United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701
February 25, 2013

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Re: Biological Opinion for the Dalton Highway MP 362-414 Rehabilitation Project

This document transmits the U.S. Fish and Wildlife Service's (Service) final Biological Opinion (BO) on a proposal by Alaska Department of Transportation and Public Facilities (ADOTPF) to rehabilitate the Dalton Highway between mileposts 362 and 414, near of Deadhorse, Alaska.

This BO describes the effects of the proposed action on spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eiders (*Polysticta stelleri*), and polar bears (*Ursus maritimus*) pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

After reviewing the information provided, the status of the species, the environmental baseline, and cumulative effects, the Service has concluded that the proposed action may affect but is not likely to adversely affect Alaska-breeding Steller's eiders and polar bears. Additionally, the Service has concluded the proposed action may adversely affect, but is not likely to jeopardize the continued existence of spectacled eiders.

A complete administrative record of this consultation is on file at the Fairbanks Fish and Wildlife Field Office, 101 12th Avenue, Fairbanks, Alaska, 99701. If you have comments or concerns regarding this BO, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office at (907) 456-0441.

Sincerely,

Ted Swem

Ted Swem
Branch Chief
Endangered Species

BIOLOGICAL OPINION

for

DALTON HIGHWAY REHABILITATION PROJECT: MP 362–414

Consultation with the
Alaska Department of Transportation
and Public Facilities
Fairbanks, Alaska

Prepared by:
Fairbanks Fish and Wildlife Field Office
U.S. Fish and Wildlife Service
101 12th Ave, Room 110
Fairbanks, AK 99701

February 25, 2013

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1. INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) on a proposal by Alaska Department of Transportation and Public Facilities (ADOTPF) to rehabilitate the Dalton Highway between mileposts (MP) 362 and 415 near Deadhorse, Alaska. Because the project will impact waters of the United States, ADOTPF has requested a section 404 permit from the U.S. Army Corps of Engineers (USACE).

This BO describes the effects of the proposed action on Alaska-breeding Steller's eiders (*Polysticta stelleri*), spectacled eiders (*Somateria fischeri*), and polar bears (*Ursus maritimus*) pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). We used information provided in project-specific communications with the USACE; other Service documents; and published and unpublished literature to develop this BO.

Section 7(a)(2) of the ESA states that Federal agencies must ensure that their activities are not likely to:

- Jeopardize the continued existence of any listed species, or
- Result in the destruction or adverse modification of designated critical habitat.

The Service has determined the proposed action is not likely to adversely affect Steller's eiders and polar bears, but may adversely affect spectacled eiders.

Following review of the status and environmental baseline of spectacled eiders, and analysis of the potential effects of the proposed action to this listed species, the Service has concluded the proposed action is not likely to jeopardize the continued existence of spectacled eiders.

If you have comments or concerns regarding this BO, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office at (907) 456-0441.

2. DESCRIPTION OF THE PROPOSED ACTION

Proposed Action
Based on the information contained in the project description, we understand that Alaska Department of Transportation and Public Facilities (ADOTPF) proposes to rehabilitate the Dalton Highway between mileposts (MP) 362 and 415 near Deadhorse, Alaska (Figure 1). The proposed rehabilitation would involve:

- grading and widening the existing road surface by up to 24 ft (7.3 m);
- rebuilding and topping the embankment with a final layer of asphalt;
- raising the existing approaches and pullouts to match the new road profile;
- installing rip-rap to prevent erosion;
- excavating and removing 33 non-functional culverts;
- extending or replacing functional culverts; and
- developing or expanding up to 8 material sites (Appendix A)

The schedule for the proposed action is as follows:

- May through October 2014 – MP 401-414
- May through October – MP 379-401
- May through October – MP 362-379

Action Area
The action area is the area in which direct and indirect effects of the action to listed species and designated critical habitat may occur. The area directly affected by the proposed project includes the Dalton Highway from MP 362 to 415 (Figure 1) as well as potential material sites along this route south of Deadhorse, Alaska (Appendix A). The area indirectly affected by the proposed project is delineated by a zone of influence[1] surrounding new activity within which listed species may be affected by disturbance resulting from construction activities.

