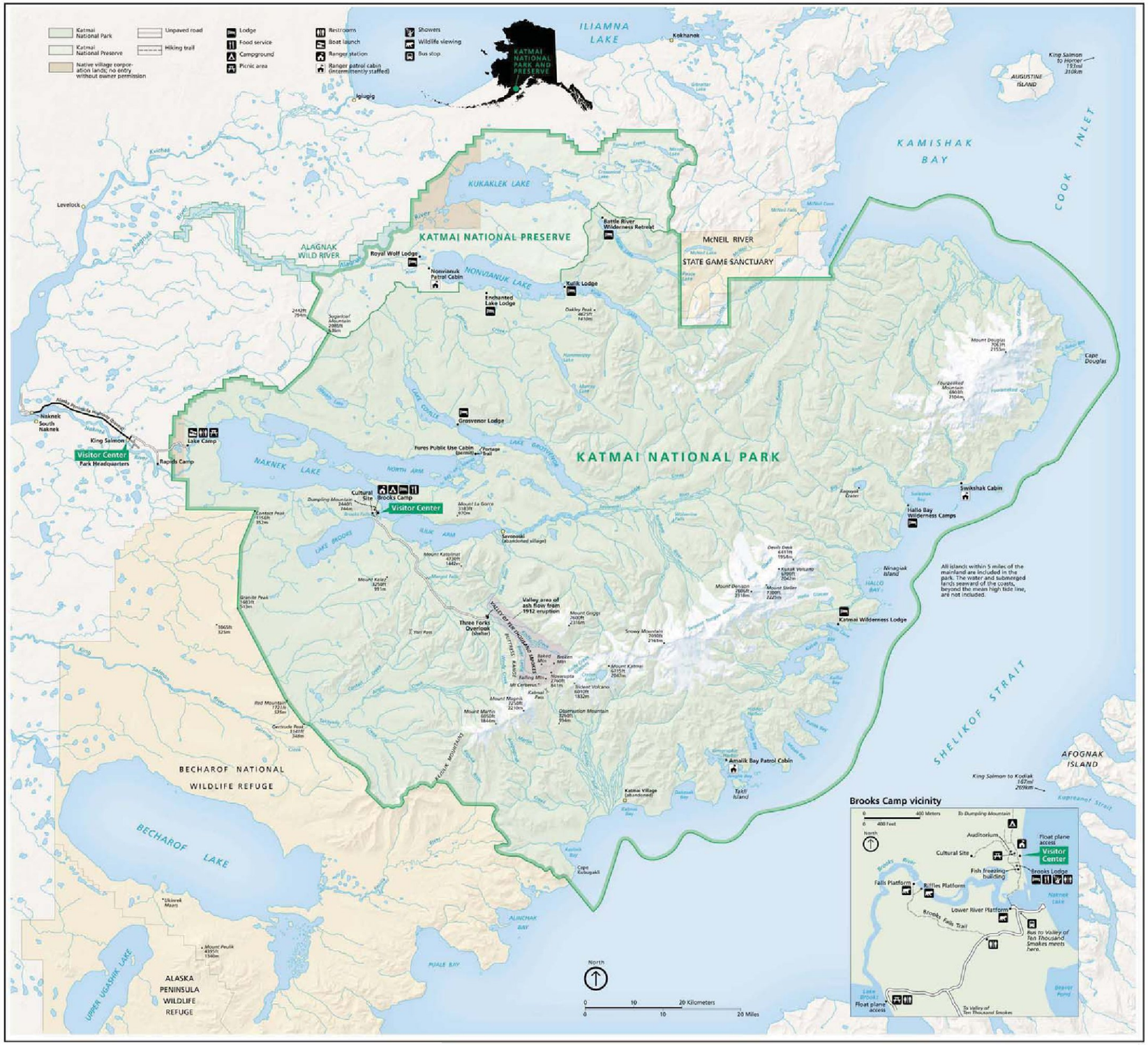


Figure 25-10, Katmai National Park and Preserve (NPS, 2007c)
Note: Inset Map added

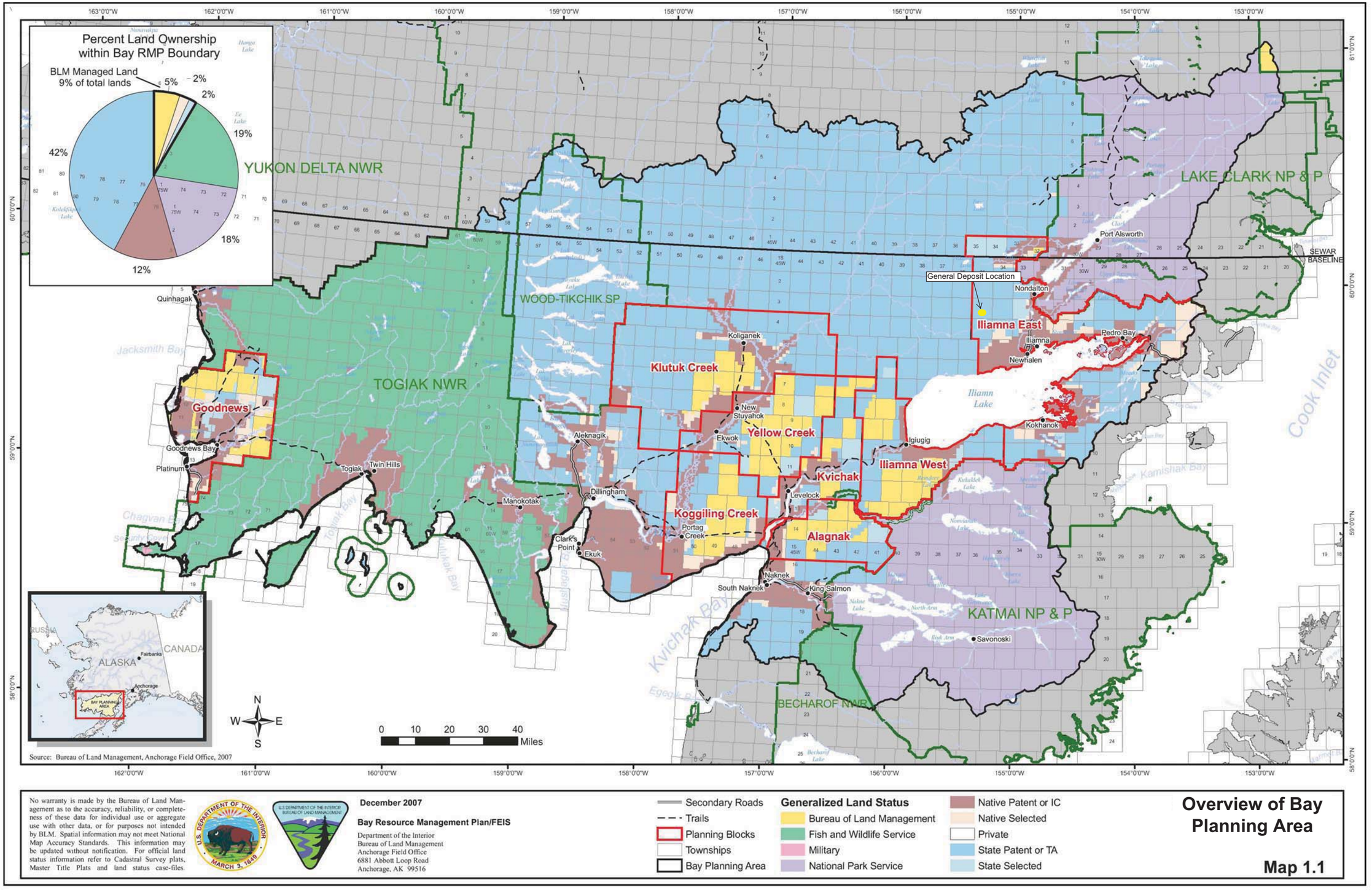
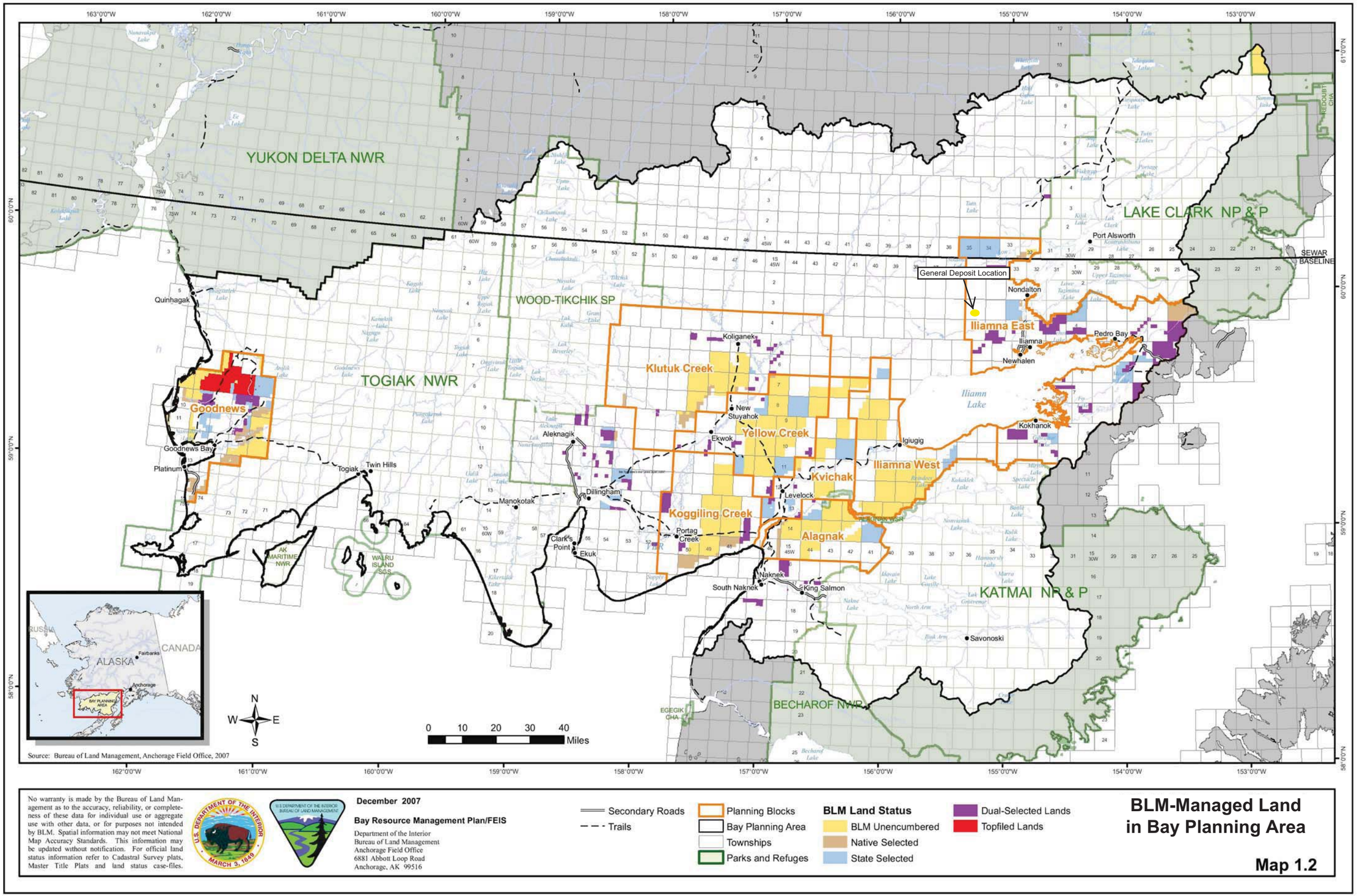


Figure 25-11, Bay Resource Management Plan, Overview of Planning Area (BLM, 2007). Note: Figure altered to show "General Deposit



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by BLM. Spatial information may not meet National Map Accuracy Standards. This information may be updated without notification. For official land status information refer to Cadastral Survey plats, Master Title Plats and land status case-files.

December 2007

Bay Resource Management Plan/FEIS

Department of the Interior
Bureau of Land Management
Anchorage Field Office
6881 Abbott Loop Road
Anchorage, AK 99516

Secondary Roads
Trails

Planning Blocks
Bay Planning Area
Townships
Parks and Refuges

BLM Land Status
BLM Unencumbered
Native Selected
State Selected
Dual-Selected Lands
Topfiled Lands

BLM-Managed Land in Bay Planning Area

Map 1.2

Figure 25-12, Bay Resource Management Plan, BLM-Managed Land (BLM, 2007) Note: Figure altered to show "General Deposit Location".

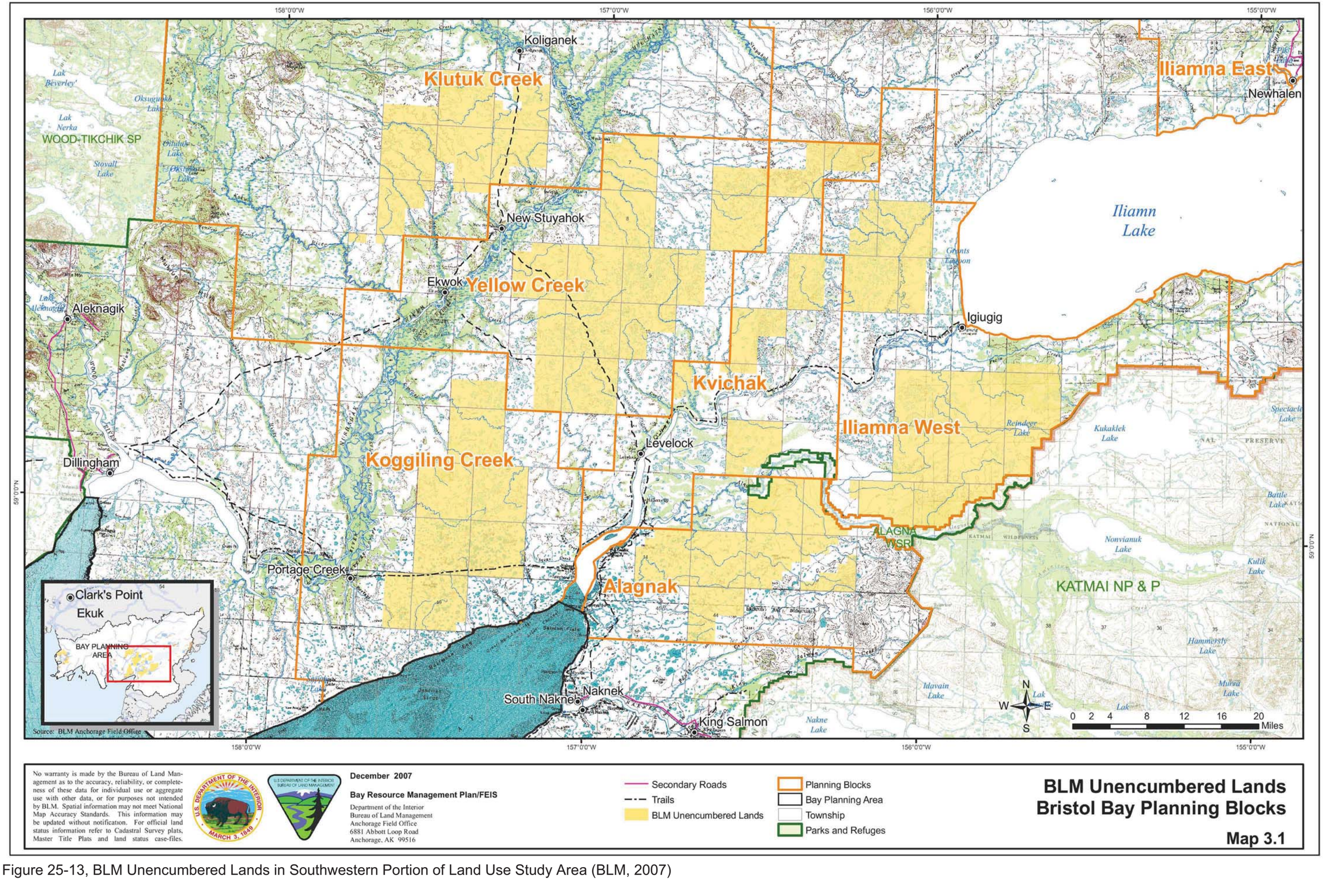


Figure 25-13, BLM Unencumbered Lands in Southwestern Portion of Land Use Study Area (BLM, 2007)

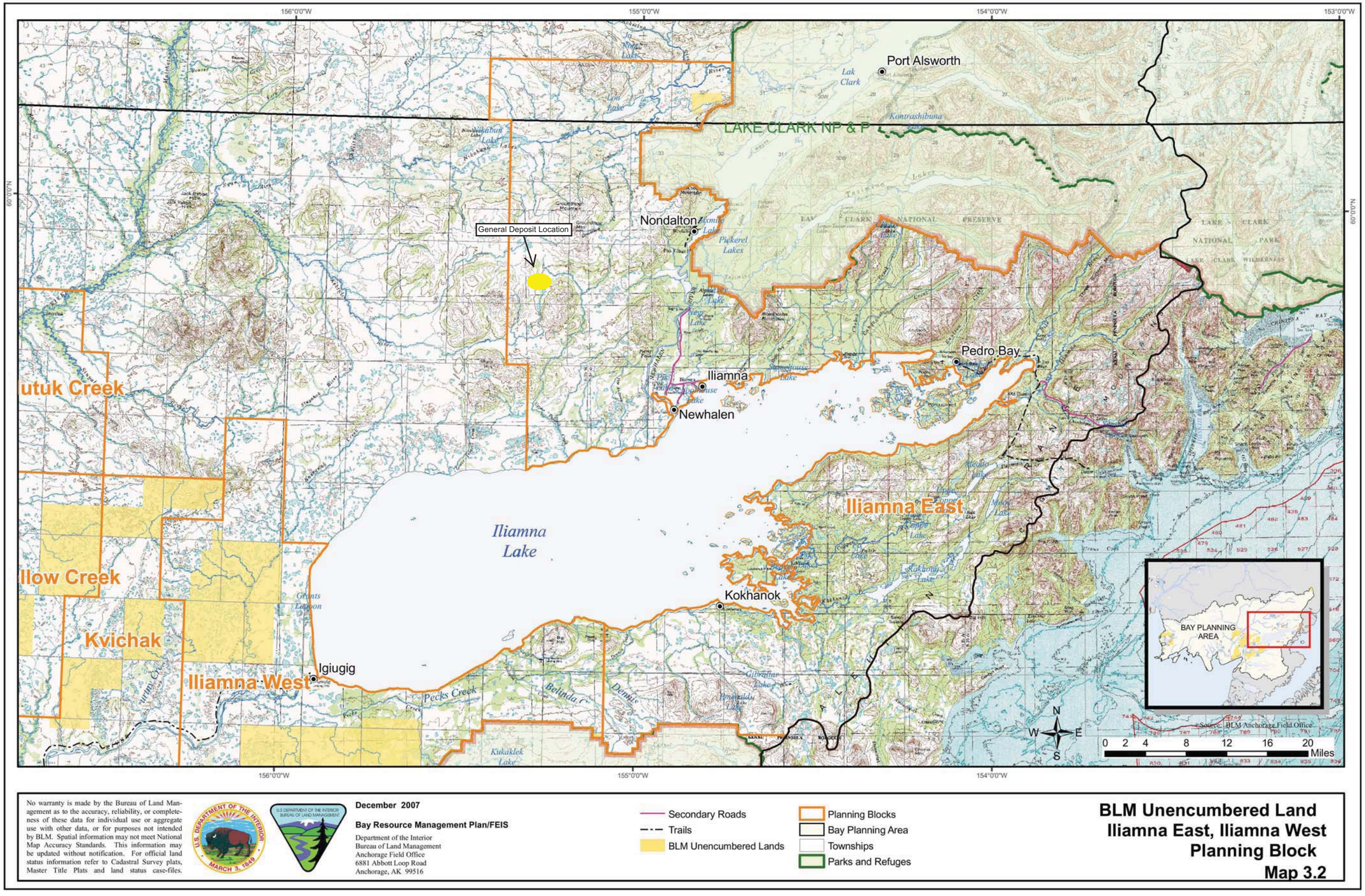


Figure 25-14, BLM Unencumbered Lands North and West of Iliamna Lake (BLM, 2007) Note: Figure altered to show "General Deposit Location".

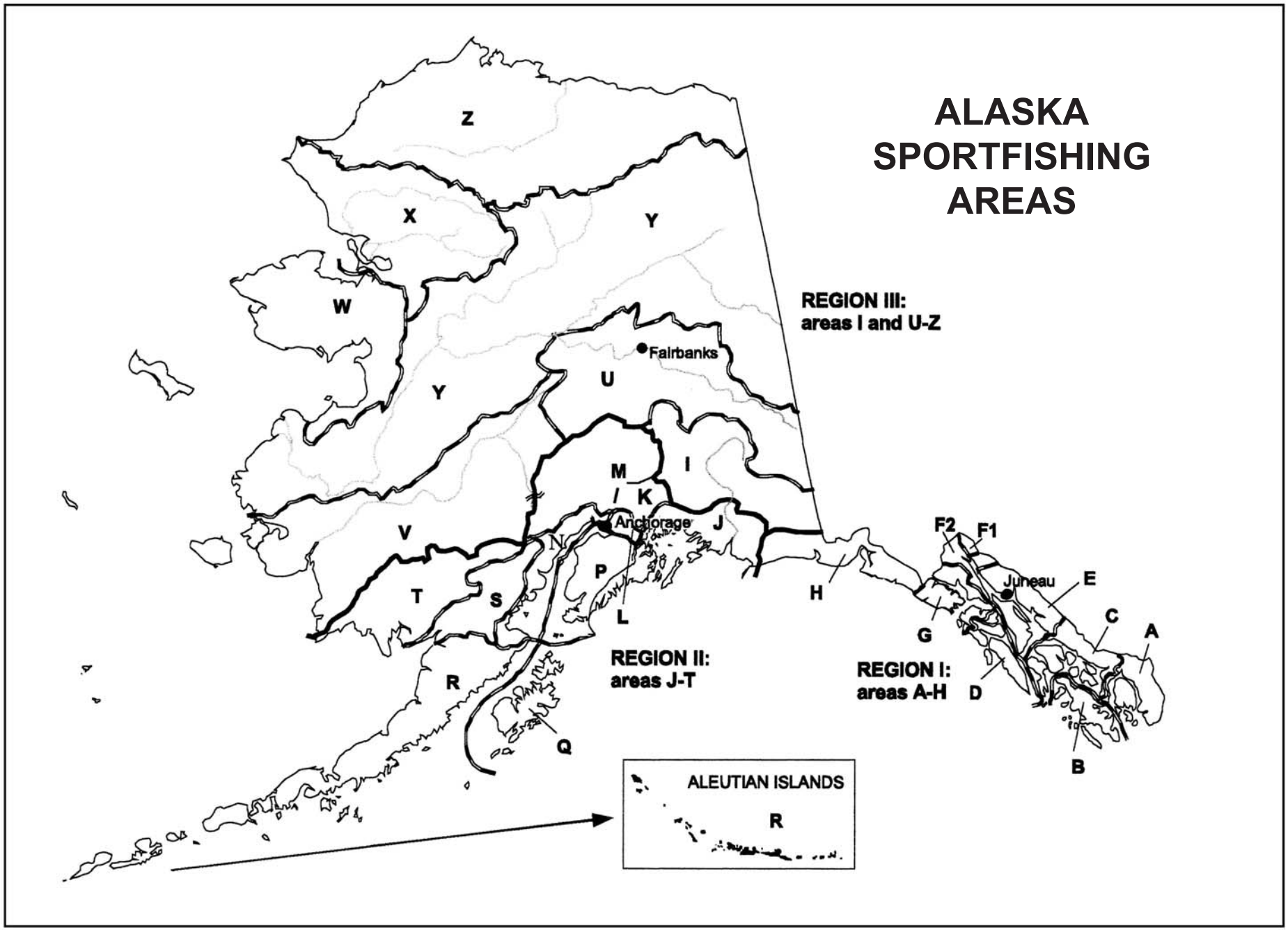
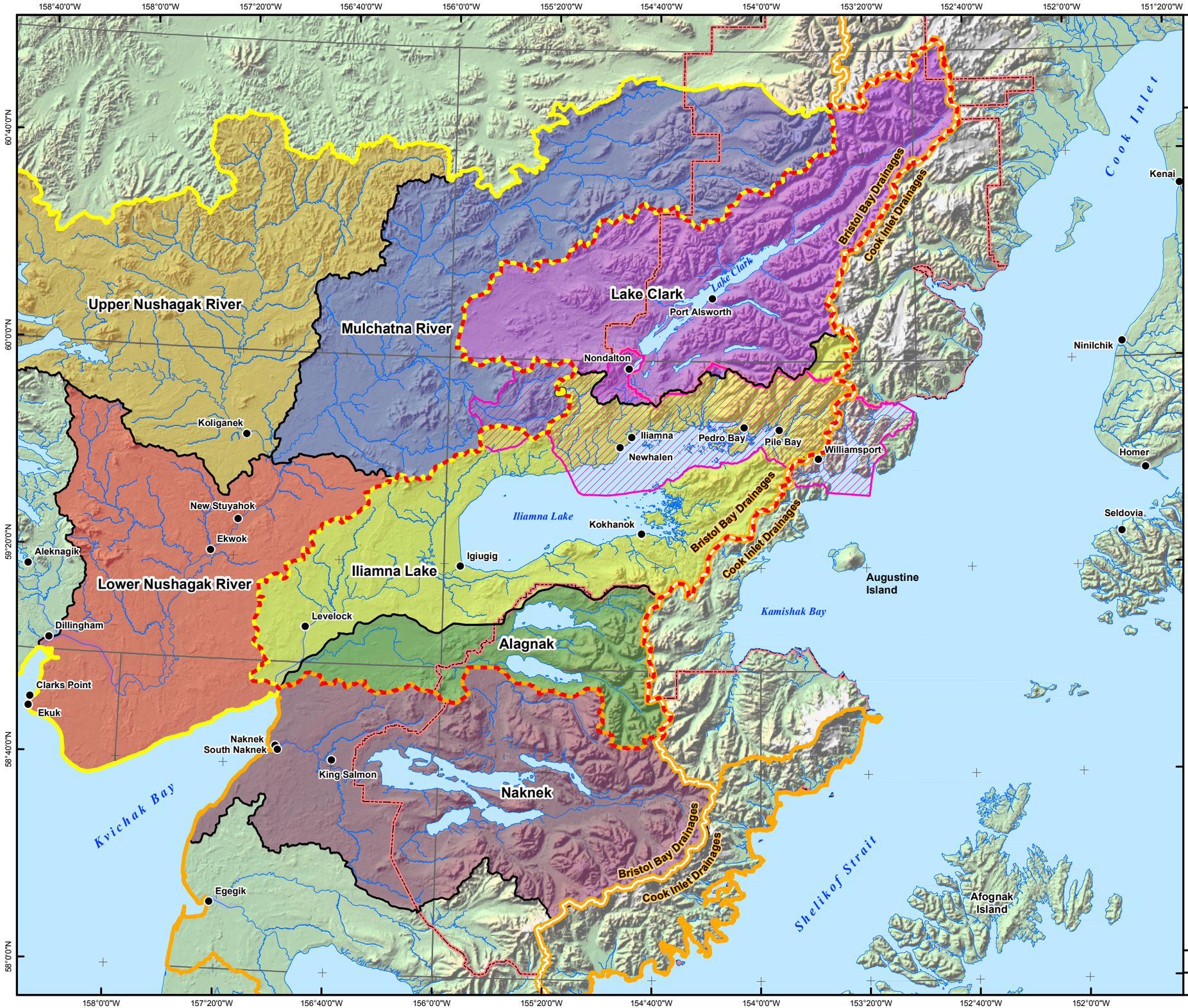


Figure 25-15, Alaska Sportfishing Management Areas (Jennings et al., 2007)



THE pebble PARTNERSHIP

Figure 25-16
Sportfishing Study Area
Bristol Bay Drainages
ADF&G Sportfishing Management Areas and USGS Drainages

Legend

- Bristol Bay/Cook Inlet Drainages Boundary

ADF&G Management Areas

- Area R
- Area S
- Area T
- USGS Drainages Boundary
- Anadromous Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

Note: The Upper Nushagak Drainage and Areas R and T extend outside the border of this map.

0 10 20 30 40 50 Miles

0 10 20 30 40 50 Kilometers

Scale 1:1,375,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

N

File: RDI_KW_Fig25-16_11X17_1of1_V04.mxd	Date: September 2, 2010
Version: 4	Author: RDI-LS

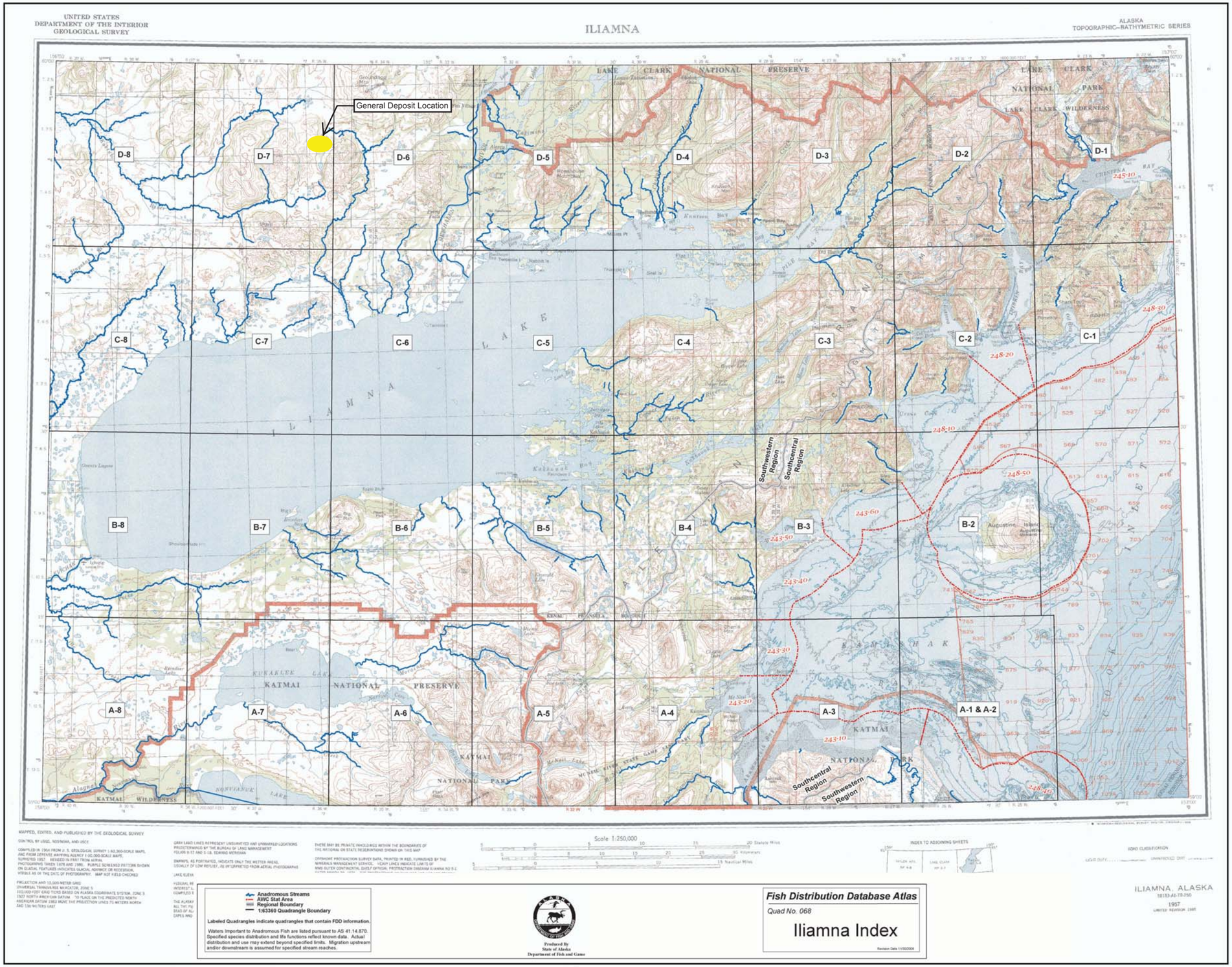


Figure 25-17, Example Map, Fish Distribution Database Atlas, 1:250,000 Scale (ADF&G SFD, 2007)
Note: Figure altered to show "General Deposit Location".

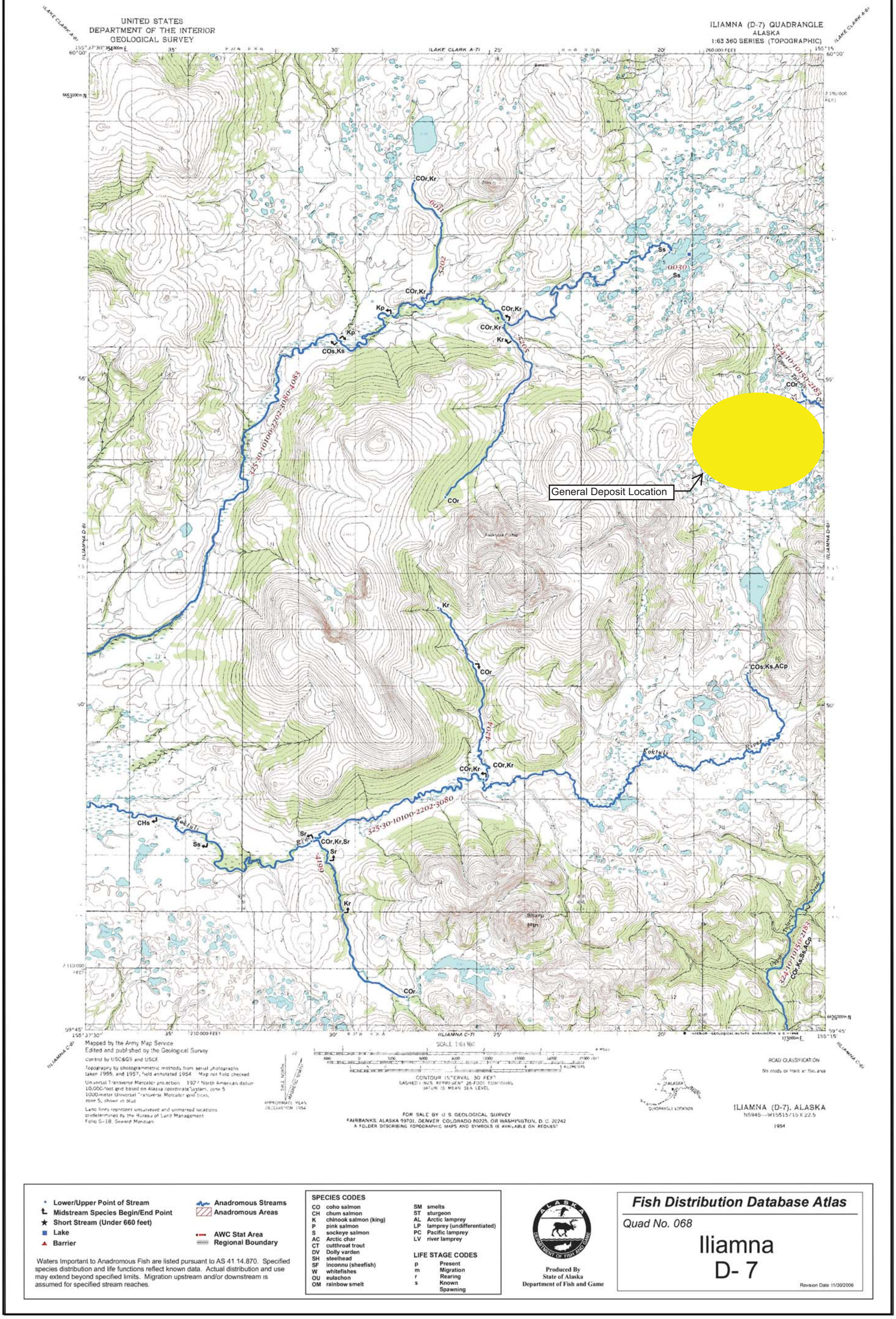
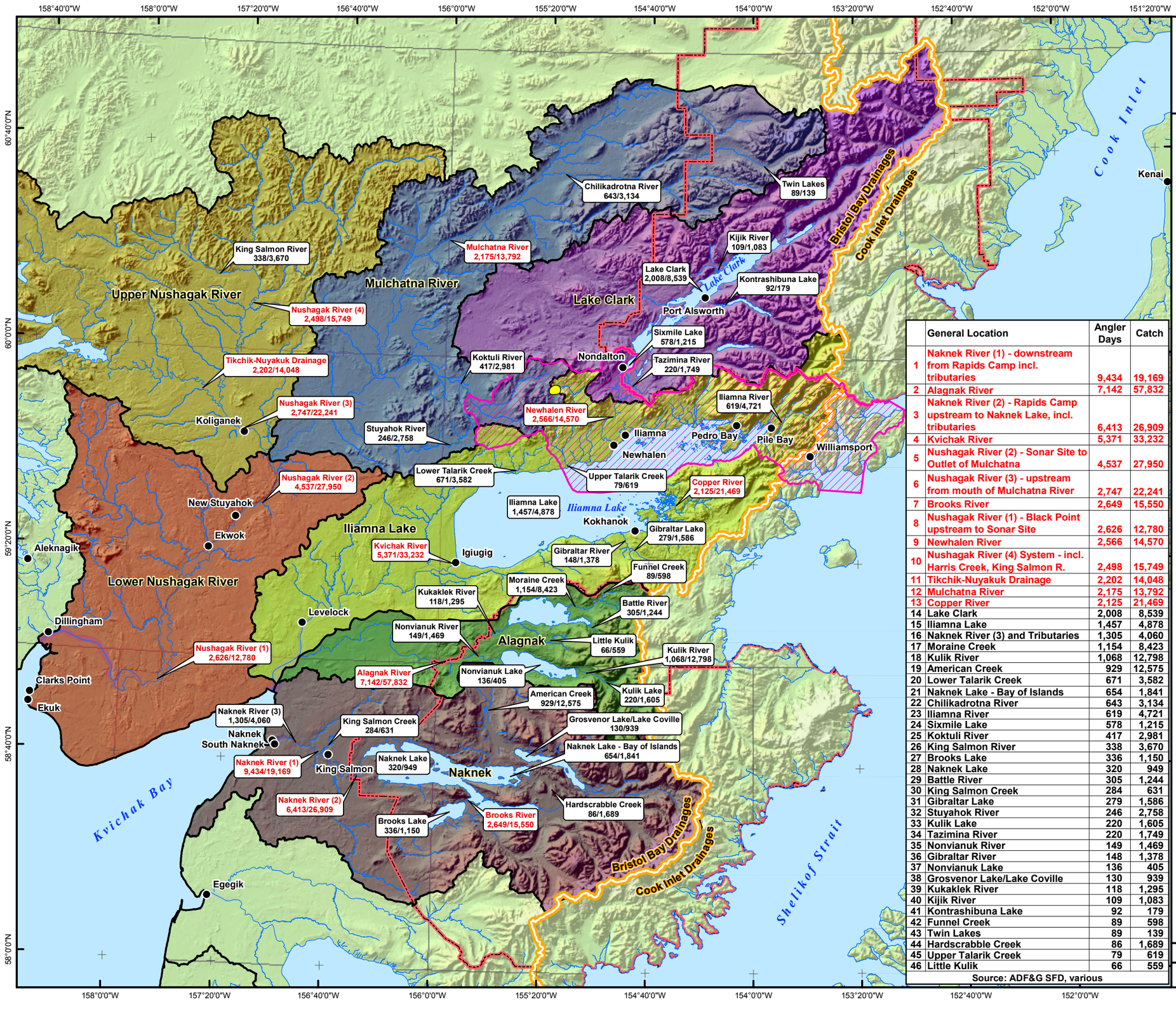


Figure 25-18, Example Map, Fish Distribution Database Atlas, 1:63,360 Scale (ADF&G SFD, 2007)
Note: Figure altered to show "General Deposit Location".



	General Location	Angler Days	Catch
1	Naknek River (1) - downstream from Rapids Camp incl. tributaries	9,434	19,169
2	Alagnak River	7,142	57,832
3	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	6,413	26,909
4	Kvichak River	5,371	33,232
5	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	4,537	27,950
6	Nushagak River (3) - upstream from mouth of Mulchatna River	2,747	22,241
7	Brooks River	2,649	15,550
8	Nushagak River (1) - Black Point upstream to Sonar Site	2,626	12,780
9	Newhalen River	2,566	14,570
10	Nushagak River (4) System - incl. Harris Creek, King Salmon R.	2,498	15,749
11	Tikchik-Nuyakuk Drainage	2,202	14,048
12	Mulchatna River	2,175	13,792
13	Copper River	2,125	21,469
14	Lake Clark	2,008	8,539
15	Iliamna Lake	1,457	4,878
16	Naknek River (3) and Tributaries	1,305	4,060
17	Moraine Creek	1,154	8,423
18	Kulik River	1,068	12,798
19	American Creek	929	12,575
20	Lower Talarik Creek	671	3,582
21	Naknek Lake - Bay of Islands	654	1,841
22	Chilikadrotna River	643	3,134
23	Iliamna River	619	4,721
24	Sixmile Lake	578	1,215
25	Koktuli River	417	2,981
26	King Salmon River	338	3,670
27	Brooks Lake	336	1,150
28	Naknek Lake	320	949
29	Battle River	305	1,244
30	King Salmon Creek	284	631
31	Gibraltar Lake	279	1,586
32	Stuyahok River	246	2,758
33	Kulik Lake	220	1,605
34	Tazimina River	220	1,749
35	Nonvianuk River	149	1,469
36	Gibraltar River	148	1,378
37	Nonvianuk Lake	136	405
38	Grosvenor Lake/Lake Coville	130	939
39	Kukaklek River	118	1,295
40	Kijik River	109	1,083
41	Kontrashibuna Lake	92	179
42	Funnel Creek	89	598
43	Twin Lakes	89	139
44	Hardscrabble Creek	86	1,689
45	Upper Talarik Creek	79	619
46	Little Kulik	66	559

Source: ADF&G SFD, various

THE pebble PARTNERSHIP

Figure 25-19
Sportfishing Study Area
Bristol Bay Drainages
Average Annual Angler Days and Catch All Species by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number/Number — Stream/Lake Location Average Annual Angler Days/Catch (1999-2005)
- Text Number/Number — These locations combined accounted for about 75 percent of total angler days and catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Iliamna Lake
- Naknek
- Mulchatna River
- Lake Clark
- Lower Nushagak River
- Upper Nushagak River

0 10 20 30 40 50 Miles

0 10 20 30 40 50 Kilometers

N

Scale 1:1,375,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

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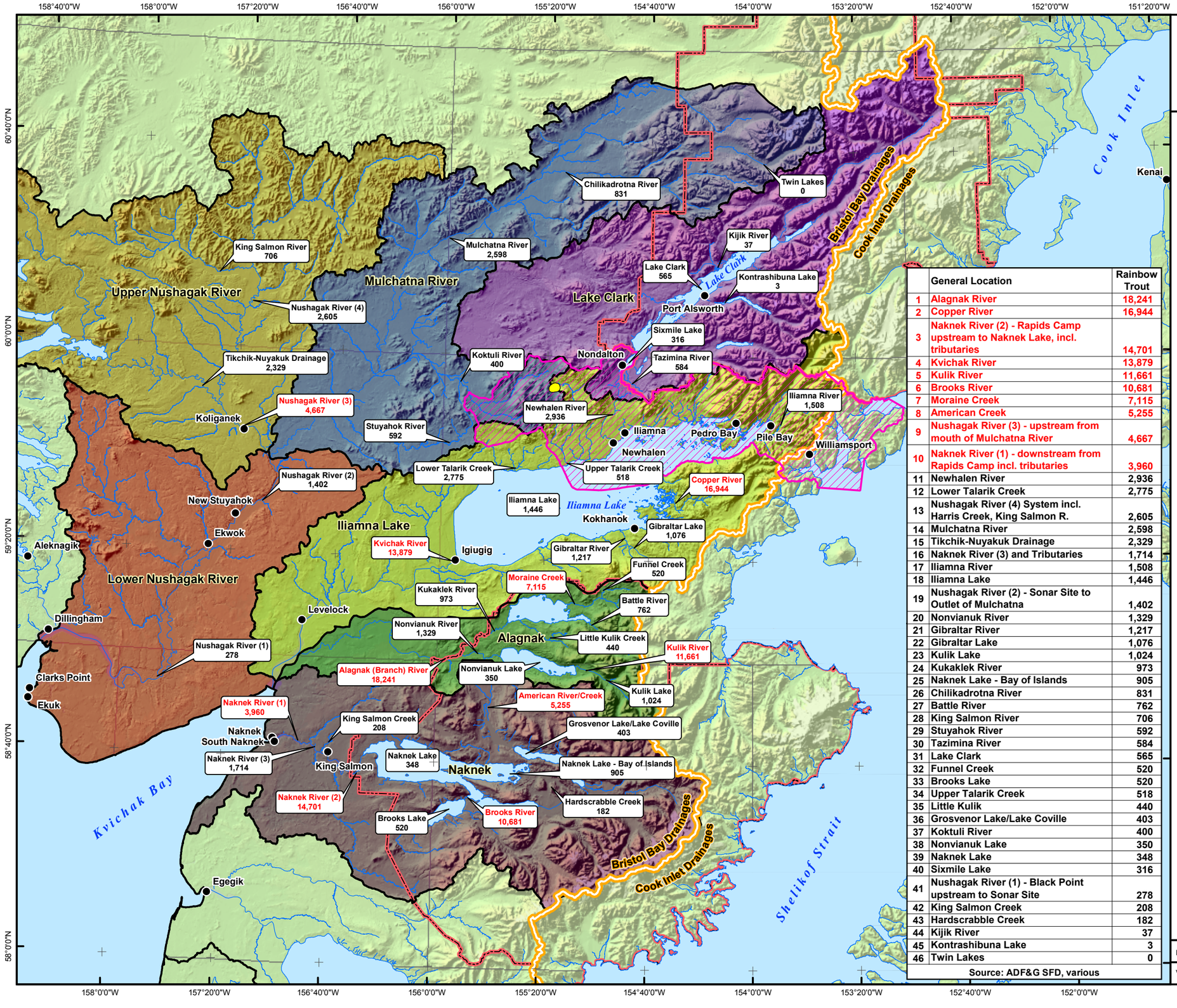
Version: 10	Author: RDI-LS



	General Location	Rainbow Trout
1	Alagnak River	18,241
2	Copper River	16,944
3	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	14,701
4	Kvichak River	13,879
5	Kulik River	11,661
6	Brooks River	10,681
7	Moraine Creek	7,115
8	American Creek	5,255
9	Nushagak River (3) - upstream from mouth of Mulchatna River	4,667
10	Naknek River (1) - downstream from Rapids Camp incl. tributaries	3,960
11	Newhalen River	2,936
12	Lower Talarik Creek	2,775
13	Nushagak River (4) System incl. Harris Creek, King Salmon R.	2,605
14	Mulchatna River	2,598
15	Tikchik-Nuyakuk Drainage	2,329
16	Naknek River (3) and Tributaries	1,714
17	Iliamna River	1,508
18	Iliamna Lake	1,446
19	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	1,402
20	Nonvianuk River	1,329
21	Gibraltar River	1,217
22	Gibraltar Lake	1,076
23	Kulik Lake	1,024
24	Kukaklek River	973
25	Naknek Lake - Bay of Islands	905
26	Chilikadrotna River	831
27	Battle River	762
28	King Salmon River	706
29	Stuyahok River	592
30	Tazimina River	584
31	Lake Clark	565
32	Funnel Creek	520
33	Brooks Lake	520
34	Upper Talarik Creek	518
35	Little Kulik	440
36	Grosvenor Lake/Lake Coville	403
37	Koktuli River	400
38	Nonvianuk Lake	350
39	Naknek Lake	348
40	Sixmile Lake	316
41	Nushagak River (1) - Black Point upstream to Sonar Site	278
42	King Salmon Creek	208
43	Hardscrabble Creek	182
44	Kijik River	37
45	Kontrashibuna Lake	3
46	Twin Lakes	0