[1] This zone of influence is assumed to be 200 m (656 ft) for spectacled eiders.

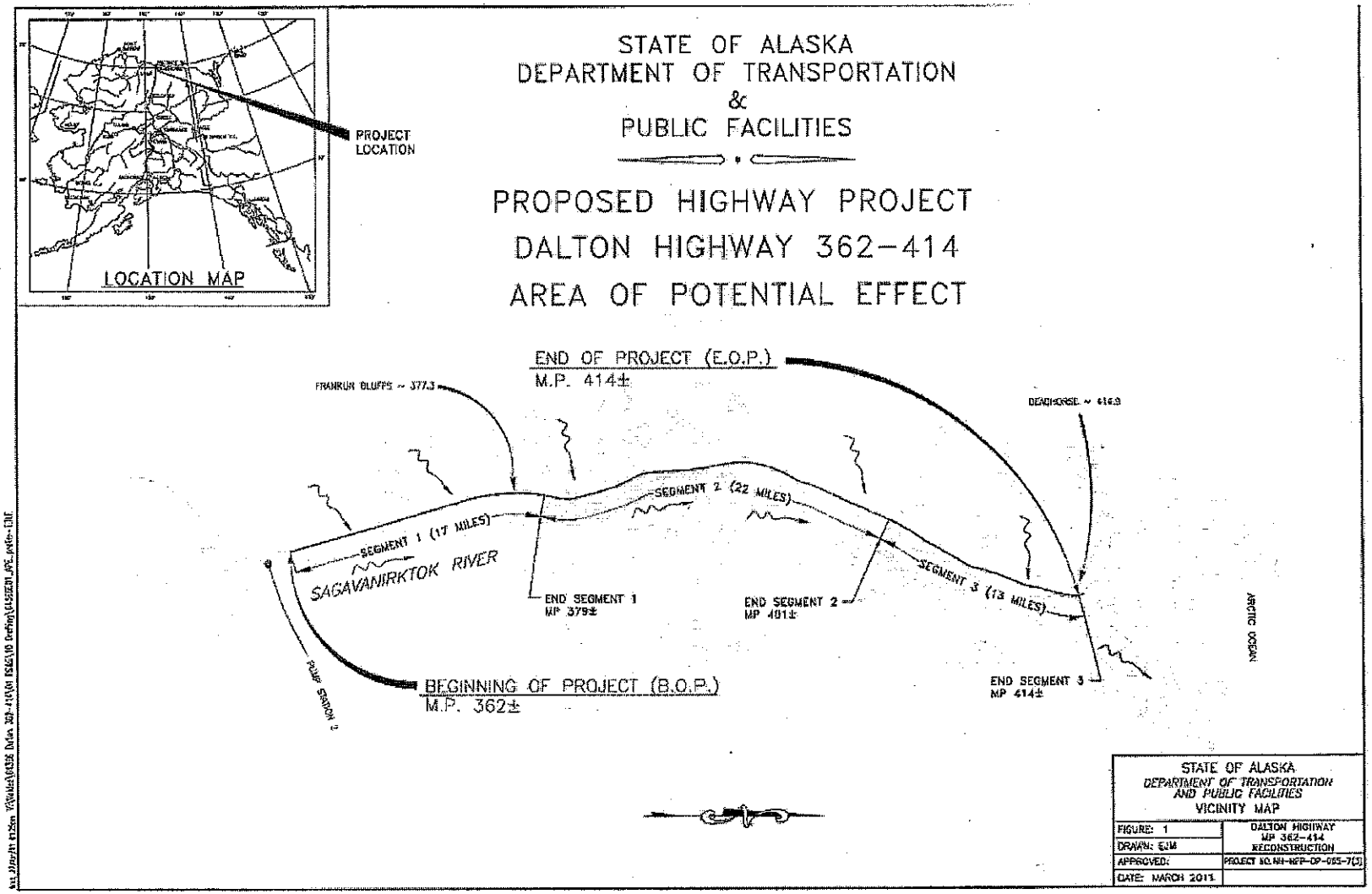


Figure 2.1. The Dalton Highway rehabilitation project area from MP 362-414 near Deadhorse, Alaska.