Source: ADF&G SFD, various

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Figure 25-20
Sportfishing Study Area
Bristol Bay Drainages
Average Annual Rainbow Trout Catch by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number — Stream/Lake Location Average Annual Catch (1999-2005)
- Text Number — These locations combined accounted for about 75 percent of total rainbow trout catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

0 10 20 30 40 50 Miles

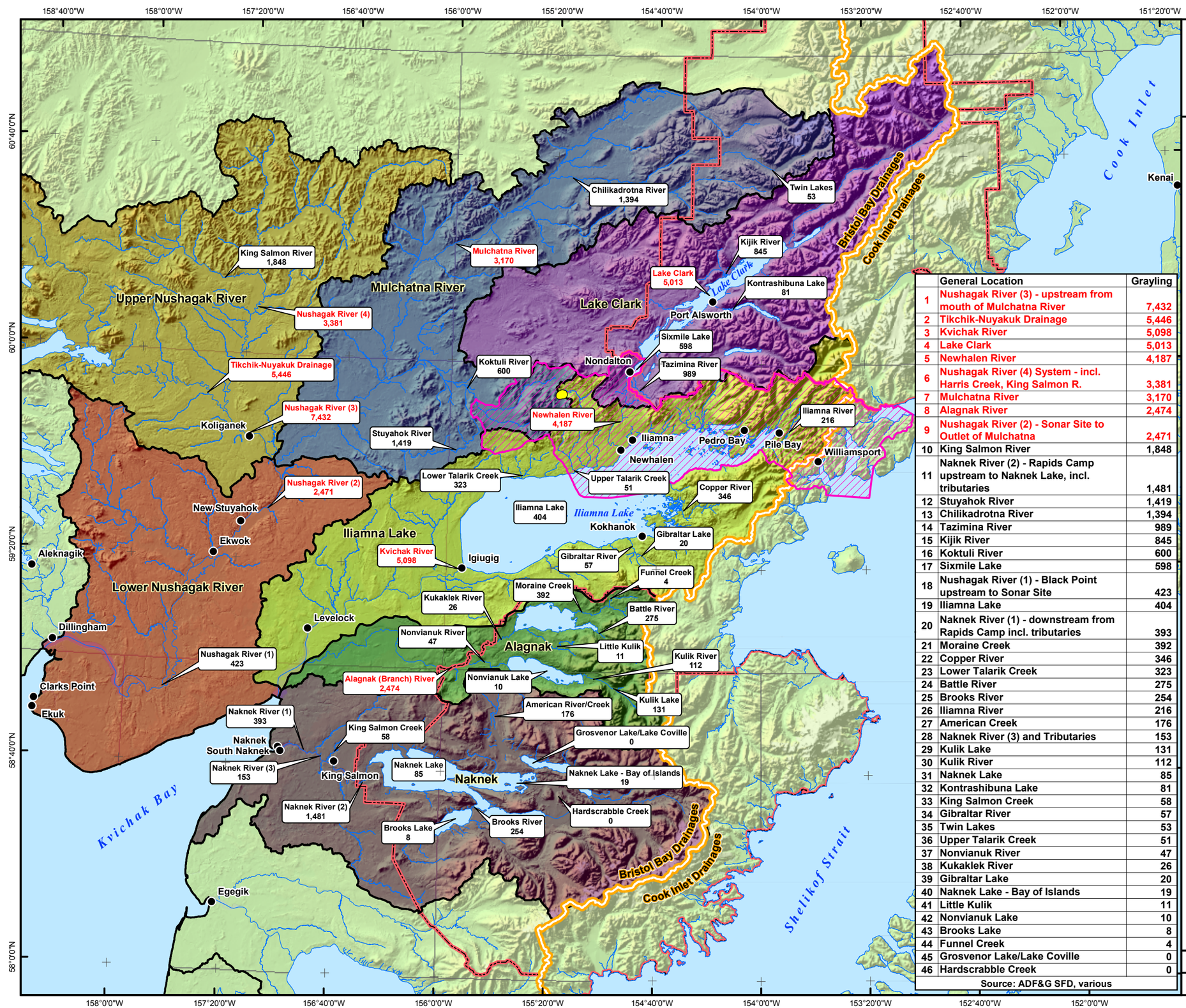
0 10 20 30 40 50 Kilometers

N

Scale 1:1,375,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_Rec_RainbowT_Fig25-20_11X17_1of1_V07.mxd	Date: September 2, 2010
Version: 7	Author: RDI-LS



	General Location	Grayling
1	Nushagak River (3) - upstream from mouth of Mulchatna River	7,432
2	Tikchik-Nuyakuk Drainage	5,446
3	Kvichak River	5,098
4	Lake Clark	5,013
5	Newhalen River	4,187
6	Nushagak River (4) System - incl. Harris Creek, King Salmon R.	3,381
7	Mulchatna River	3,170
8	Alagnak River	2,474
9	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	2,471
10	King Salmon River	1,848
11	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	1,481
12	Stuyahok River	1,419
13	Chilikadrotna River	1,394
14	Tazimina River	989
15	Kijik River	845
16	Koktuli River	600
17	Sixmile Lake	598
18	Nushagak River (1) - Black Point upstream to Sonar Site	423
19	Iliamna Lake	404
20	Naknek River (1) - downstream from Rapids Camp incl. tributaries	393
21	Moraine Creek	392
22	Copper River	346
23	Lower Talarik Creek	323
24	Battle River	275
25	Brooks River	254
26	Iliamna River	216
27	American Creek	176
28	Naknek River (3) and Tributaries	153
29	Kulik Lake	131
30	Kulik River	112
31	Naknek Lake	85
32	Kontrashibuna Lake	81
33	King Salmon Creek	58
34	Gibraltar River	57
35	Twin Lakes	53
36	Upper Talarik Creek	51
37	Nonvianuk River	47
38	Kukaklek River	26
39	Gibraltar Lake	20
40	Naknek Lake - Bay of Islands	19
41	Little Kulik	11
42	Nonvianuk Lake	10
43	Brooks Lake	8
44	Funnel Creek	4
45	Grosvenor Lake/Lake Coville	0
46	Hardscrabble Creek	0

Source: ADF&G SFD, various

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Figure 25-21
Sportfishing Study Area
Bristol Bay Drainages
Average Annual Grayling Catch by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number — Stream/Lake Location Average Annual Catch (1999-2005)
- Text Number — These locations combined accounted for about 75 percent of total grayling catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

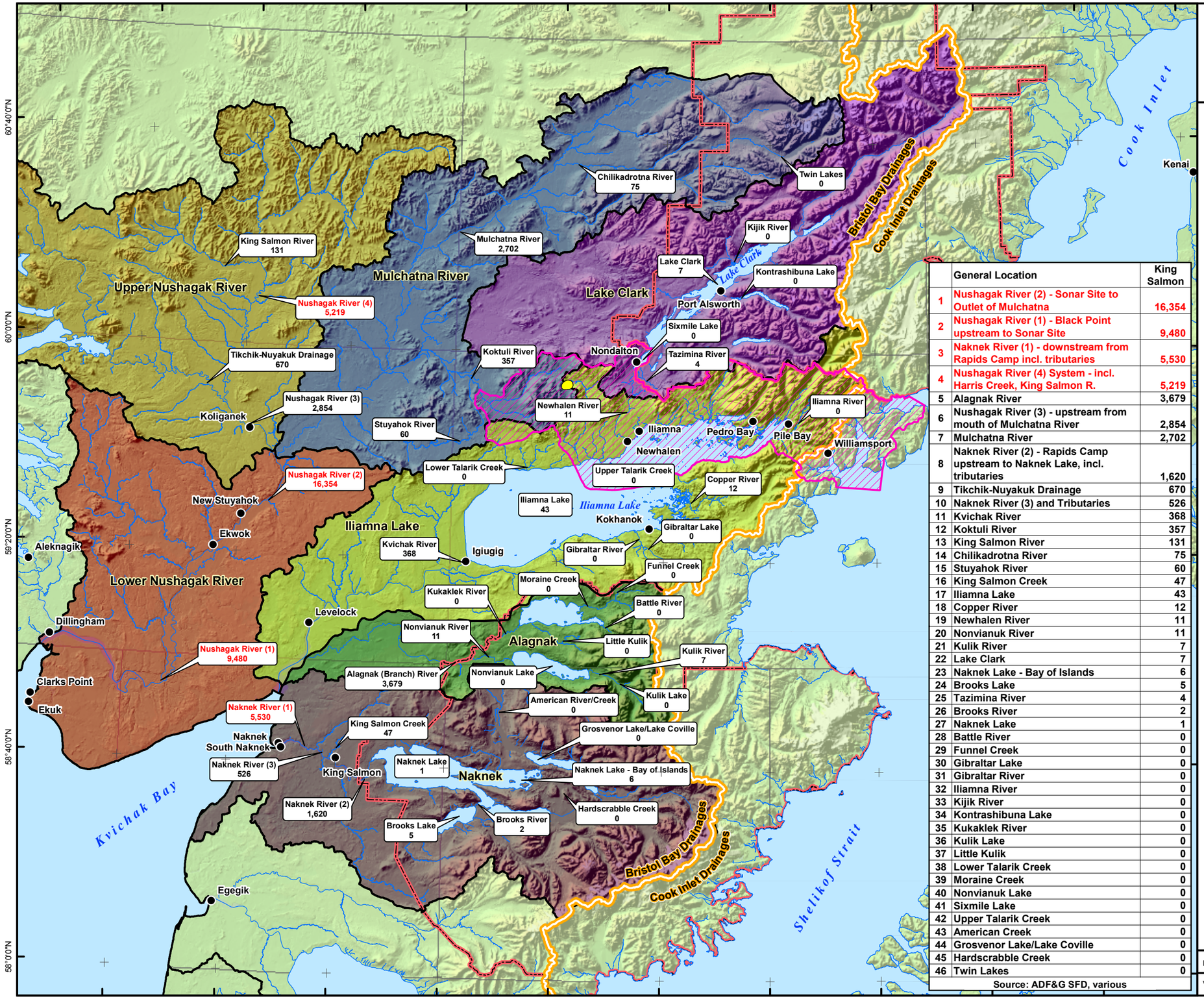
0 10 20 30 40 50 Miles

0 10 20 30 40 50 Kilometers

Scale 1:1,375,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_Rec_Grayling_Fig25-21_11X17_1of1_V06.mxd	Date: September 2, 2010
Version: 6	Author: RDI-LS



	General Location	King Salmon
1	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	16,354
2	Nushagak River (1) - Black Point upstream to Sonar Site	9,480
3	Naknek River (1) - downstream from Rapids Camp incl. tributaries	5,530
4	Nushagak River (4) System - incl. Harris Creek, King Salmon R.	5,219
5	Alagnak River	3,679
6	Nushagak River (3) - upstream from mouth of Mulchatna River	2,854
7	Mulchatna River	2,702
8	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	1,620
9	Tikchik-Nuyakuk Drainage	670
10	Naknek River (3) and Tributaries	526
11	Kvichak River	368
12	Koktuli River	357
13	King Salmon River	131
14	Chilikadrotna River	75
15	Stuyahok River	60
16	King Salmon Creek	47
17	Iliamna Lake	43
18	Copper River	12
19	Newhalen River	11
20	Nonvianuk River	11
21	Kulik River	7
22	Lake Clark	7
23	Naknek Lake - Bay of Islands	6
24	Brooks Lake	5
25	Tazimina River	4
26	Brooks River	2
27	Naknek Lake	1
28	Battle River	0
29	Funnel Creek	0
30	Gibraltar Lake	0
31	Gibraltar River	0
32	Iliamna River	0
33	Kijik River	0
34	Kontrashibuna Lake	0
35	Kukaklek River	0
36	Kulik Lake	0
37	Little Kulik	0
38	Lower Talarik Creek	0
39	Moraine Creek	0
40	Nonvianuk Lake	0
41	Sixmile Lake	0
42	Upper Talarik Creek	0
43	American Creek	0
44	Grosvenor Lake/Lake Coville	0
45	Hardscrabble Creek	0
46	Twin Lakes	0

Source: ADF&G SFD, various

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Figure 25-22
Sportfishing Study Area
Bristol Bay Drainages
Average Annual King Salmon Catch by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number — Stream/Lake Location Average Annual Catch (1999-2005)
- Text Number — These locations combined accounted for about 75 percent of total king salmon catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

0 10 20 30 40 50 Miles

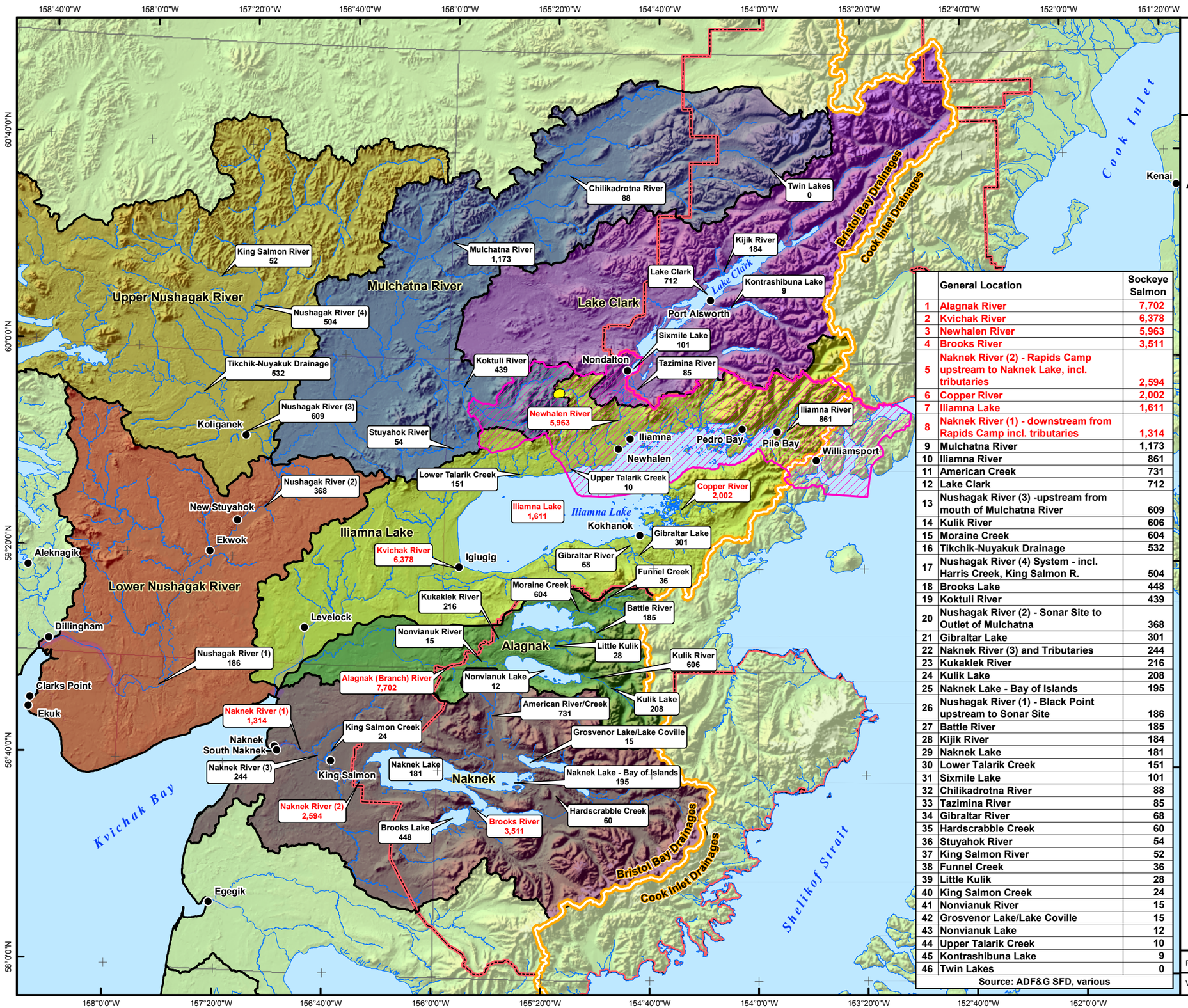
0 10 20 30 40 50 Kilometers

Scale 1:1,375,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

N

File: RDI_KW_Rec_King_Fig25-22_11X17_1of1_V06.mxd	Date: September 2, 2010
Version: 6	Author: RDI-LS



	General Location	Sockeye Salmon
1	Alagnak River	7,702
2	Kvichak River	6,378
3	Newhalen River	5,963
4	Brooks River	3,511
5	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	2,594
6	Copper River	2,002
7	Iliamna Lake	1,611
8	Naknek River (1) - downstream from Rapids Camp incl. tributaries	1,314
9	Mulchatna River	1,173
10	Iliamna River	861
11	American Creek	731
12	Lake Clark	712
13	Nushagak River (3) -upstream from mouth of Mulchatna River	609
14	Kulik River	606
15	Moraine Creek	604
16	Tikchik-Nuyakuk Drainage	532
17	Nushagak River (4) System - incl. Harris Creek, King Salmon R.	504
18	Brooks Lake	448
19	Koktuli River	439
20	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	368
21	Gibraltar Lake	301
22	Naknek River (3) and Tributaries	244
23	Kukaklek River	216
24	Kulik Lake	208
25	Naknek Lake - Bay of Islands	195
26	Nushagak River (1) - Black Point upstream to Sonar Site	186
27	Battle River	185
28	Kijik River	184
29	Naknek Lake	181
30	Lower Talarik Creek	151
31	Sixmile Lake	101
32	Chilikadrotna River	88
33	Tazimina River	85
34	Gibraltar River	68
35	Hardscrabble Creek	60
36	Stuyahok River	54
37	King Salmon River	52
38	Funnel Creek	36
39	Little Kulik	28
40	King Salmon Creek	24
41	Nonvianuk River	15
42	Grosvenor Lake/Lake Coville	15
43	Nonvianuk Lake	12
44	Upper Talarik Creek	10
45	Kontrashibuna Lake	9
46	Twin Lakes	0

Source: ADF&G SFD, various

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Figure 25-23
Sportfishing Study Area
Bristol Bay Drainages
Average Annual Sockeye Salmon Catch by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number — Stream/Lake Location Average Annual Catch (1999-2005)
- Text Number — These locations combined accounted for about 75 percent of total sockeye salmon catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

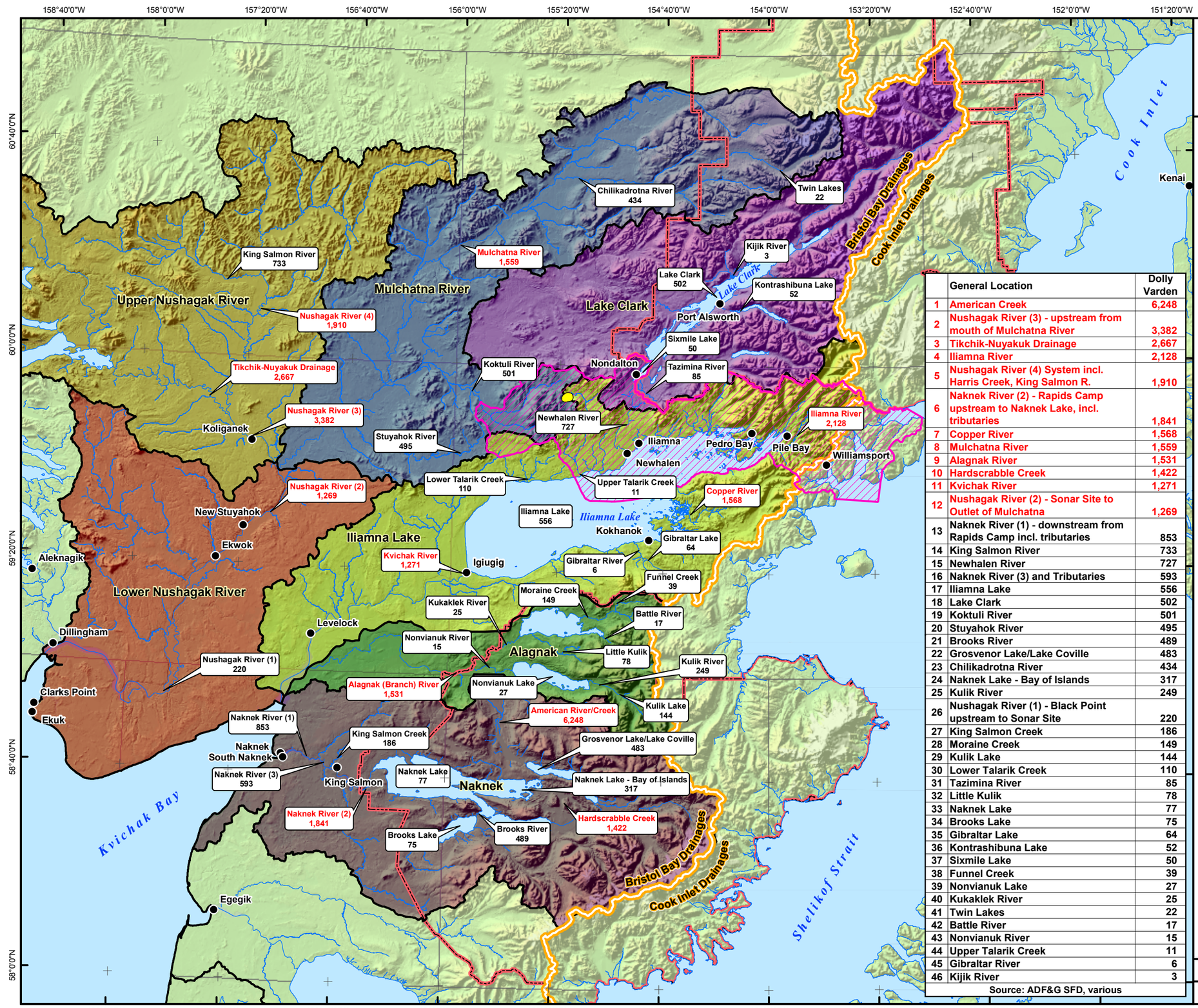
Bristol Bay USGS Drainages

- Alagnak
- Iliamna Lake
- Naknek
- Mulchatna River
- Lake Clark
- Lower Nushagak River
- Upper Nushagak River

Miles 0 10 20 30 40 50
Kilometers 0 10 20 30 40 50
Scale 1:1,375,000
Alaska State Plane Zone 5 (units feet)
1983 North American Datum

N

File: RDI_KW_Rec_Sockeye_Fig25-23_11X17_1of1_V06.mxd	Date: September 2, 2010
Version: 6	Author: RDI-LS



	General Location	Dolly Varden
1	American Creek	6,248
2	Nushagak River (3) - upstream from mouth of Mulchatna River	3,382
3	Tikchik-Nuyakuk Drainage	2,667
4	Iliamna River	2,128
5	Nushagak River (4) System incl. Harris Creek, King Salmon R.	1,910
6	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	1,841
7	Copper River	1,568
8	Mulchatna River	1,559
9	Alagnak River	1,531
10	Hardscrabble Creek	1,422
11	Kvichak River	1,271
12	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	1,269
13	Naknek River (1) - downstream from Rapids Camp incl. tributaries	853
14	King Salmon River	733
15	Newhalen River	727
16	Naknek River (3) and Tributaries	593
17	Iliamna Lake	556
18	Lake Clark	502
19	Koktuli River	501
20	Stuyahok River	495
21	Brooks River	489
22	Grosvenor Lake/Lake Coville	483
23	Chilikadrotna River	434
24	Naknek Lake - Bay of Islands	317
25	Kulik River	249
26	Nushagak River (1) - Black Point upstream to Sonar Site	220
27	King Salmon Creek	186
28	Moraine Creek	149
29	Kulik Lake	144
30	Lower Talarik Creek	110
31	Tazimina River	85
32	Little Kulik	78
33	Naknek Lake	77
34	Brooks Lake	75
35	Gibraltar Lake	64
36	Kontrashibuna Lake	52
37	Sixmile Lake	50
38	Funnel Creek	39
39	Nonvianuk Lake	27
40	Kukaklek River	25
41	Twin Lakes	22
42	Battle River	17
43	Nonvianuk River	15
44	Upper Talarik Creek	11
45	Gibraltar River	6
46	Kijik River	3

Source: ADF&G SFD, various

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Figure 25-24
Sportfishing Study Area
Bristol Bay Drainages
Average Annual Dolly Varden Catch by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number — Stream/Lake Location Average Annual Catch (1999-2005)
- Text Number — These locations combined accounted for about 75 percent of total Dolly Varden catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

0 10 20 30 40 50 Miles

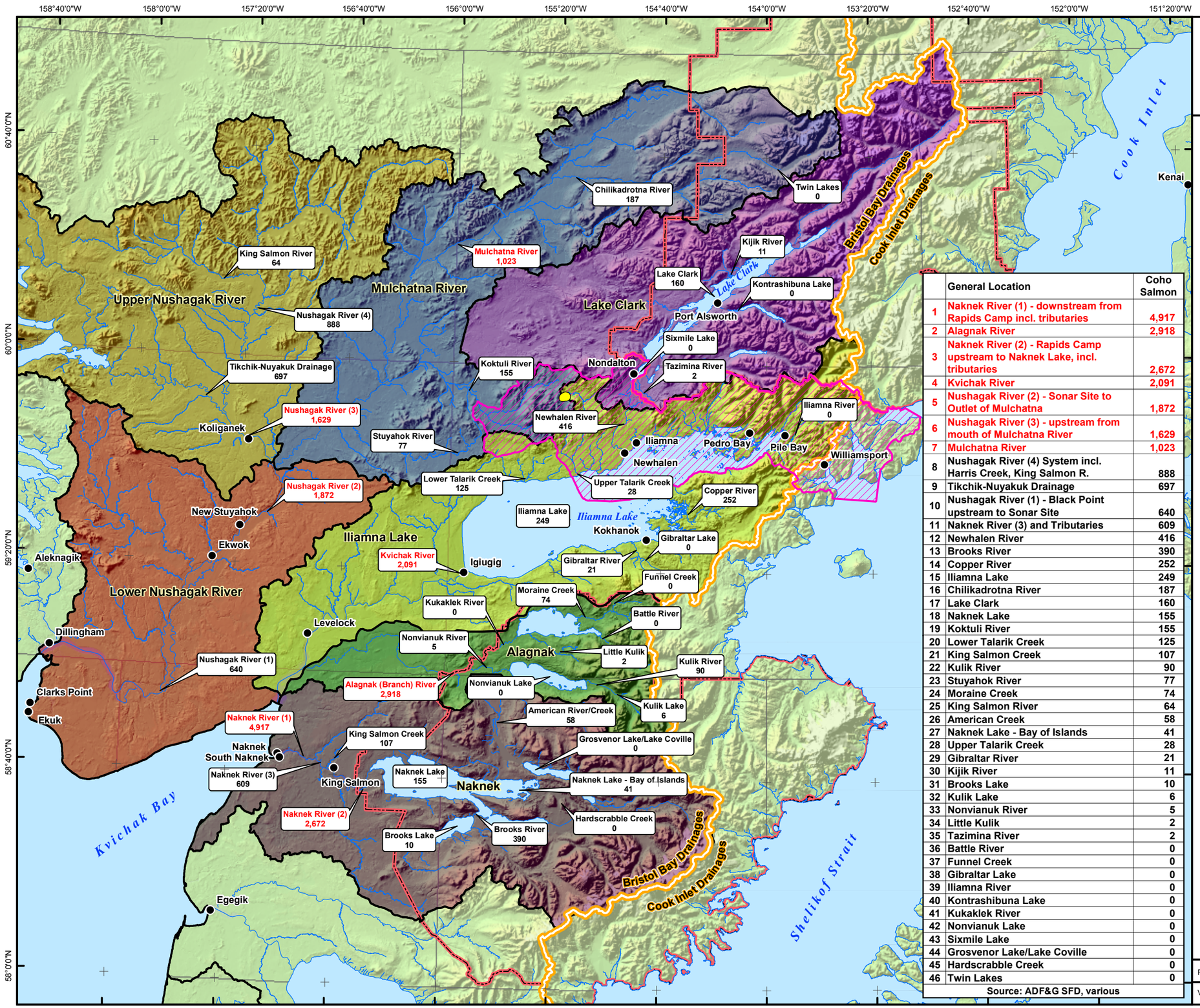
0 10 20 30 40 50 Kilometers

N

Scale 1:1,375,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_Rec_Dolly_Fig25-24_11X17_1of1_V06.mxd	Date: September 2, 2010
Version: 6	Author: RDI-LS



	General Location	Coho Salmon
1	Naknek River (1) - downstream from Rapids Camp incl. tributaries	4,917
2	Alagnak River	2,918
3	Naknek River (2) - Rapids Camp upstream to Naknek Lake, incl. tributaries	2,672
4	Kvichak River	2,091
5	Nushagak River (2) - Sonar Site to Outlet of Mulchatna	1,872
6	Nushagak River (3) - upstream from mouth of Mulchatna River	1,629
7	Mulchatna River	1,023
8	Nushagak River (4) System incl. Harris Creek, King Salmon R.	888
9	Tikchik-Nuyakuk Drainage	697
10	Nushagak River (1) - Black Point upstream to Sonar Site	640
11	Naknek River (3) and Tributaries	609
12	Newhalen River	416
13	Brooks River	390
14	Copper River	252
15	Iliamna Lake	249
16	Chilikadrotna River	187
17	Lake Clark	160
18	Naknek Lake	155
19	Koktuli River	155
20	Lower Talarik Creek	125
21	King Salmon Creek	107
22	Kulik River	90
23	Stuyahok River	77
24	Moraine Creek	74
25	King Salmon River	64
26	American Creek	58
27	Naknek Lake - Bay of Islands	41
28	Upper Talarik Creek	28
29	Gibraltar River	21
30	Kijik River	11
31	Brooks Lake	10
32	Kulik Lake	6
33	Nonvianuk River	5
34	Little Kulik	2
35	Tazimina River	2
36	Battle River	0
37	Funnel Creek	0
38	Gibraltar Lake	0
39	Iliamna River	0
40	Kontrashibuna Lake	0
41	Kukaklek River	0
42	Nonvianuk Lake	0
43	Sixmile Lake	0
44	Grosvenor Lake/Lake Coville	0
45	Hardscrabble Creek	0
46	Twin Lakes	0

Source: ADF&G SFD, various

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Figure 25-25
Sportfishing Study Area
Bristol Bay Drainages
Average Annual Coho Salmon Catch by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Text Number — Stream/Lake Location Average Annual Catch (1999-2005)
- Text Number — These locations combined accounted for about 75 percent of total coho salmon catch.
- Anadromous Fish Streams
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

Miles 0 10 20 30 40 50
Kilometers 0 10 20 30 40 50
N

Scale 1:1,375,000
Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_Rec_Coho_Fig25-25_11X17_1of1_V06.mxd	Date: September 2, 2010
Version: 6	Author: RDI-LS

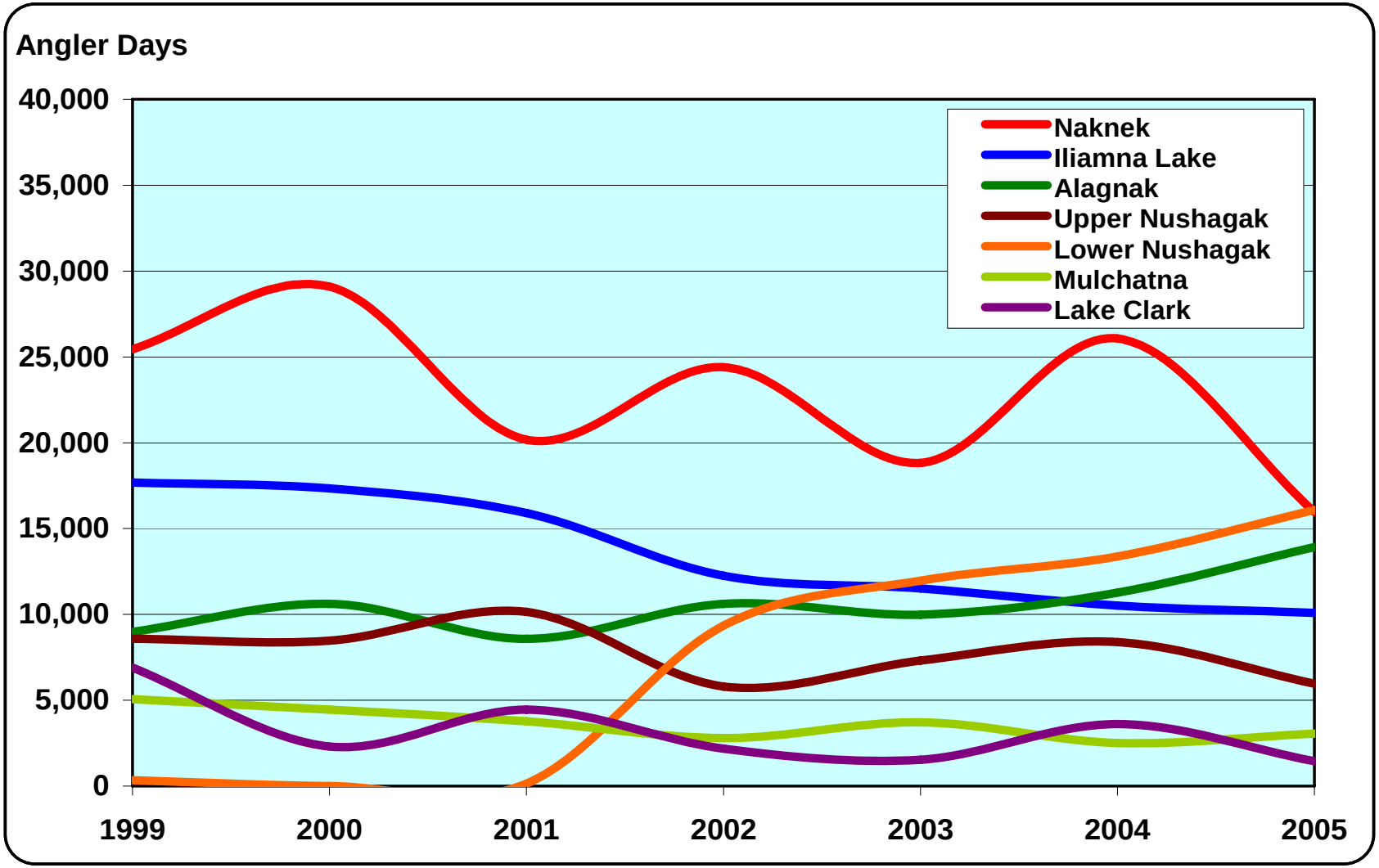

Figure 25-26, Annual Angler Days by Drainage, Sportfishing Study Area, Bristol Bay Drainages, 1999-2005 (based on data from ADF&G SFD, various).

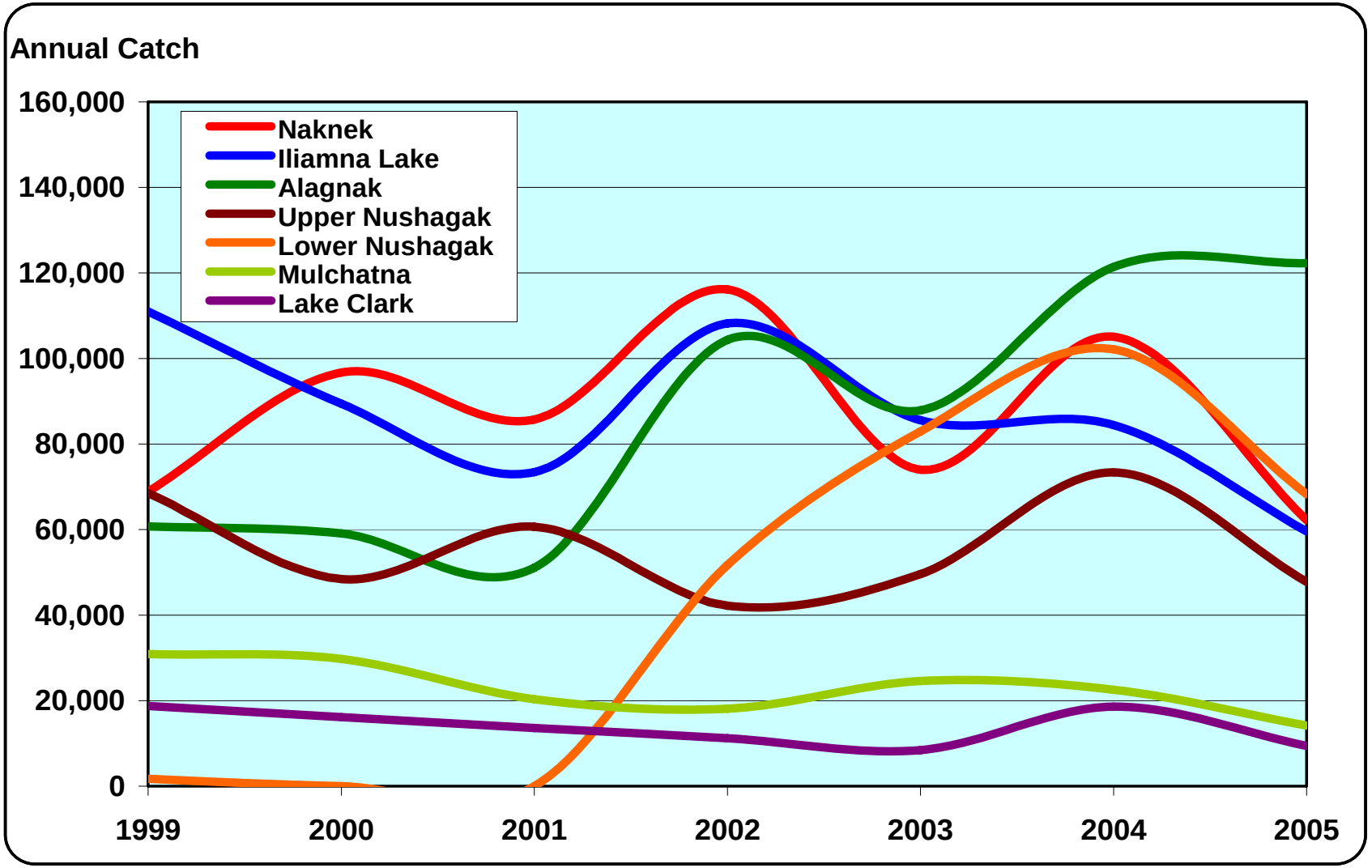

Figure 25-27, Annual Freshwater Catch by Drainage, Sportfishing Study Area, Bristol Bay Drainages, 1999-2005 (based on data from ADF&G SFD, various).

General Location	Rainbow Trout	Grayling	Dolly Varden
Iliamna Lake	1,446	404	556
Iliamna River	1,508	216	2,128
Koktuli River	400	600	501
Newhalen River	2,936	4,187	727
Sixmile Lake	316	598	50
Upper Talarik Creek	518	51	11
Source: ADF&G SFD, various			

156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W 152°40'0"W

60°40'0"N

60°0'0"N

59°20'0"N

Lake Clark

Port Alsworth

Mulchatna River

Sixmile Lake

316 / 50 / 598

Nondalton

400 / 501 / 600

Koktuli River

1,508 / 2,128 / 216

Iliamna River

Pedro Bay

Pile Bay

Iliamna

Newhalen

2,936 / 727 / 4,187

Newhalen River

Williamsport

518 / 11 / 51

Upper Talarik Creek

Lower Nushagak River

1,446 / 556 / 404

Iliamna Lake

Kokhanok

Iliamna Lake

Igiugig

Augustine Island

Kamishak Bay

Alagnak

Naknek

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Figure 25-28
Recreation Central Study Area
Bristol Bay Drainages
Average Annual Catch
Rainbow Trout, Grayling, and Dolly Varden
by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Central Study Area
- Text — Stream/Lake Location
- Rainbow Trout / Dolly Varden / Grayling — Average Annual Catch, (1999-2005)
- Anadromous Fish Streams
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

0 10 20 30 Miles

0 10 20 30 40 Kilometers

N

Scale 1:800,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_Rec_Fish_Fig-25-28_11x17L_1of1_V08.mxd	Date: September 2, 2010
Version: 8	Author: RDI-LS

General Location	Sockeye Salmon	King Salmon	Coho Salmon
Iliamna Lake	1,611	43	249
Iliamna River	861	0	0
Koktuli River	439	357	155
Newhalen River	5,963	11	416
Sixmile Lake	101	0	0
Upper Talarik Creek	10	0	28

Source: ADF&G SFD, various

156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W 152°40'0"W

60°40'0"N

60°0'0"N

59°20'0"N

Lake Clark

Port Alsworth

Mulchatna River

Sixmile Lake

101 / 0 / 0

Nondalton

439 / 357 / 155

Koktuli River

861 / 0 / 0

Iliamna River

Pedro Bay

Pile Bay

Iliamna

Newhalen

Newhalen River

5,963 / 11 / 416

Williamsport

10 / 0 / 28

Upper Talarik Creek

Lower Nushagak River

1,611 / 43 / 249

Iliamna Lake

Kokhanok

Iliamna Lake

Igiugig

Augustine Island

Kamishak Bay

Alagnak

Naknek

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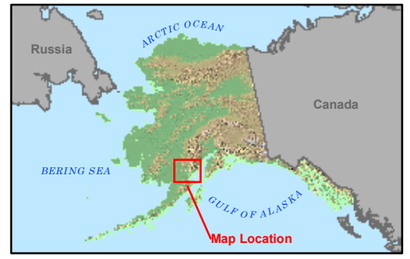
Figure 25-29
Recreation Central Study Area
Bristol Bay Drainages
Average Annual Catch
Sockeye, King, and Coho Salmon
by General Location, 1999-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Central Study Area
- Text — Stream/Lake Location
- Sockeye / King / Coho — Average Annual Catch, (1999-2005)
- Anadromous Fish Streams
- National Park and Preserve Boundary
- General Deposit Location
- Outside Sportfishing Study Area
- Communities

Bristol Bay USGS Drainages

- Alagnak
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River



0 10 20 30 Miles
0 10 20 30 40 Kilometers

N

Scale 1:800,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

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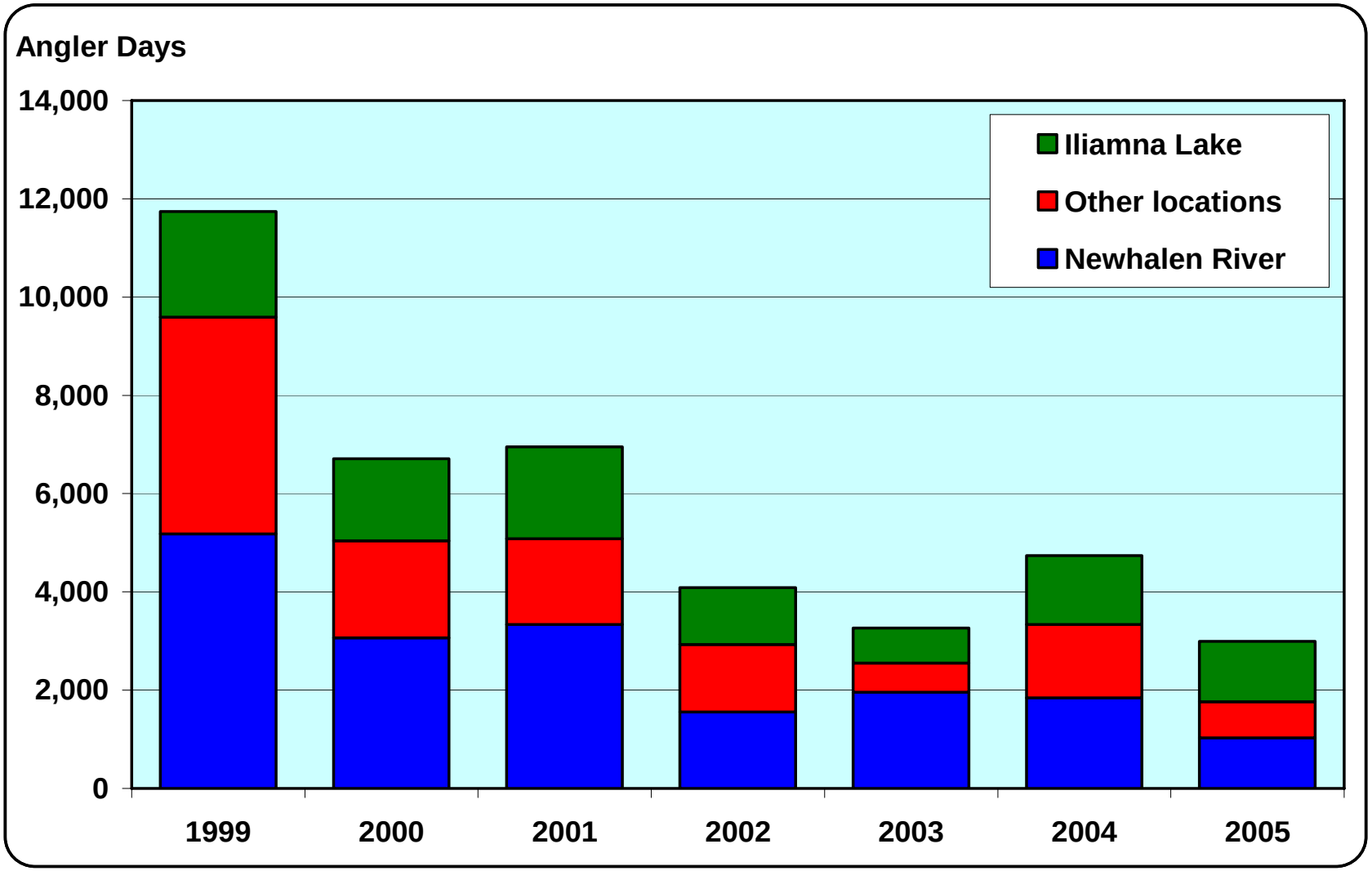


Figure 25-30, Annual Angler Days, Central Study Area Locations, 1999-2005 (ADF&G, 2007a, 2006a, 2004).

Note: “Other locations” includes Iliamna River, Koktuli River, Sixmile Lake, Upper Talarik Creek, Alexcy Creek, Alexcy Lake, Bear Creek, Schoolhouse Lake, Chekok Creek, Knutson Creek, Chinkelyes Creek, and Long Lake.

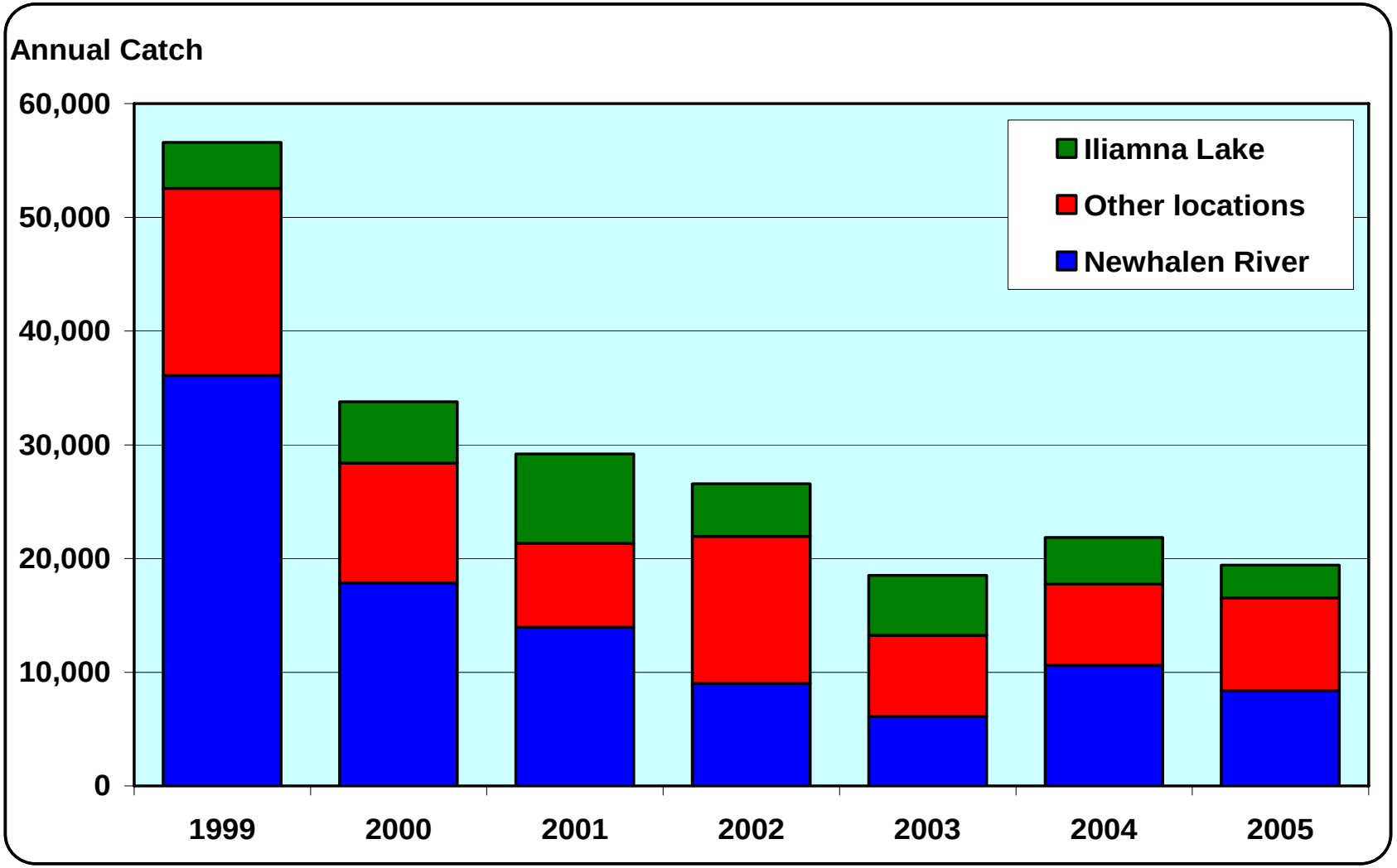


Figure 25-31, Annual Freshwater Catch, Central Study Area Locations, 1999-2005 (ADF&G, 2007a, 2006a, 2004).

Note: “Other locations” includes Iliamna River, Koktuli River, Sixmile Lake, Upper Talarik Creek, Alexcy Creek, Alexcy Lake, Bear Creek, Schoolhouse Lake, Chekok Creek, Knutson Creek, Chinkelyes Creek, and Long Lake.

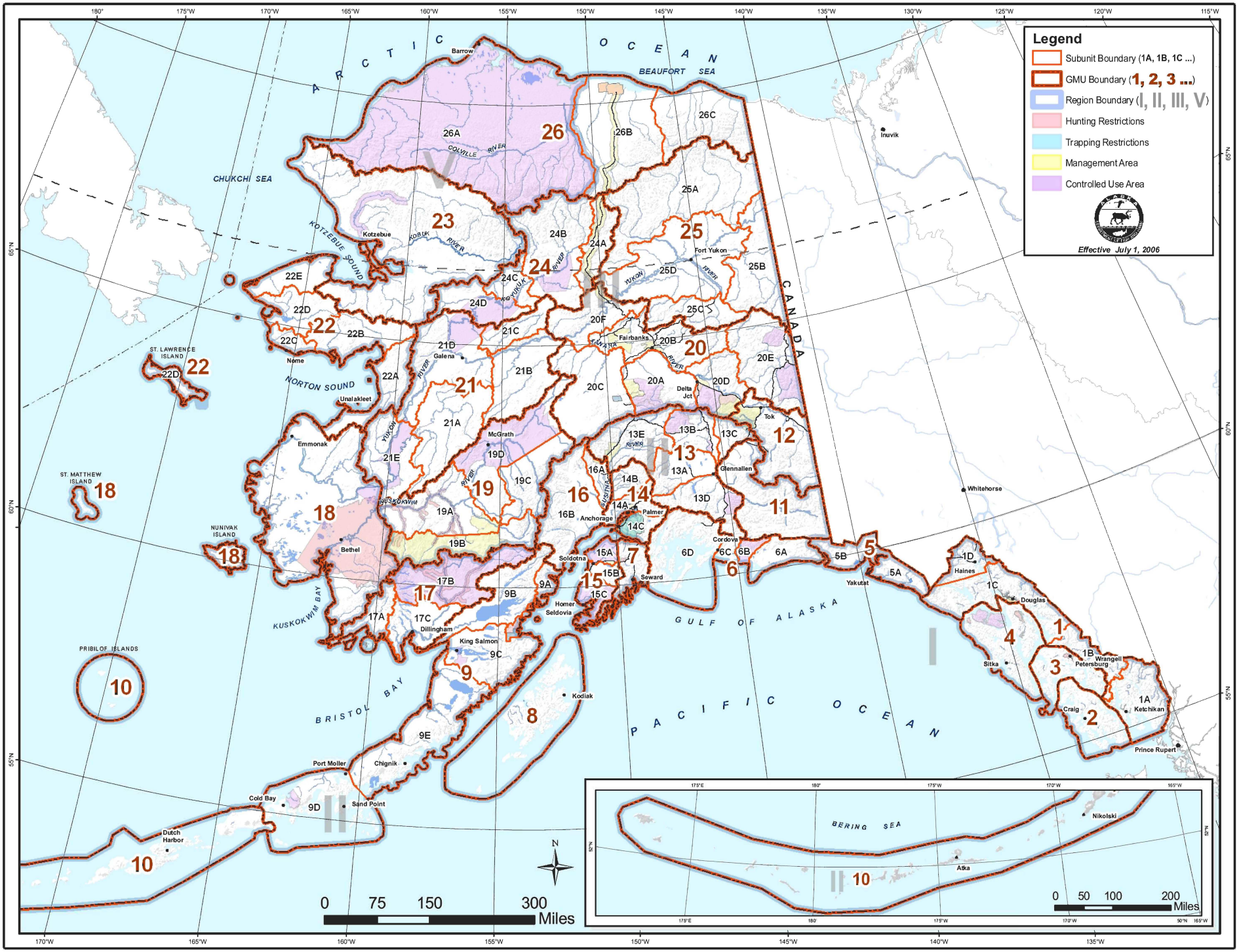


Figure 25-32, Statewide Map of Game Management Units (ADF&G, DWC, n. d. [c]).

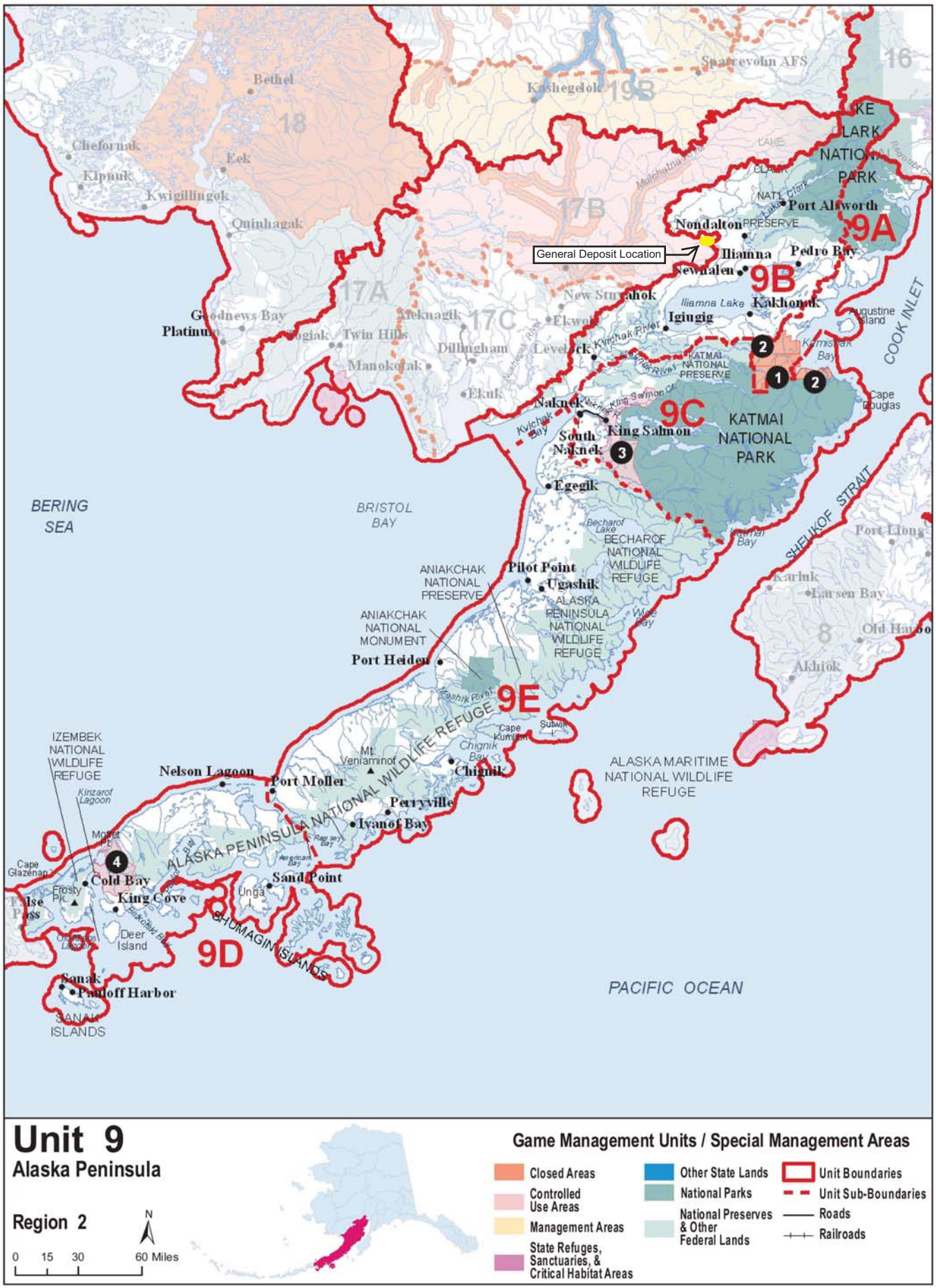


Figure 25-33, Game Management Unit 9 (ADF&G, DWC, n.d.[c]).
Note: Figure altered to show "General Deposit Location".

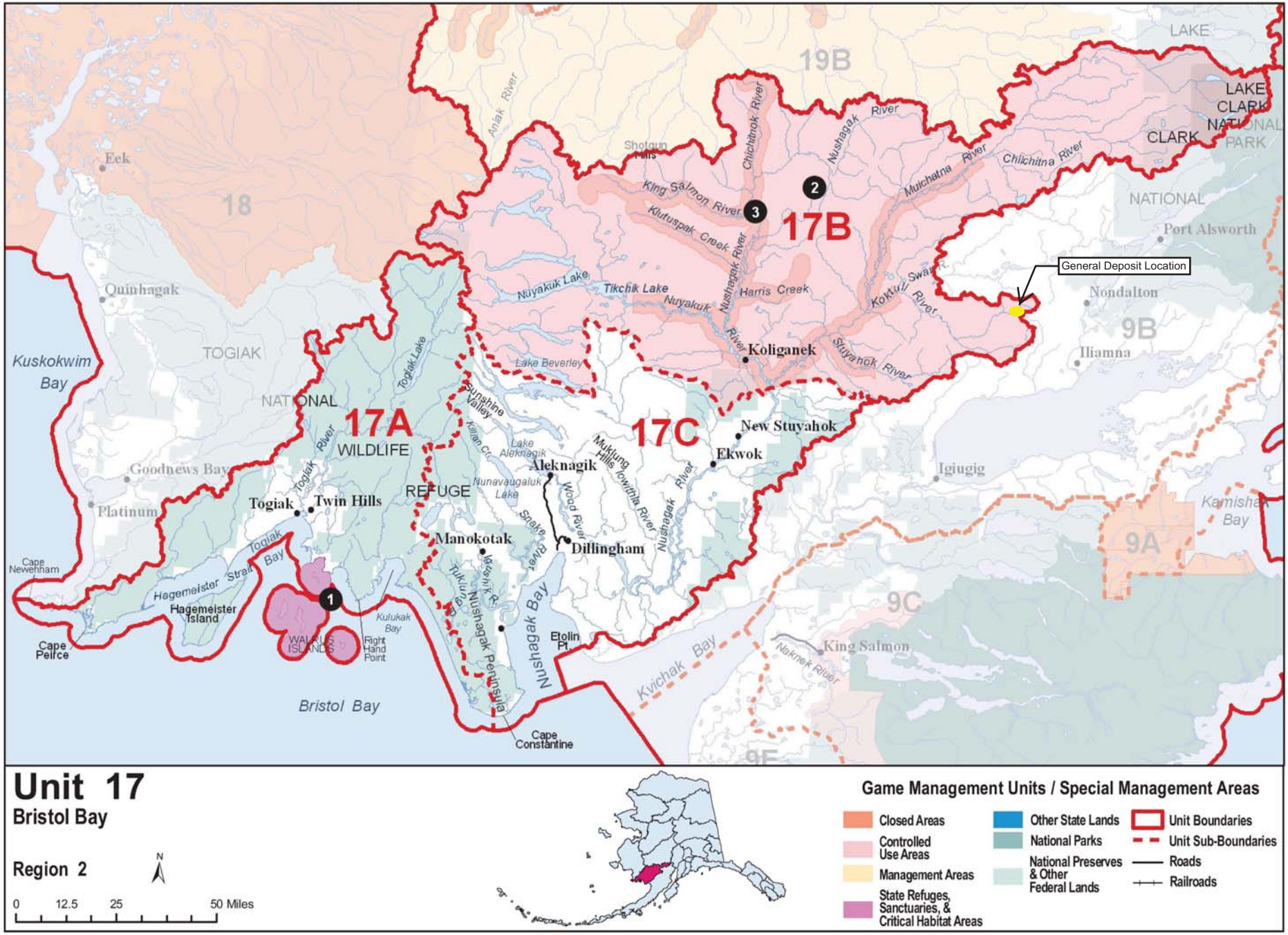
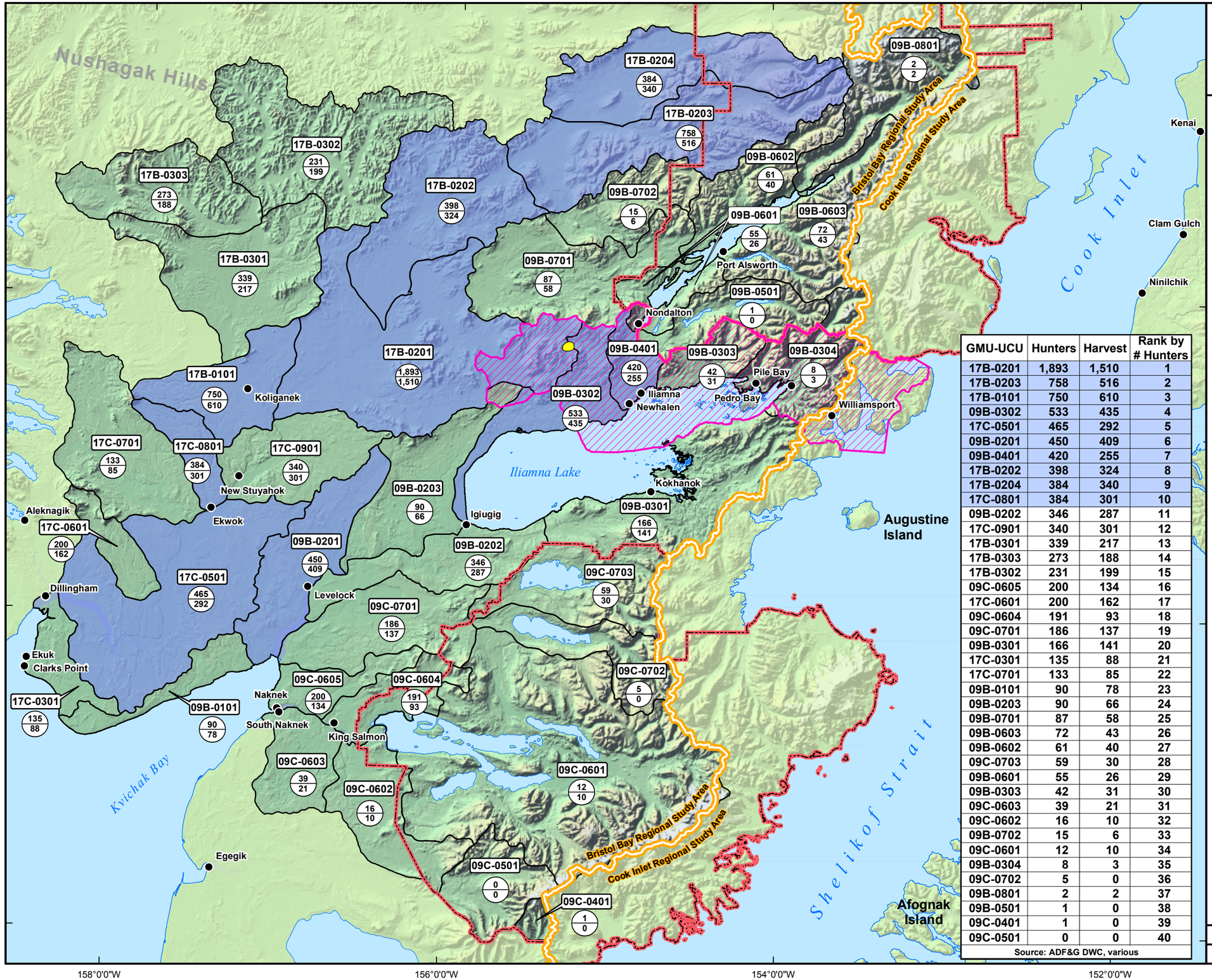


Figure 25-34, Game Management Unit 17 (ADF&G, DWC, n.d.[c]).
Note: Figure altered to show "General Deposit Location".

158°0'0"W 156°0'0"W 154°0'0"W 152°0'0"W

60°0'0"N 59°0'0"N 58°0'0"N



GMU-UCU	Hunters	Harvest	Rank by # Hunters
17B-0201	1,893	1,510	1
17B-0203	758	516	2
17B-0101	750	610	3
09B-0302	533	435	4
17C-0501	465	292	5
09B-0201	450	409	6
09B-0401	420	255	7
17B-0202	398	324	8
17B-0204	384	340	9
17C-0801	384	301	10
09B-0202	346	287	11
17C-0901	340	301	12
17B-0301	339	217	13
17B-0303	273	188	14
17B-0302	231	199	15
09C-0605	200	134	16
17C-0601	200	162	17
09C-0604	191	93	18
09C-0701	186	137	19
09B-0301	166	141	20
17C-0301	135	88	21
17C-0701	133	85	22
09B-0101	90	78	23
09B-0203	90	66	24
09B-0701	87	58	25
09B-0603	72	43	26
09B-0602	61	40	27
09C-0703	59	30	28
09B-0601	55	26	29
09B-0303	42	31	30
09C-0603	39	21	31
09C-0602	16	10	32
09B-0702	15	6	33
09C-0601	12	10	34
09B-0304	8	3	35
09C-0702	5	0	36
09B-0801	2	2	37
09B-0501	1	0	38
09C-0401	1	0	39
09C-0501	0	0	40

Source: ADF&G DWC, various

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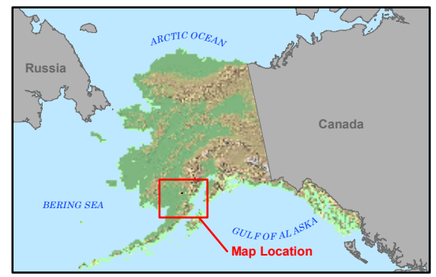
Figure 25-35
Hunting Study Area
Bristol Bay Drainages
Total Caribou Hunters and Harvest
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 UCU Designation
- 10 / 1 Number of Caribou hunters / Number of Caribou harvested
- These 10 UCUs combined accounted for 66% of the total hunters and harvest.
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Hunting Study Area
- Communities



0 10 20 30 40 50 Miles

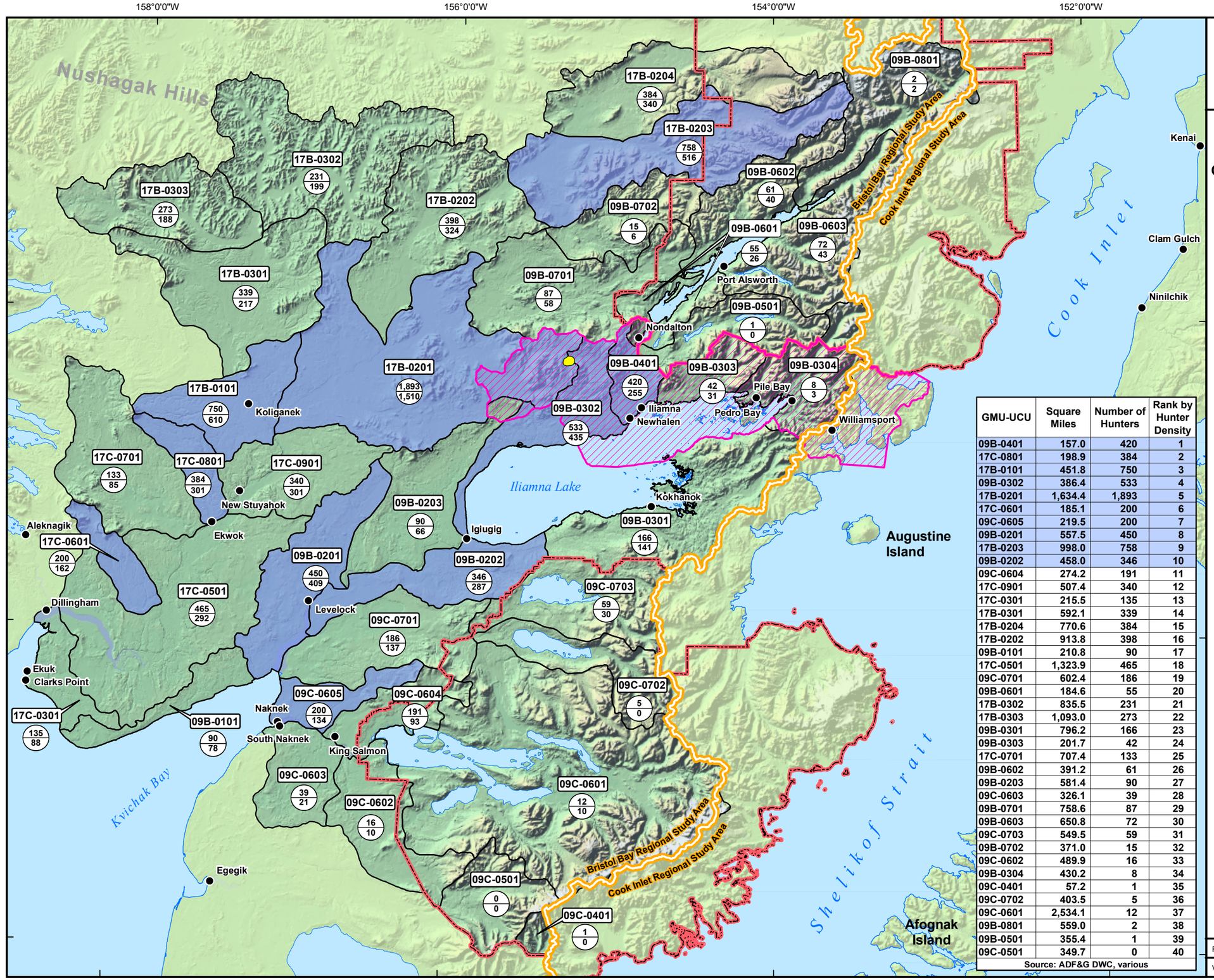
0 15 30 45 60 Kilometers

N

Scale 1:1,330,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB__Caribou_Fig25-35_11X17L_1of1_D13.mxd	Date: September 2, 2010
Version: 13	Author: RDI-LS



GMU-UCU	Square Miles	Number of Hunters	Rank by Hunter Density
09B-0401	157.0	420	1
17C-0801	198.9	384	2
17B-0101	451.8	750	3
09B-0302	386.4	533	4
17B-0201	1,634.4	1,893	5
17C-0601	185.1	200	6
09C-0605	219.5	200	7
09B-0201	557.5	450	8
17B-0203	998.0	758	9
09B-0202	458.0	346	10
09C-0604	274.2	191	11
17C-0901	507.4	340	12
17C-0301	215.5	135	13
17B-0301	592.1	339	14
17B-0204	770.6	384	15
17B-0202	913.8	398	16
09B-0101	210.8	90	17
17C-0501	1,323.9	465	18
09C-0701	602.4	186	19
09B-0601	184.6	55	20
17B-0302	835.5	231	21
17B-0303	1,093.0	273	22
09B-0301	796.2	166	23
09B-0303	201.7	42	24
17C-0701	707.4	133	25
09B-0602	391.2	61	26
09B-0203	581.4	90	27
09C-0603	326.1	39	28
09B-0701	758.6	87	29
09B-0603	650.8	72	30
09C-0703	549.5	59	31
09B-0702	371.0	15	32
09C-0602	489.9	16	33
09B-0304	430.2	8	34
09C-0401	57.2	1	35
09C-0702	403.5	5	36
09C-0601	2,534.1	12	37
09B-0801	559.0	2	38
09B-0501	355.4	1	39
09C-0501	349.7	0	40

Source: ADF&G DWC, various

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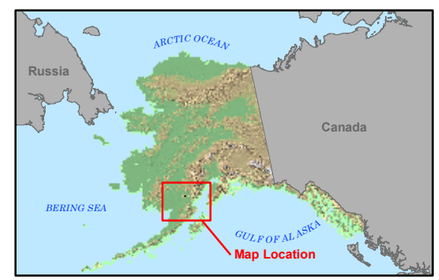
Figure 25-36
Hunting Study Area
Bristol Bay Drainages
Caribou Hunter Density by Uniform Coding Unit
2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 UCU Designation
- 10 / 1 Number of Moose hunters / Number of Moose harvested
- These10 UCUs combined accounted for 23% of the study area and 60% of total hunting effort.
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Hunting Study Area
- Communities



0 10 20 30 40 50 Miles

0 15 30 45 60 Kilometers

N

Scale 1:1,330,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB__Caribou_Fig25-36_11X17L_1of1_D09.mxd	Date: September 2, 2010
Version: 9	Author: RDI-LS

GMU-UCU	Hunters	Harvest
17B-0201	1,893	1,510
09B-0302	533	435
09B-0401	420	255
09B-0203	90	66
09B-0601	55	26
09B-0303	42	31
09B-0304	8	3

Source: ADF&G DWC, various

157°20'0"W 156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W

59°40'0"N

59°20'0"N

Bristol Bay Regional Study Area

Cook Inlet Regional Study Area

Port Alsworth

09B-0601 55/26

Nondalton

09B-0303 42/31

09B-0401 420/255

09B-0304 8/3

Pedro Bay

Pile Bay

Iliamna

Newhalen

09B-0302 533/435

Williamsport

17B-0201 1,893/1,510

Iliamna Lake

09B-0203 90/66

Kokhanok

Augustine Island

Igiugig

Levelock

Kamishak Bay

Bristol Bay Regional Study Area

Cook Inlet Regional Study Area

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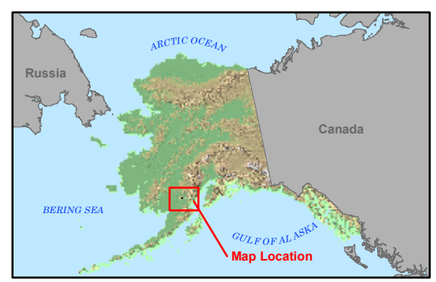
Figure 25-37
Recreation Central Study Area
Bristol Bay Drainages
Total Caribou Hunters and Harvest
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 GMU-UCU Designation
- 10/1 Number of Moose hunters / Number of Moose harvested
- UCUs Wholly or Partly in Central Study Area
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Anadromous Fish Streams
- Outside Hunting Study Area
- Communities



0 10 20 30 Miles

0 10 20 30 40 Kilometers

N

Scale 1:800,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB_Caribou_Fig25-37_11X17L_1of1_D07.mxd	Date: September 2, 2010
Version: 7	Author: RDI-LS

158°0'0"W 156°0'0"W 154°0'0"W 152°0'0"W

60°0'0"N 59°0'0"N 58°0'0"N

Nushagak Hills

17B-0204 47/12
17B-0203 206/50
17B-0302 174/77
17B-0303 191/63
17B-0202 48/25
09B-0801 1/1
09B-0602 83/18
09B-0702 38/12
09B-0601 18/0
09B-0603 25/5
17B-0301 82/58
09B-0701 39/10
09B-0501 16/5
17B-0201 397/92
09B-0401 36/4
09B-0303 15/7
09B-0304 66/17
17B-0101 180/79
09B-0302 32/8
17C-0701 278/138
17C-0801 214/90
17C-0901 111/54
09B-0203 45/17
09B-0301 135/53
17C-0601 121/80
09B-0201 73/29
09B-0202 23/11
17C-0501 1,136/491
09C-0703 28/10
09C-0701 70/28
09C-0702 40/9
09C-0605 25/4
09C-0604 246/70
17C-0301 74/27
09B-0101 21/5
09C-0603 34/4
09C-0602 156/48
09C-0601 7/1
09C-0501 0/0
09C-0401 0/0

Kenai
Clam Gulch
Ninilchik
Cook Inlet
Port Alsworth
Nondalton
Pile Bay
Williamsport
Iliamna
Newhalen
Pedro Bay
Iliamna Lake
Kokhanok
Koliganek
New Stuyahok
Ekwok
Aleknagik
Dillingham
Levelock
Igiugig
Augustine Island
Afognak Island
Shelikof Strait
Ekuk
Clarks Point
Naknek
South Naknek
King Salmon
Kvichak Bay
Egegik

Bristol Bay Regional Study Area
Cook Inlet Regional Study Area

GMU-UCU	Hunters	Harvest	Rank by # Hunters
17C-0501	1,136	491	1
17B-0201	397	92	2
17C-0701	278	138	3
09C-0604	246	70	4
17C-0801	214	90	5
17B-0203	206	50	6
17B-0303	191	63	7
17B-0101	180	79	8
17B-0302	174	77	9
09C-0602	156	48	10
09B-0301	135	53	11
17C-0601	121	80	12
17C-0901	111	54	13
09B-0602	83	18	14
17B-0301	82	58	15
17C-0301	74	27	16
09B-0201	73	29	17
09C-0701	70	28	18
09B-0304	66	17	19
17B-0202	48	25	20
17B-0204	47	12	21
09B-0203	45	17	22
09C-0702	40	9	23
09B-0701	39	10	24
09B-0702	38	12	25
09B-0401	36	4	26
09C-0603	34	4	27
09B-0302	32	8	28
09C-0703	28	10	29
09B-0603	25	5	30
09C-0605	25	4	31
09B-0202	23	11	32
09B-0101	21	5	33
09B-0601	18	0	34
09B-0501	16	5	35
09B-0303	15	7	36
09C-0601	7	1	37
09B-0801	1	1	38
09C-0401	0	0	39
09C-0501	0	0	40

Source: ADF&G DWC, various

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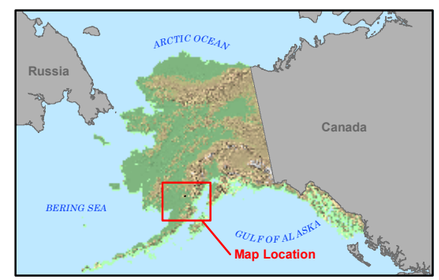
Figure 25-38
Hunting Study Area
Bristol Bay Drainages
Total Moose Hunters and Harvest
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 UCU Designation
- 10/1 Number of Moose hunters / Number of Moose harvested
- These 10 UCUs combinded accounted for 70% of the total hunters and harvest.
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Hunting Study Area
- Communities



0 10 20 30 40 50 Miles

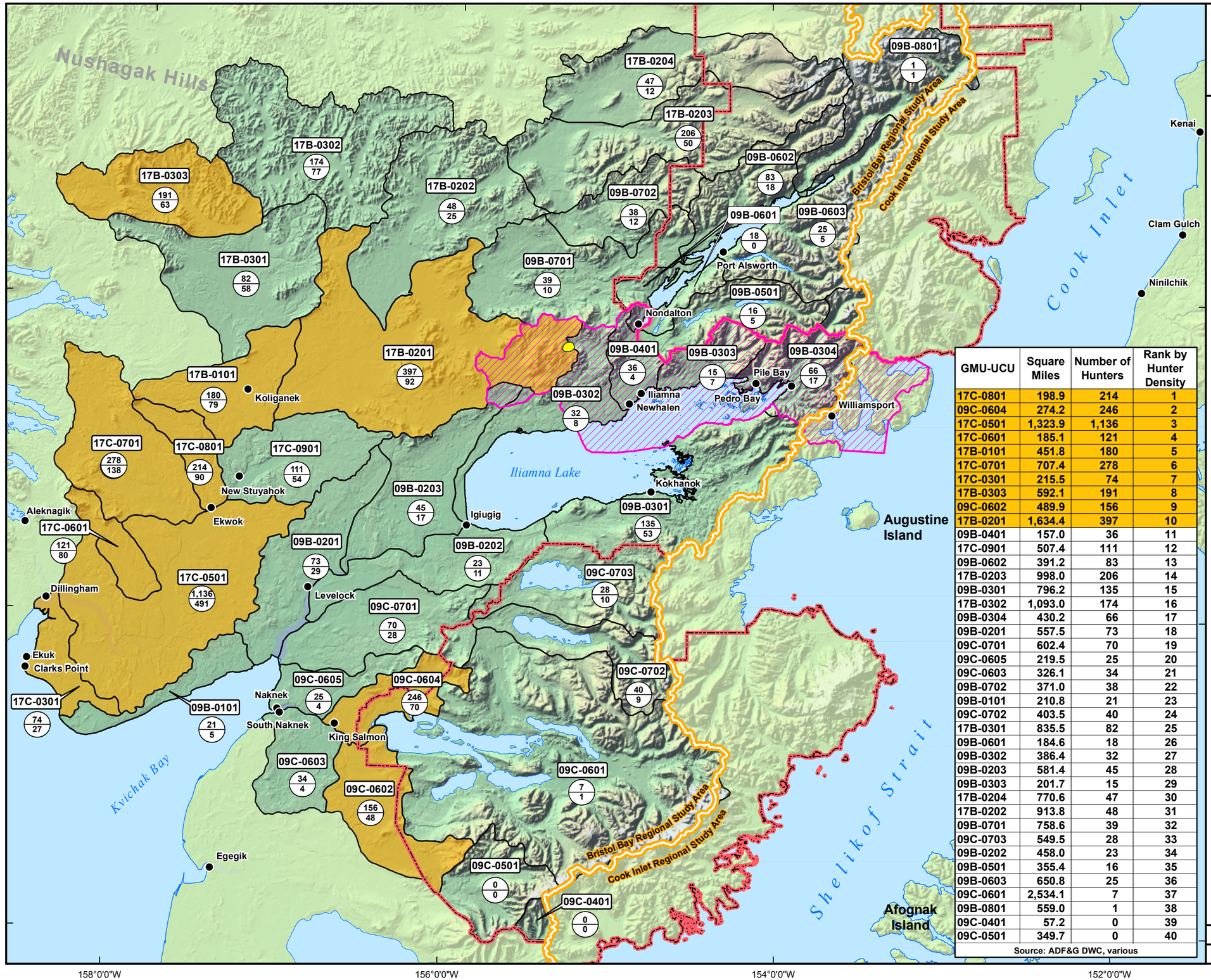
0 15 30 45 60 Kilometers

N

Scale 1:1,330,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB__Moose_Fig25-38_11X17L_1of1_D11.mxd	Date: September 2, 2010
Version: 11	Author: RDI-LS



GMU-UCU	Square Miles	Number of Hunters	Rank by Hunter Density
17C-0801	198.9	214	1
09C-0604	274.2	246	2
17C-0501	1,323.9	1,136	3
17C-0601	185.1	121	4
17B-0101	451.8	180	5
17C-0701	707.4	278	6
17C-0301	215.5	74	7
17B-0303	592.1	191	8
09C-0602	489.9	156	9
17B-0201	1,634.4	397	10
09B-0401	157.0	36	11
17C-0901	507.4	111	12
09B-0602	391.2	83	13
17B-0203	998.0	206	14
09B-0301	796.2	135	15
17B-0302	1,093.0	174	16
09B-0304	430.2	66	17
09B-0201	557.5	73	18
09C-0701	602.4	70	19
09C-0605	219.5	25	20
09C-0603	326.1	34	21
09B-0702	371.0	38	22
09B-0101	210.8	21	23
09C-0702	403.5	40	24
17B-0301	835.5	82	25
09B-0601	184.6	18	26
09B-0302	386.4	32	27
09B-0203	581.4	45	28
09B-0303	201.7	15	29
17B-0204	770.6	47	30
17B-0202	913.8	48	31
09B-0701	758.6	39	32
09C-0703	549.5	28	33
09B-0202	458.0	23	34
09B-0501	355.4	16	35
09B-0603	650.8	25	36
09C-0601	2,534.1	7	37
09B-0801	559.0	1	38
09C-0401	57.2	0	39
09C-0501	349.7	0	40

Source: ADF&G DWC, various

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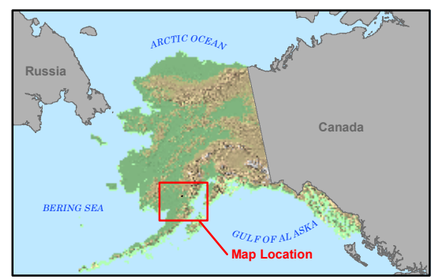
Figure 25-39
Hunting Study Area
Bristol Bay Drainages
Moose Hunter Density
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 UCU Designation
- 10 / 1 Number of Moose hunters / Number of Moose harvested
- These 10 UCUs combined accounted for 26% of the study area and 66% of total hunting effort.
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Hunting Study Area
- Communities



0 10 20 30 40 50 Miles

0 15 30 45 60 Kilometers

N

Scale 1:1,330,000

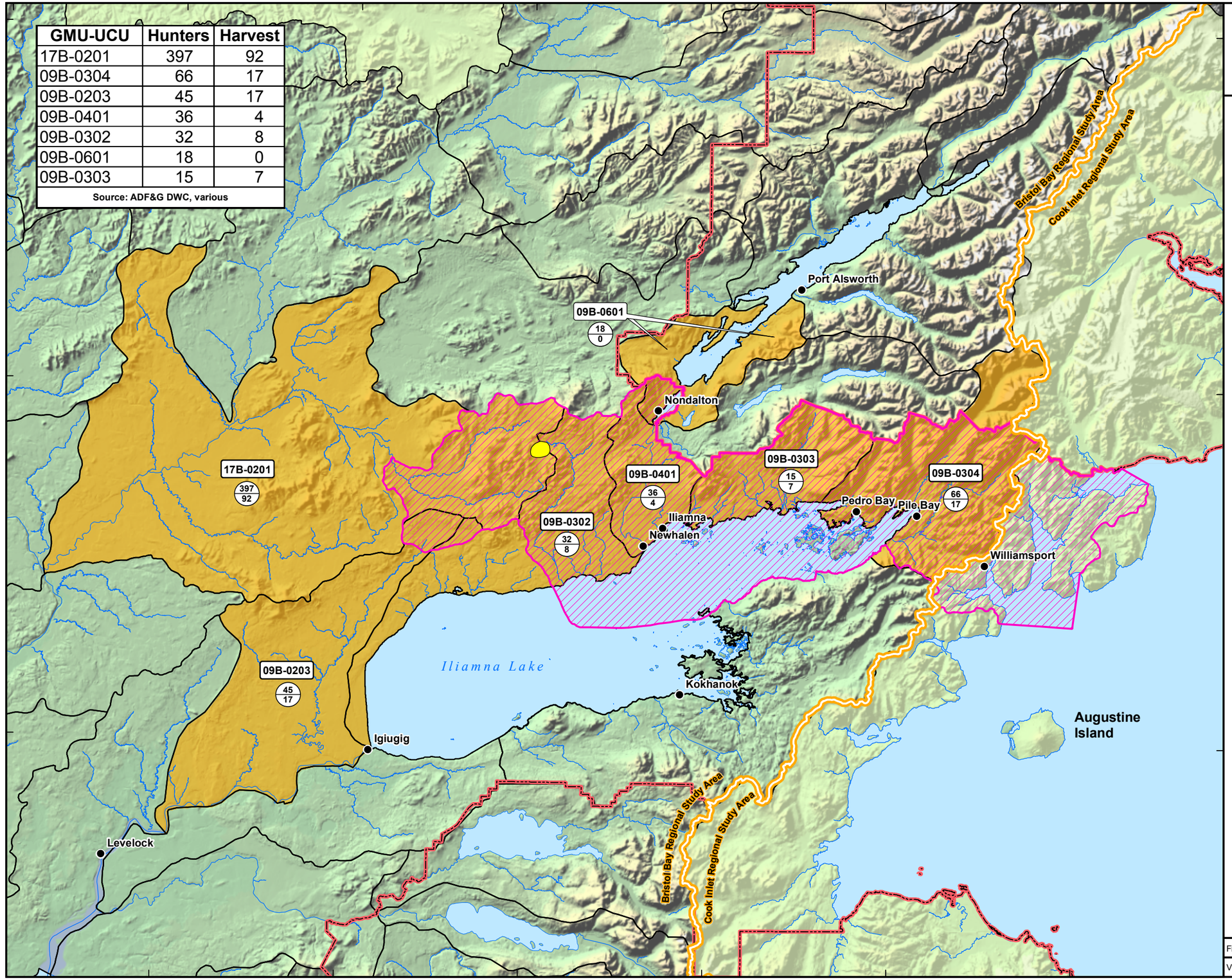
Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB__Moose_Fig25-39_11X17L_1of1_D09.mxd	Date: September 2, 2010
Version: 9	Author: RDI-LS

157°20'0"W 156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W

GMU-UCU	Hunters	Harvest
17B-0201	397	92
09B-0304	66	17
09B-0203	45	17
09B-0401	36	4
09B-0302	32	8
09B-0601	18	0
09B-0303	15	7

Source: ADF&G DWC, various



60°0'0"N

59°20'0"N

156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W

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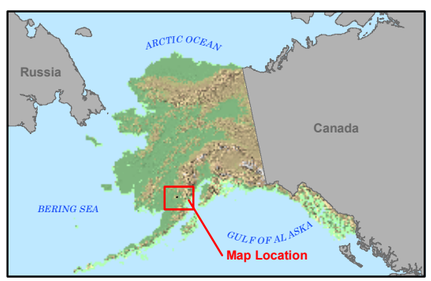
Figure 25-40
Recreation Central Study Area
Bristol Bay Drainages
Total Moose Hunters and Harvest
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 — UCU Designation
- 10 / 1 — Number of Moose hunters / Number of Moose harvested
- UCUs Wholly or Partly in Central Study Area
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Anadromous Fish Streams
- Outside Hunting Study Area
- Communities



0 10 20 30 Miles

0 10 20 30 40 Kilometers

N

Scale 1:800,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB_Moose_Fig25-40_11X17L_1of1_D07.mxd	Date: September 2, 2010
Version: 7	Author: RDI-LS

158°0'0"W 156°0'0"W 154°0'0"W 152°0'0"W

60°0'0"N 59°0'0"N 58°0'0"N

Nushagak Hills

17B-0204 6
17B-0203 24
17B-0302 24
17B-0303 34
17B-0202 51
17B-0301 28
17B-0201 72
17B-0101 2
09B-0801 0
09B-0602 3
09B-0702 2
09B-0601 0
09B-0603 5
09B-0701 3
09B-0501 0
09B-0401 8
09B-0303 9
09B-0304 62
09B-0302 18
09B-0203 11
09B-0301 56
09B-0202 2
09B-0201 1
09C-0703 81
09C-0701 10
09C-0605 23
09C-0604 42
09C-0702 7
09C-0603 8
09C-0602 22
09C-0601 1
09C-0501 0
09C-0401 0
17C-0701 17
17C-0801 5
17C-0901 3
17C-0601 18
17C-0501 4
17C-0301 3
09B-0101 2

Kenai
Clam Gulch
Ninilchik
Port Alsworth
Nondalton
Pile Bay
Iliamna
Newhalen
Pedro Bay
Williamsport
Koliganek
New Stuyahok
Ekwok
Aleknagik
Dillingham
Levelock
Igiugig
Kokhanok
Ekuk
Clarks Point
Naknek
South Naknek
King Salmon
Egegik

Bristol Bay Regional Study Area
Cook Inlet Regional Study Area

Cook Inlet
Iliamna Lake
Augustine Island
Shelikof Strait
Afognak Island
Kvichak Bay

GMU-UCU	Harvest	Rank by # Harvested
09C-0703	81	1
17B-0201	72	2
09B-0304	62	3
09B-0301	56	4
17B-0202	51	5
09C-0604	42	6
17B-0303	34	7
17B-0301	28	8
17B-0203	24	9
17B-0302	24	10
09C-0605	23	11
09C-0602	22	12
09B-0302	18	13
17C-0601	18	14
17C-0701	17	15
09B-0203	11	16
09C-0701	10	17
09B-0303	9	18
09B-0401	8	19
09C-0603	8	20
09C-0702	7	21
17B-0204	6	22
09B-0603	5	23
17C-0801	5	24
17C-0501	4	25
09B-0602	3	26
09B-0701	3	27
17C-0301	3	28
17C-0901	3	29
09B-0101	2	30
09B-0202	2	31
09B-0702	2	32
17B-0101	2	33
09B-0201	1	34
09C-0601	1	35
09B-0501	0	36
09B-0601	0	37
09B-0801	0	38
09C-0401	0	39
09C-0501	0	40

Source: ADF&G DWC, various

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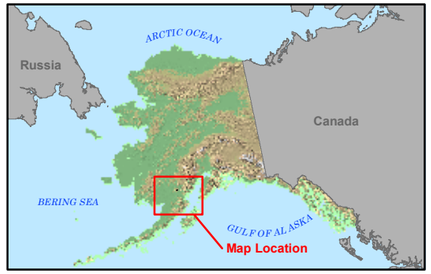
Figure 25-41
Hunting Study Area
Bristol Bay Drainages
Total Brown Bear Harvest
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 UCU Designation
- 10 Number of Brown Bear harvested
- These 10 UCUs combined accounted for 71% of the total harvest.
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Hunting Study Area
- Communities



0 10 20 30 40 50 Miles
0 15 30 45 60 Kilometers

N

Scale 1:1,330,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB_Bear_Fig25-41_11X17L_1of1_D10.mxd	Date: September 2, 2010
Version: 10	Author: RDI-LS

158°0'0"W 156°0'0"W 154°0'0"W 152°0'0"W

60°0'0"N 59°0'0"N 58°0'0"N

Nushagak Hills
Iliamna Lake
Kvichak Bay
Cook Inlet
Shelikof Strait
Augustine Island
Afognak Island

17B-0204 6
17B-0203 24
17B-0302 24
17B-0303 34
17B-0202 51
09B-0801 0
09B-0602 3
09B-0702 2
09B-0601 0
09B-0603 5
17B-0301 28
09B-0701 3
09B-0501 0
17B-0201 72
09B-0401 8
09B-0303 9
09B-0304 62
17B-0101 2
09B-0302 18
17C-0701 17
17C-0801 5
17C-0901 3
09B-0203 11
17C-0601 18
09B-0201 1
09B-0202 2
09B-0301 56
17C-0501 4
09C-0703 81
09C-0701 10
09C-0605 23
09C-0604 42
09C-0702 7
17C-0301 3
09B-0101 2
09C-0603 8
09C-0602 22
09C-0601 1
09C-0501 0
09C-0401 0

Port Alsworth
Nondalton
Iliamna
Newhalen
Pile Bay
Pedro Bay
Williamsport
Kokhanok
Igiugig
New Stuyahok
Ekwok
Koliganek
Aleknagik
Dillingham
Levelock
Ekuk
Clarks Point
Naknek
South Naknek
King Salmon
Egegik
Kenai
Clam Gulch
Ninilchik

Bristol Bay Regional Study Area
Cook Inlet Regional Study Area

GMU-UCU	Square Miles	Harvest	Rank by Harvest Density
09C-0604	274.2	42	1
09C-0703	549.5	81	2
09B-0304	430.2	62	3
09C-0605	219.5	23	4
17C-0601	185.1	18	5
09B-0301	796.2	56	6
17B-0303	592.1	34	7
17B-0202	913.8	51	8
09B-0401	157.0	8	9
09B-0302	386.4	18	10
09C-0602	489.9	22	11
09B-0303	201.7	9	12
17B-0201	1,634.4	72	13
17B-0301	835.5	28	14
17C-0801	198.9	5	15
09C-0603	326.1	8	16
17B-0203	998.0	24	17
17C-0701	707.4	17	18
17B-0302	1,093.0	24	19
09B-0203	581.4	11	20
09C-0702	403.5	7	21
09C-0701	602.4	10	22
17C-0301	215.5	3	23
09B-0101	210.8	2	24
17B-0204	770.6	6	25
09B-0603	650.8	5	26
09B-0602	391.2	3	27
17C-0901	507.4	3	28
09B-0702	371.0	2	29
17B-0101	451.8	2	30
09B-0202	458.0	2	31
09B-0701	758.6	3	32
17C-0501	1,323.9	4	33
09B-0201	557.5	1	34
09C-0601	2,534.1	1	35
09B-0501	355.4	0	36
09B-0601	184.6	0	37
09B-0801	559.0	0	38
09C-0401	57.2	0	39
09C-0501	349.7	0	40

Source: ADF&G DWC, various

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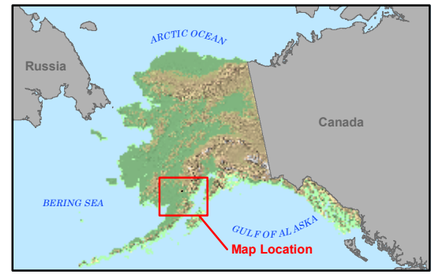
Figure 25-42
Hunting Study Area
Bristol Bay Drainages
Brown Bear Harvest Density
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 UCU Designation
- 10 Number of Brown Bear harvested
- These 10 UCUs combined accounted for 19% of the study area and 59% of the harvest.
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Outside Hunting Study Area
- Communities



0 10 20 30 40 50 Miles

0 15 30 45 60 Kilometers

N

Scale 1:1,330,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB_Bear_Fig25-42_11X17L_1of1_D09.mxd	Date: September 2, 2010
Version: 9	Author: RDI-LS

157°20'0"W 156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W

GMU-UCU	Harvest
17B-0201	72
09B-0304	62
09B-0302	18
09B-0203	11
09B-0303	9
09B-0401	8
09B-0601	0

Source: ADF&G DWC, various

59°40'0"N

59°20'0"N

156°40'0"W 156°0'0"W 155°20'0"W 154°40'0"W 154°0'0"W 153°20'0"W

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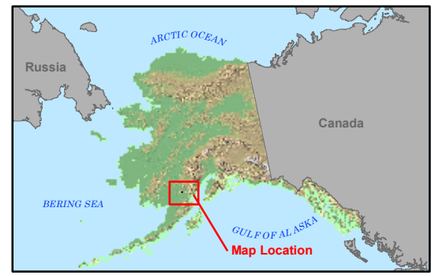
Figure 25-43
Recreation Central Study Area
Bristol Bay Drainages
Total Brown Bear Harvest
by Uniform Coding Unit, 2000-2005

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- UCU Boundary
- 09B-0501 — UCU Designation
- 11 — Number of Brown Bear harvested
- UCUs Wholly or Partly in Central Study Area
- Central Study Area
- National Park and Preserve Boundary
- General Deposit Location
- Anadromous Fish Streams
- Outside Hunting Study Area
- Communities



0 8 16 24 32 Miles

0 10 20 30 40 Kilometers

N

Scale 1:800,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_BB_Bear_Fig25-43_11X17L_1of1_D08.mxd	Date: September 2, 2010
Version: 8	Author: RDI-LS

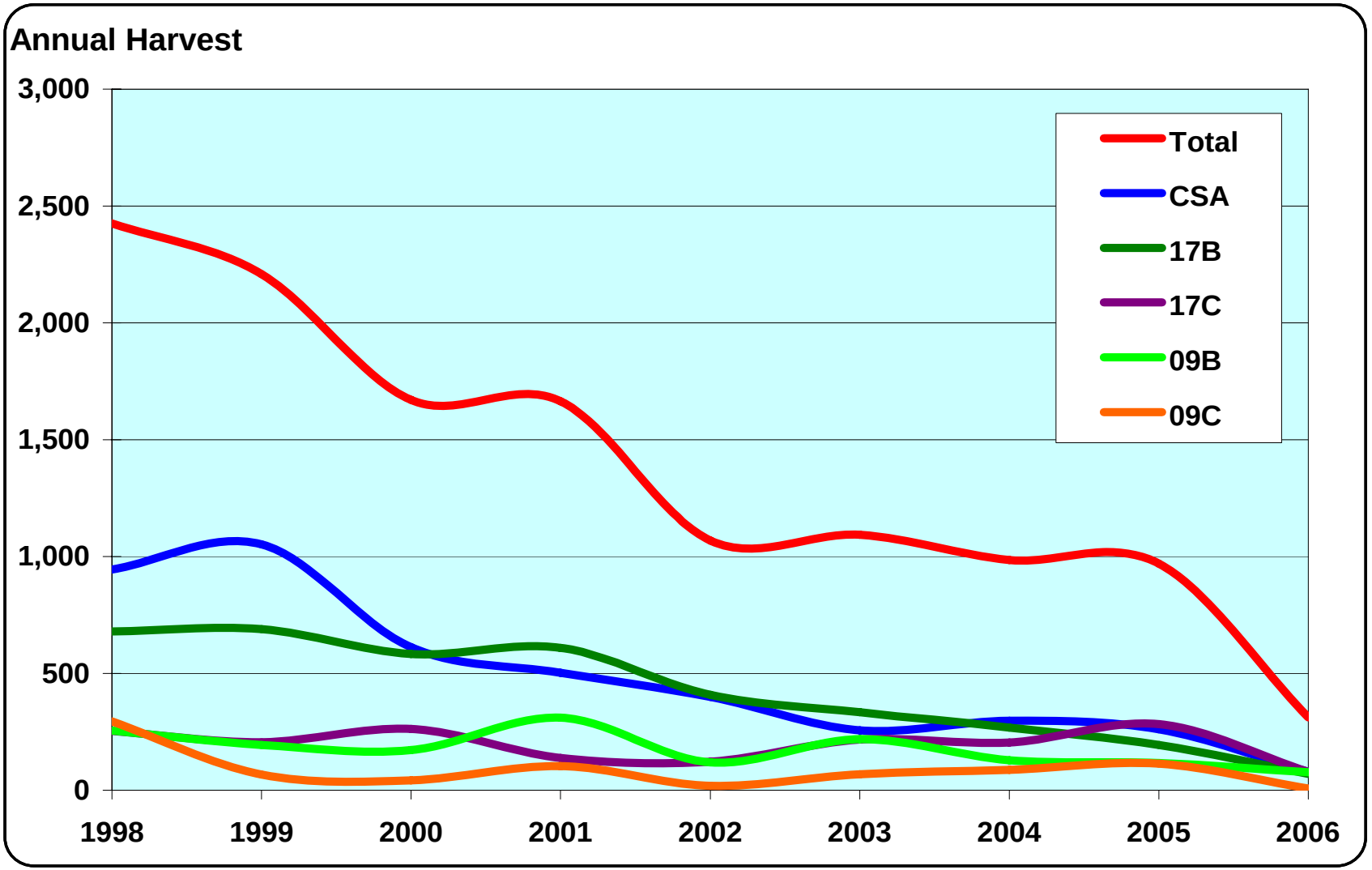


Figure 25-44, Annual Caribou Harvest for UCUs in the Hunting Study Area, Bristol Bay Drainages, 1998-2006 (based on data from ADF&G DWC, various).

Note: Only the UCUs within the Hunting Study Area are included here. See Table 25-32 for a listing of UCUs in the CSA and GMUs 09B, 09C, 17B, and 17C.

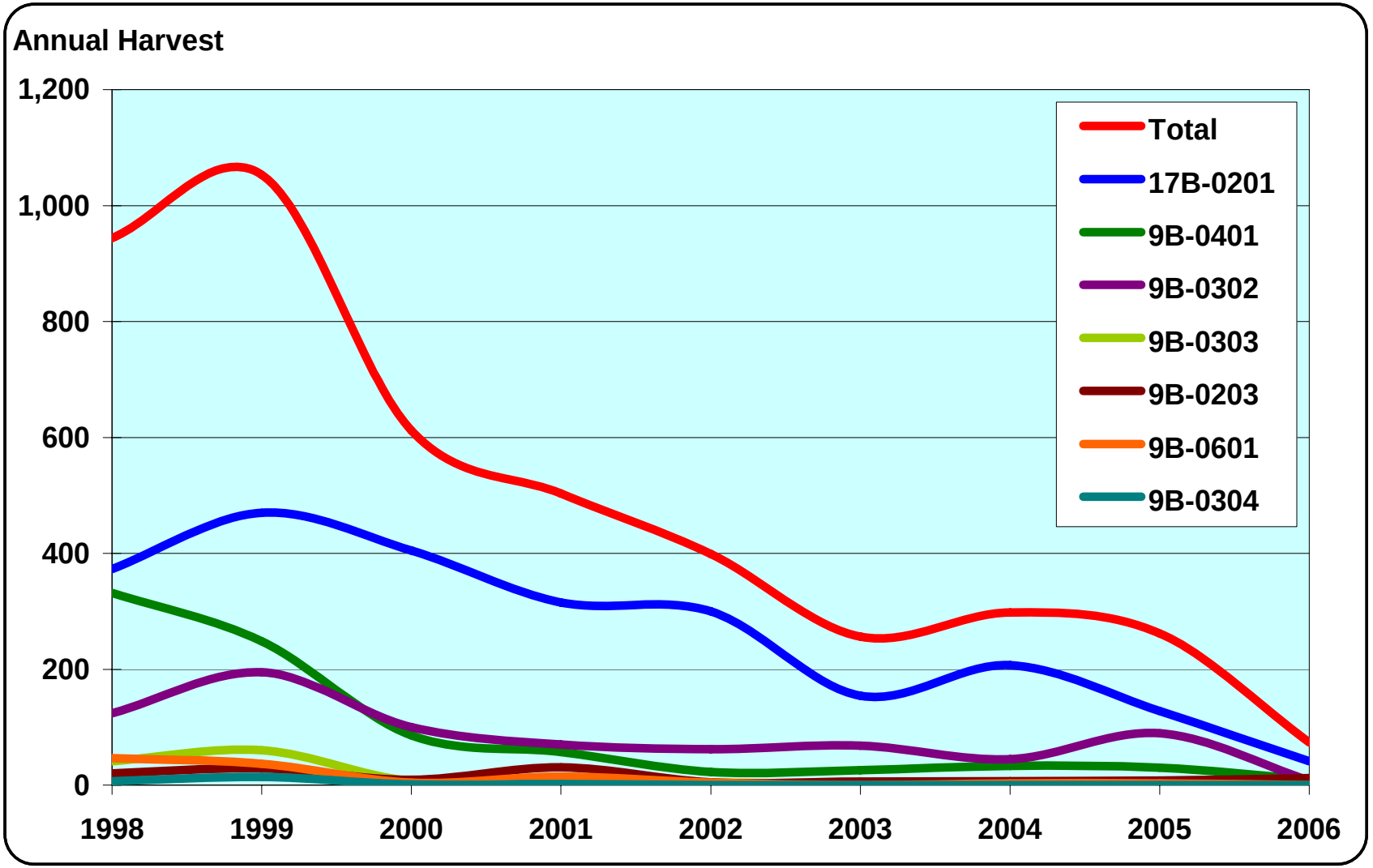


Figure 25-45, Annual Caribou Harvest, Central Study Area UCUs, 1998-2006 (based on data from ADF&G DWC, n.d.[d]).

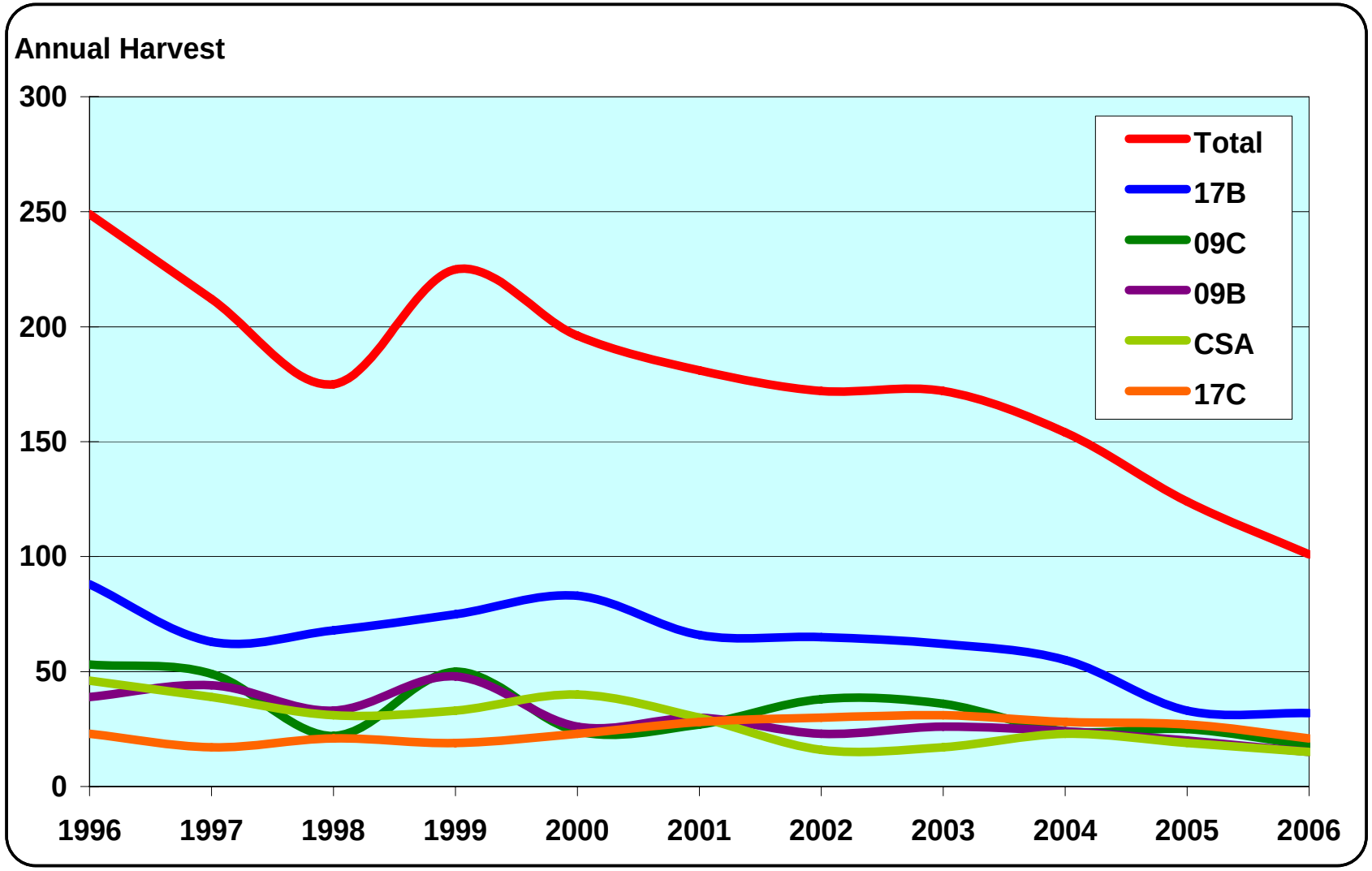


Figure 25-46, Annual Moose Harvest for UCUs in the Hunting Study Area, Bristol Bay Drainages, 1996-2006 (based on data from ADF&G DWC, various).

Note: Only the UCUs within the Hunting Study Area are included here. See Table 25-32 for a listing of UCUs in the CSA and GMUs 09B, 09C, 17B, and 17C.

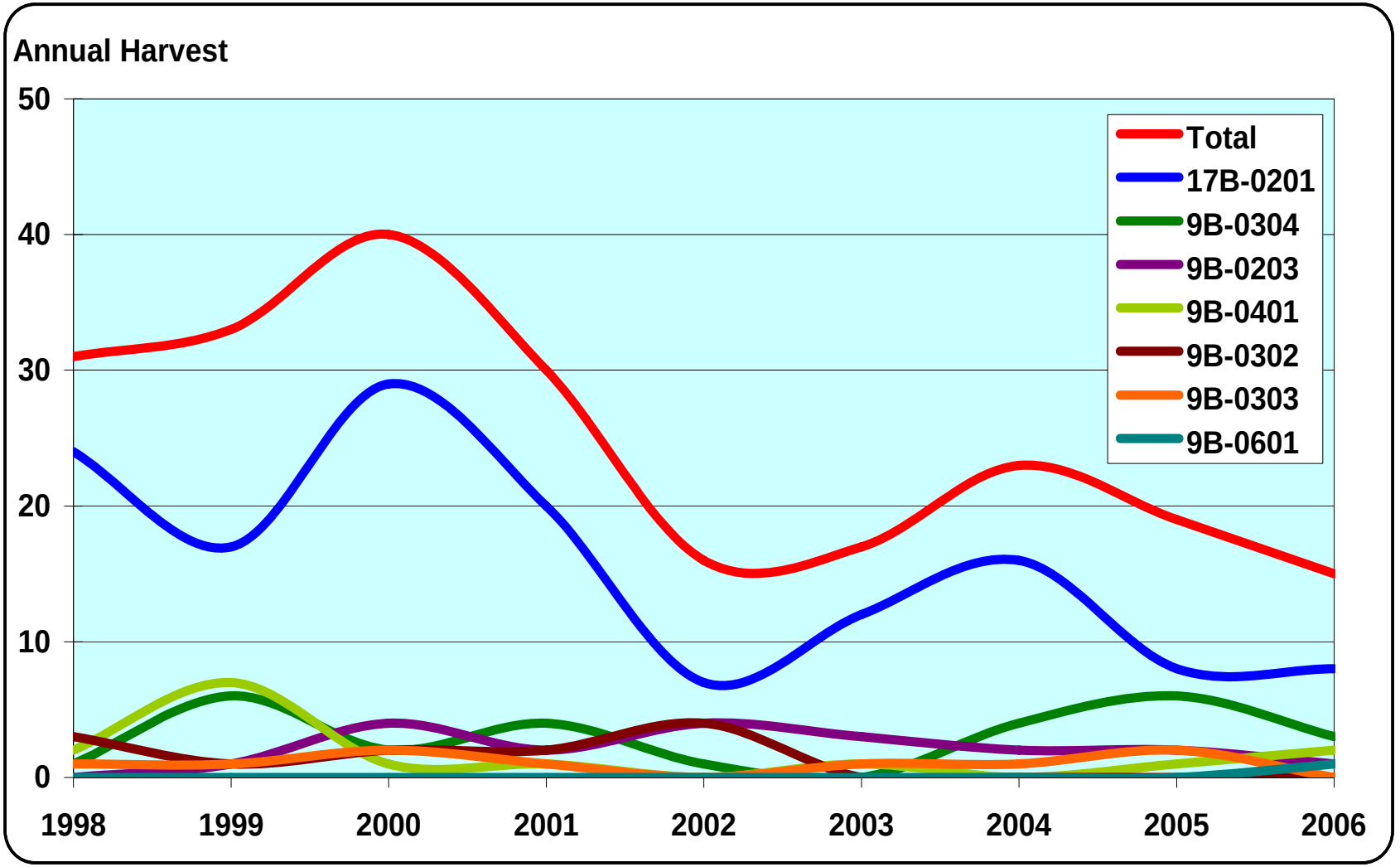


Figure 25-47, Annual Moose Harvest, Central Study Area UCUs, 1998-2006 (based on data from ADF&G DWC, n.d.[d]).

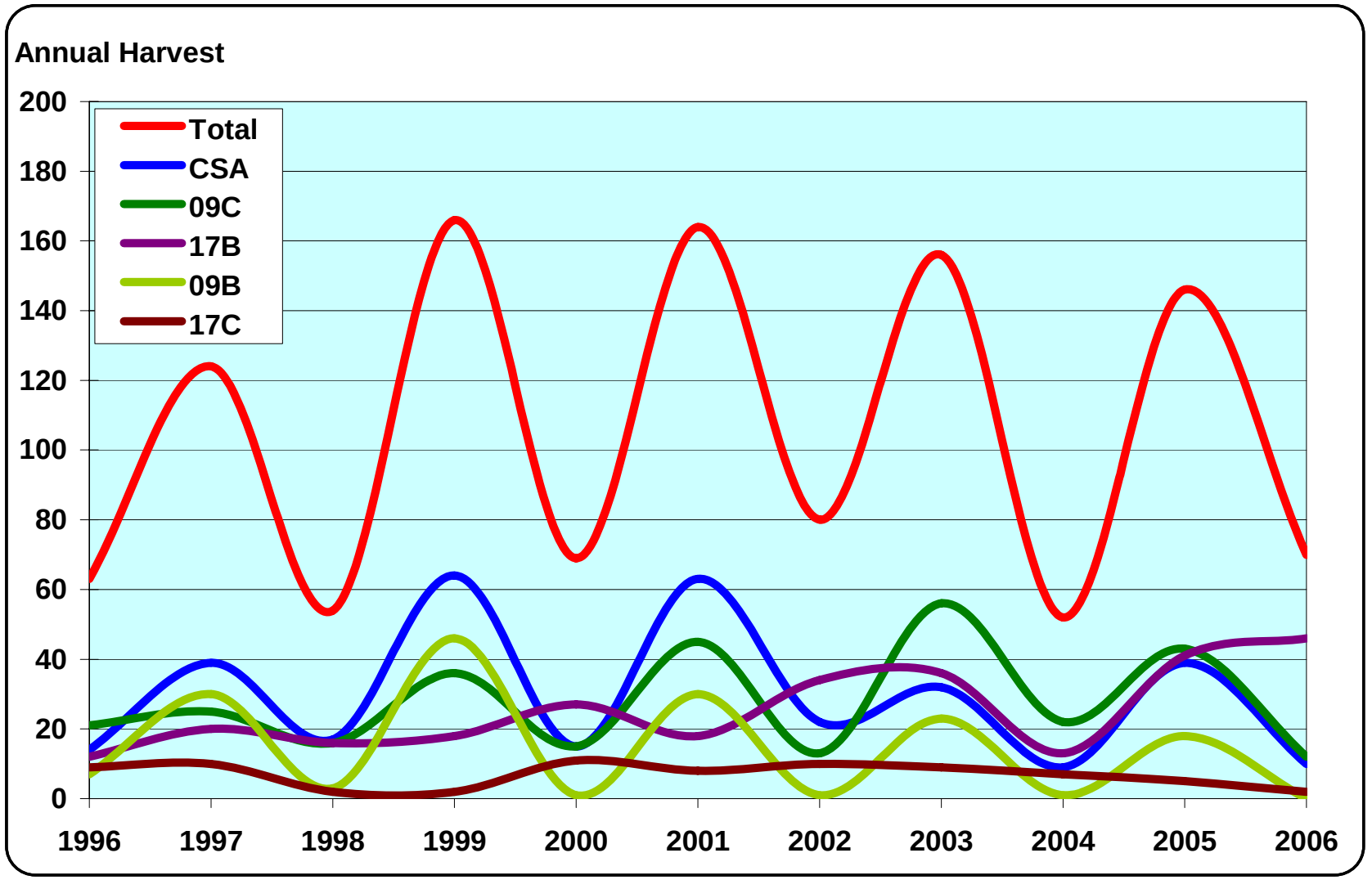


Figure 25-48, Annual Brown Bear Harvest for UCUs in the Hunting Study Area, Bristol Bay Drainages, 1996-2006 (based on data from ADF&G DWC, various).

Note: Only the UCUs within the Hunting Study Area are included here. See Table 25-32 for a listing of UCUs in the CSA and GMUs 09B, 09C, 17B, and 17C.

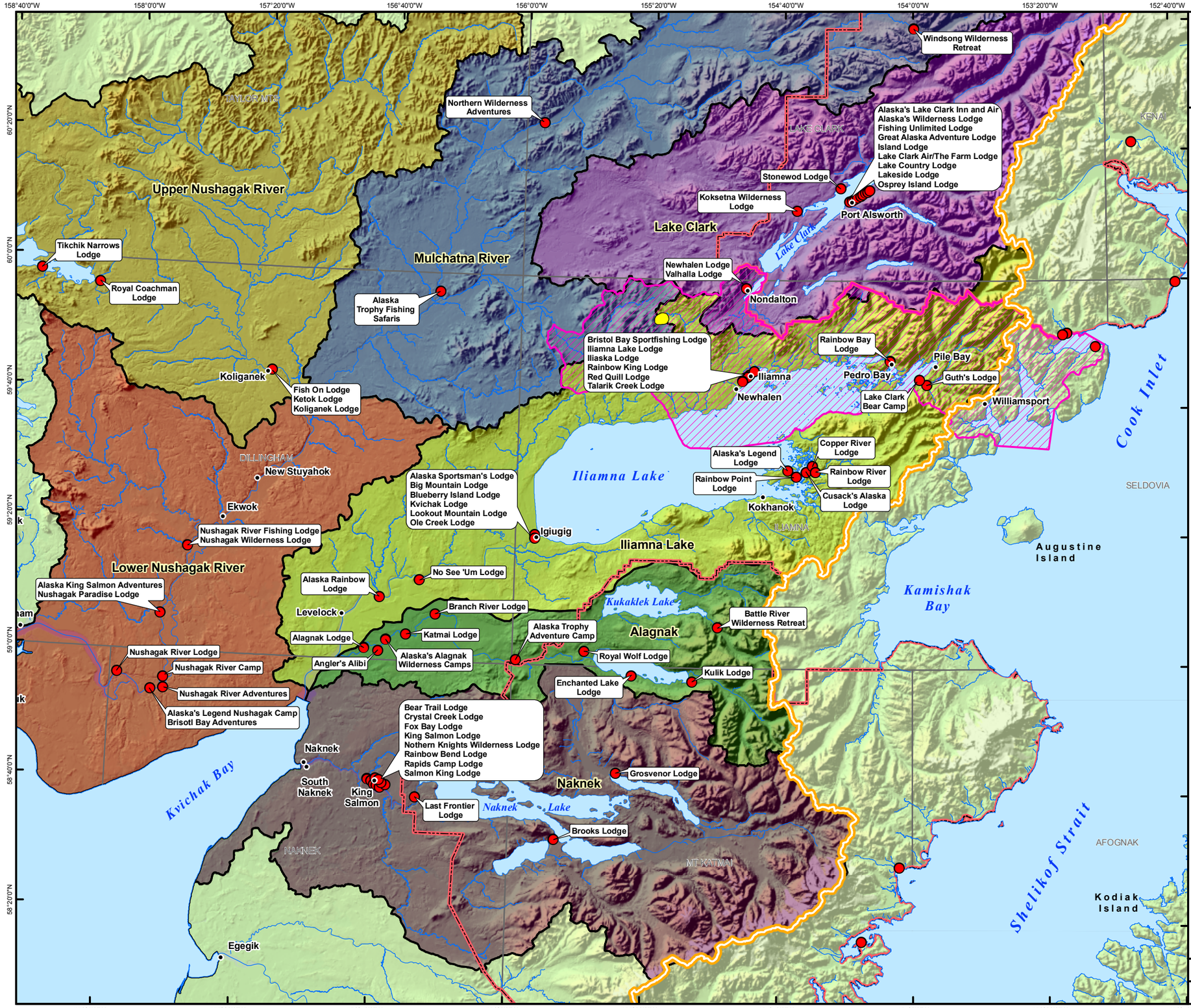


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Figure 25-49
Sportfishing Study Area
Bristol Bay Drainages
Recreational Lodge Locations

Legend

- Bristol Bay/Cook Inlet Drainages Boundary
- Lodge Locations
- Communities
- National Park and Preserve Boundary
- Central Study Area
- Outside Sportfishing Study Area
- General Deposit Locaiton

Bristol Bay USGS Drainages

- Alagnak
- Lake Clark
- Iliamna Lake
- Naknek
- Mulchatna River
- Lower Nushagak River
- Upper Nushagak River

0 10 20 30 40 Miles

0 10 20 30 40 Kilometers

N

Scale 1:1,110,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: RDI_KW_Lodge_Fig25-49_11x17L_1of1_D05.mxd	Date: September 2, 2010
Version: 5	Author: RDI-LS

APPENDICES

APPENDIX 25A

Recreational Characteristics for Selected BBAP Management Units

Recreational Characteristics for Selected Bristol Bay Area Plan Management Units

REGION 7—UPPER MULCHATNA AND UPPER HOHOLITNA

Recreation. Most recreational uses in Region 7 are related to outdoor activities such as sport fishing, hunting, camping, river travel, and wildlife viewing. Since the region borders Lake Clark National Park and Preserve, recreational uses are similar to those of Park users. The majority of activities are concentrated along the Mulchatna River. The upper reaches of the Mulchatna and the Chilikadrotna Rivers, within the National Park, are designated with Wild and Scenic River status; these extend partially into the Region and are the focus of recreational river use. Where the Mulchatna River flows through the Bonanza Hills the shallow and rocky river channel is more suitable for rafts and kayaks than canoes; west of Bonanza Creek, where the valley broadens, the river is gentle. The Chilikadrotna is a swift, twisting, narrow river most suitable for rafts or kayaks.

Fish and Wildlife. Region 7 contains important habitat for moose, along the river valleys, and caribou. Many streams host returns of anadromous sockeye (red), Chinook (king), and coho (silver) salmon. Eagles and other raptors nest along the Mulchatna River corridor and the lower reaches of the Chilchitna River. The subsistence harvest is small and most hunting pressure on fish and game is from sportsman. The majority of hunts are unguided though commercial services commonly include transport to the field. Moose are relatively new to the Bristol Bay area, possibly moving into the area from the middle Kuskokwim drainages during the last 100 years. During the previous twenty years, moose numbers have increased and moose are now common along the Nushagak/Mulchatna Rivers and all of their major tributaries.

Caribou are an important resource in the area. The Mulchatna caribou herd has been increasing in size and expanding its range since the 1930's. Serious efforts to conduct a census of the herd have taken place since 1973; between 1981 and 1996, the Mulchatna caribou herd increased from 19,000 to 200,000. The herd is presently estimated at approximately 150,000 individuals. Region 7 contains significant numbers of caribou and contains areas that are important for calving. The area east of Tutna Lake and extending northeast to Turquoise Lake has been identified as calving grounds in the past. Recently calving has expanded throughout the upper Hoholitna River and northeastern Nushagak Hills.

Brown bear occur throughout the area and the density can be considered high. Bear streams include the Chilikadrotna drainage, the Mulchatna River, and the Chilchitna River. Spring habitat is found along the lowermost reaches of the Koksetna River.

REGION 8—LAKE CLARK, NEWHALEN

Recreation. The Lake Clark-Newhalen River area is an important recreation corridor for outdoor recreation activities, especially sport fishing, river excursions, and wildlife viewing. The corridor contains at least half a dozen commercial recreation lodges with up to a dozen more located around Lake Clark itself. The Newhalen River is also utilized for commercial rafting and jet-boat tours. The Newhalen River

Gorge is Class V+ water and provides a thrilling experience for those interested in white water adventure. The clear turquoise-colored waters of the river contain all five Alaska species of anadromous Pacific salmon, trout, Arctic grayling, and Dolly Varden. The corridor also is used by wildlife such as eagles, other raptors, brown bear, moose, and caribou.

Fish and Wildlife. The Lake Clark drainage is a major sockeye salmon spawning area, and the fisheries resources are used locally by both subsistence and sport fishermen. The Newhalen River is noteworthy for its clear water and good habitat; the river and its tributaries are important sockeye spawning grounds, contributing up to 16 percent of the world's commercial wild red salmon harvest. All five Alaska Pacific salmon species are found, as are rainbow trout, Dolly Varden, and Arctic grayling; caribou, moose, and brown bear are also important to subsistence and recreational users. Eagles and other raptors are found in the Region.

REGION 9—EASTERN ILIAMNA LAKE

Recreation. Recreation resources and uses are primarily related to use of Iliamna Lake for boating and fishing and to commercial and noncommercial sport fishing and hunting. A number of sport fishing lodges are clustered in the Pedro Bay, Copper River, and Kokhanok areas.

Fish and Wildlife. The Region has significant moose and caribou populations and contains many water bodies utilized by anadromous fish. Moose rutting areas occur near Kokhanok, on non-state lands, and moose calving areas occur along the Pile River and both Knutson and Chekok Creeks. The upper portions of these drainages occupy state land. Caribou frequent small portions of the far western part of the Region, but there are no known calving or rutting areas within the Region. All five Alaska species of Pacific salmon occur in the streams of the Region; sockeye are the most important species commercially. Brown bears concentrate along streams throughout the Region during spawning periods. Freshwater sport fish are generally prolific and, along with sockeye salmon, provide the basis for the commercial sport fishing industry.

REGION 10—WESTERN ILIAMNA, KVICHAK RIVER

Recreation. Sport fishing is an important seasonal resource in Region 10. Lower Talarik Creek is popular for trout fishing and the Alagnak River area is renowned for its stream fishing for salmon and trout. Lower Talarik Creek is known for its large rainbow trout and is a fly-fishing-only stream. The Alagnak River is designated as a Wild River. The Alagnak River rainbow trout fishery has a reputation of being a world-class fishery and therefore attracts large numbers of anglers. It is considered to be one of the most popular fly-in fishing destinations in southwest Alaska supporting important salmon, Arctic grayling, Arctic Char, and lake trout sport fisheries. About a dozen commercial recreation fishing lodges and camps are located on the Kvichak and Alagnak Rivers. Several lodges on the main stem of the Alagnak, at the outlet of Nonvianuk Lake, and one on the Kulik River provide guided fishing services. Together these lodges support the majority of the visitation for fishing. The amount of use is a cause of concern to some users and managers. ADF&G reports that visitor use for fishing has increased from approximately 1,900 angler days per year in 1981 to over 13,000 in 1995. This has since fallen to 10,614 in 2002.

Fish and Wildlife. All five Alaska species of Pacific salmon – king, sockeye, pink, silver, and chum – spawn in the Kvichak and Alagnak river systems. Sockeyes are the most important commercially. However, king and silver salmon are important to the recreational sport fishing industry, as are trout and

char. The Alagnak River corridor and Ole, Belinda, and Dennis, and Kaskanak Creeks are heavily used by bears. The south side of Iliamna Lake and the Alagnak River drainage are moose calving and rutting areas.

Eagles and other raptors nest along the Alagnak River and on the west end of Iliamna Lake. The lowlands west of Iliamna Lake contain a plethora of lakes, ponds, and marshes that are used by waterfowl; high concentrations of red-breasted mergansers, black scoters, scaup, mallards, and tundra swans occur in this area.

Iliamna Lake is also home to this continent's sole population of freshwater seals. This phenomenon only occurs in one other lake in the world, Lake Baikal in Russia.

REGION 11—BRISTOL BAY BOROUGH AREA

Recreation. The Bristol Bay Borough can be considered the "gateway" to Katmai National Park and Preserve. Most travelers to the park pass through the King Salmon airport. The Katmai National Monument was first established in 1918 to preserve the Valley of Ten Thousand Smokes, an area of streaming ash flows created by Novarupta Volcano. The Park is famous for brown bears, fish, and wildlife and is the site of the Brooks River National Historic Landmark with North America's highest concentration of prehistoric human dwellings (approximately 900).

Sport fishing is very important in Region 11. The Naknek River is host to a variety of sport fish including king, silver, and red salmon, as well as large rainbow trout and arctic char. A number of lodges and guides in the Naknek-King Salmon area cater to the recreational and commercial recreational sport fishing industry.

Fish and Wildlife. All five Alaska species of Pacific salmon — king, sockeye, pink, silver, and chum — spawn in the Naknek River system. Sockeye are the most important commercially. Freshwater sport fish, including rainbow trout, arctic char, Dolly Varden, and northern pike, are generally prolific throughout the area. The Naknek drainage experiences some of the highest levels of sport fishing effort in the Bristol Bay area; in 2002 the drainage is estimated to have experienced 24,401 angler-days.

King Salmon Creek and Pauls Creek support moose and King Salmon Creek is noted as an important bear stream. The Region is within game management unit no. 9 which has the highest brown bear harvest in Alaska (682 in 2001-2002). Region 11 is within the range of both the Mulchatna caribou herd and the Northern Alaska Peninsula herd.

Eagle nesting sites are concentrated along the middle and upper Naknek River, as well as King Salmon Creek. The western two-thirds of Region 11 consist of low-lying, poorly drained land that contains an abundance of lakes, ponds, and marshes. This area, combined with the Naknek River, is good waterfowl habitat that supports mallards, gadwalls, teal, and some northern shovelers.

(Text excerpted from ADNR, 2005a.)

APPENDIX 25B

Resource Inventory, Management Guidelines, and Management Recommendations from the Nushagak and Mulchatna Rivers Recreation Management Plan for Select Management Units in the Land Use Study Area

Resource Inventory, Management Guidelines, and Management Recommendations from the Nushagak and Mulchatna Rivers Recreation Management Plan for Select Management Units in the Land Use Study Area

UNIT 15. LOWER MULCHATNA RIVER CORRIDOR

Land Status. Most of the land adjacent to the lower portion of the river is owned or selected by Koliganek Natives Ltd. The Mulchatna River is navigable; the state owns the shorelands. A number of Native allotments are located in the unit.

Miles of River. The main channel of the Mulchatna River extends for 41 miles.

Access. The unit is easily accessible by motorboat, float and wheeled airplanes, and snowmobile. The unit is about a one-hour flight from Iliamna and Dillingham.

Existing Development. Seven cabins are located in this unit. Three sites have been used for commercial camps.

Fisheries. The Mulchatna River serves as a major salmon migration corridor and provides important spawning and rearing habitat for king, chum, and coho salmon.

Subsistence fishing use is moderate for freshwater species and spawning salmon. Sport fishing use is moderate and generally associated with floating activity. There is locally high sport fishing effort at the mouths of the Stuyahok and Koktuli rivers because they provide good fishing and access, and excellent camping and staging opportunities. Anglers target primarily salmon. Commercial recreational use is high and is associated with guided floating, commercial camps in the unit, and fly-in day use. Day use may rely on motorboats stored in the unit.

Wildlife. The unit provides essential winter range for moose and densities are seasonally high.

Caribou migrate through the unit and densities are moderate to high. The unit is a waterfowl staging area during spring and fall migrations.

The unit is primarily a travel corridor for all user groups. Subsistence hunting for caribou and moose is high during the fall and winter. Sport hunting use is low but has increased as float trips down the Mulchatna, Stuyahok, and Koktuli rivers to pickup points in this unit have become more popular.

Other Values. Scenic values in the unit are low because of constricted views and low landscape diversity. Floating use is high and originates from drop-offs on the Stuyahok, Koktuli, and upper Mulchatna rivers. Floating use is chiefly unguided and is increasing. The unit is used for trapping by local residents. Four cultural sites are located in the unit, including Stuyahok, the site of the old village located at the mouth of the Stuyahok River, which is especially significant to local residents.

Area Plan Designations. The navigable portions of the river system and its adjacent uplands are co-designated Habitat, and Public Recreation and Tourism-Dispersed. Public Use Sites are designated Public Recreation and Tourism-Public Use Site (retain in public ownership).

Management intent. Semi-primitive use experience.

Public use sites:

See Public Use Sites in Chapter 2 for management guidelines. Specific locations of sites are shown on maps in Appendix C.

Site 21 This site is a special use area (ADL 226852). See "Other Guidelines Specific to this Unit." Campsite and floatplane landing area on the Mulchatna River at the mouth of the Stuyahok River. There is a pending Native allotment in this site.

Site 22 Campsite and floatplane landing area on the Mulchatna River, 1.5 miles downstream from the mouth of the Koktuli River.

Site 23 Campsite and floatplane landing area on the Mulchatna River at the mouth of the Koktuli River.

Recommendations for this unit. Management of Public Use Sites at the Stuyahok and Koktuli Rivers: Use of the sandbars at the mouths of the Stuyahok and Koktuli Rivers (public use sites # 21 and # 23) for camping, fishing, and waiting for floatplane pickups is steadily increasing. Problems with overcrowding, garbage, and waste are beginning to develop at the mouth of the Stuyahok River. Possible management actions that should be considered are: 1) developing public information materials suggesting alternative sites and recommending measures for keeping the sites clean, 2) developing privies at the sites, and 3) changing the number of days that short-term (generally allowed) uses can occur.

UNIT 17. KOKTULI RIVER CORRIDOR

Land Status. Most of the land in the unit is owned or selected by the state. A number of Native allotments are located in the unit. The upper portion of the corridor is within the Lake and Peninsula Borough.

Miles of River. The main channel of the Koktuli River extends for 46 miles.

Access. Downstream of the Swan River, the Koktuli River is easily accessible by motorboat; upper portions are increasingly difficult. Airplane accessibility is moderate in the upper portion; a few landing sites provide drop-offs for floating. Upper portions of the unit are near Iliamna.

Existing Development. Two cabins and one site which has been used as a commercial sport fishing and outfitting camp for hunting are located in the unit.

Fisheries. The rivers provide important spawning habitat for king, sockeye, and chum salmon. Rainbow trout fishing is good in the lower portion of the unit.

Subsistence fishing use is low. Sport fishing use is moderate. Commercial sport use is concentrated on the lower portion of the unit and is based out of a nearby camp or is fly-in day use relying on motorboats stored near the unit. Sport fishing use in the remaining portion of the unit is associated with floating.

Wildlife. Moose density is moderate, caribou density is high, and brown bear density is high near Jack Rabbit Hills. Upper portions of the unit provide essential caribou calving habitat.

Subsistence hunting use is high. Subsistence hunters concentrate their effort in the lower portion of the unit for moose and caribou in the fall and hunt throughout the unit for caribou in the winter. Use by guided or outfitted sport hunters is moderate to high during the fall and has been increasing in recent years.

Other Values. Floating use is high and chiefly unguided. The corridor has high scenic value because of views of nearby uplands and high landscape diversity grading from upland tundra to bottomland forest. One cultural site is located in the unit.

Area Plan Designations. The bulk of the navigable portions of the river system and its adjacent uplands are co-designated Habitat, and Public Recreation and Tourism-Dispersed. The eastern portion of the Koktuli River and adjoining uplands, situated within BBAP management unit R06-30, is designated Public Recreation and Tourism-Dispersed. Public Use Sites are designated Public Recreation and Tourism-Public Use Site (retain in public ownership).

Management intent. Primitive use experience.

Public use sites:

See Public Use Sites in Chapter 2 for management guidelines. Specific locations of sites are shown on maps in Appendix C.

Site 27 Campsite on the Koktuli River at the mouth of the Swan River. There is a pending Native allotment in this site.

Site 28 Wheeled plane landing area on the Koktuli River, 1 mile downstream from the confluence of the north and south forks. There is a pending Native allotment in this site.

Site 29 Campsite on the Koktuli River at the confluence of the north and south forks. There is a pending Native allotment in this site.

Site 30 Floatplane landing area on unnamed lake, 1 mile south of the upper Koktuli River, and campsite on the Koktuli River, connected by a trail.

Site 31 Floatplane landing area on unnamed lake on the south side of the upper Koktuli River, 2.5 miles northwest of Sharp Mountain.

Recommendations for this unit. None.

UNIT 19. LOWER MULCHATNA UPLANDS

Land Status. The unit is predominantly owned or selected by the state. Smaller amounts of land are owned or selected by Koliganek Natives Ltd. and Stuyahok Ltd. A number of Native allotments are located in the unit. The eastern portion of the unit is within the Lake and Peninsula Borough. Mining claims are located in the northern portion of the unit.

Access. The unit is easily accessed by floatplane at many lakes and on the lower Swan River, except in the hilly northern portion of the unit where relatively few airplane landing sites exist.

The southern portion of the unit is easily accessed by snowmobile from Nushagak River communities. Most of the unit is about a one-hour flight from Iliamna.

Existing Development. Two cabins are located in this unit. Three sites have been used as guided/outfitted hunting camps.

Fisheries. Fisheries values are generally low.

Subsistence and sport fishing uses are low.

Wildlife. Moose density is moderate, caribou density is high, and brown bear density is high in the Jack Rabbit Hills and moderate elsewhere. Portions of the unit provide essential caribou calving habitat.

Subsistence hunting for caribou is high in the winter. Sport hunting use in the fall is high for caribou and moderate to high for moose, primarily by nonresident and non-local Alaskans. Guided brown bear hunting use is moderate in the Jack Rabbit Hills vicinity.

Other Values. The northern and eastern portions of the unit are hilly and have moderate scenic value. Low relief and tundra in much of the western portion of the unit provide low scenic value.

Area Plan Designations. This management unit is designated General Use.

Management intent. Semi-primitive use experience.

Public use sites. None.

Recommendations for this unit. None.

(Text excerpted from ADNR, 2005b.)