3. EFFECT DETERMINATION FOR STELLER'S EIDER AND POLAR BEARS

Steller's eider

In Alaska, Steller's eiders breed almost exclusively on the Arctic Coastal Plain (ACP), migrating to the breeding grounds in late spring and remaining in the region as late as mid-October. However, nesting is concentrated in tundra wetlands near Barrow, Alaska and Steller's eiders occur at very low densities elsewhere on the ACP (Larned et al. 2010). USFWS aerial surveys for breeding eiders conducted annually on the ACP from 1992–2010 reported only 5 observations of Steller's eiders east of the Colville River, with the most recent observation in 1998 (USFWS Alaska Region Migratory Bird Management, unpublished data). Because available data indicate Steller's eiders are extremely unlikely to nest near or migrate through the project area, we conclude that adverse effects will be discountable and that the proposed action is *not likely to adversely affect* Alaska-breeding Steller's eiders.

Polar bears

Due to threats to its sea ice habitat, on May 15, 2008 the Service listed the polar bear (*Ursus maritimus*) as a threatened species under the Act (73 FR 28212). Polar bears could occur in the action area, but their presence is infrequent. Due to a lack of preferred denning habitat, polar bears rarely den near Deadhorse. Furthermore, given that the timing of the proposed work would occur from May through October, we expect effects of the proposed action on denning polar bears would be extremely unlikely and are therefore discountable.

Although rare, transient bears could conceivably enter the action area and be disturbed by the presence of humans or equipment noise. However, given existing levels of disturbance (traffic) in the project area, it is unlikely that the proposed action would contribute an appreciable level of disturbance to polar bears. Furthermore, we expect disturbances would be minor and temporary because polar bears would likely respond by departing the area. Because of the low probability of encountering a polar bear, and the fact that behavioral effects would be minor and temporary, we expect effects of the proposed project on polar bears would be insignificant.

4. STATUS OF THE SPECIES

This section presents biological and ecological information relevant to formation of the BO. Appropriate information on the species' life history, habitat and distribution, and other factors necessary for their survival is included for analysis in later sections.

Spectacled eider

Spectacled eiders (Figure 4.1A) were listed as threatened throughout their range on May 10, 1993 (USFWS 1993) based on indications of steep declines in the two Alaska-breeding populations. There are three primary spectacled eider populations, each

corresponding to breeding grounds on Alaska's North Slope, the Yukon–Kuskokwim Delta (YK-delta), and northern Russia. The YK-delta population declined 96% between the early 1970s and 1992 (Stehn et al. 1993). Data from the Prudhoe Bay oil fields (Warnock and Troy 1992) and information from Native elders at Wainwright, Alaska (R. Suydam, pers. comm. in USFWS 1996) suggested concurrent localized declines on the North Slope, although data for the entire North Slope breeding population were not available. Spectacled eiders molt in several discrete areas (Figure 4.1B) during late summer and fall, with birds from the different populations and genders apparently favoring different molting areas (Petersen et al. 1999). All three spectacled eider populations overwinter in openings in pack ice of the central Bering Sea, south and southwest of St. Lawrence Island (Petersen et al. 1999; Figure 4.2), where they remain until March–April (Lovvorn et al. 2003).

Life History

Breeding – In Alaska, spectacled eiders breed primarily on the North Slope (ACP) and the YK-delta. On the ACP, spectacled eiders breed north of a line connecting the mouth of the Utukok River to a point on the Shaviovik River about 24-km (15-mi) inland from its mouth. Breeding density varies across the ACP (Figure 4.2). Although spectacled eiders historically occurred throughout the coastal zone of the YK-delta, they currently breed primarily in the central coast zone within about 15-km (9-mi) of the coast from Kigigak Island north to Kokechik Bay (USFWS 1996). However, a number of sightings on the YK-delta have also occurred both north and south of this area during the breeding season (R. Platte, USFWS, pers. comm. 1997).

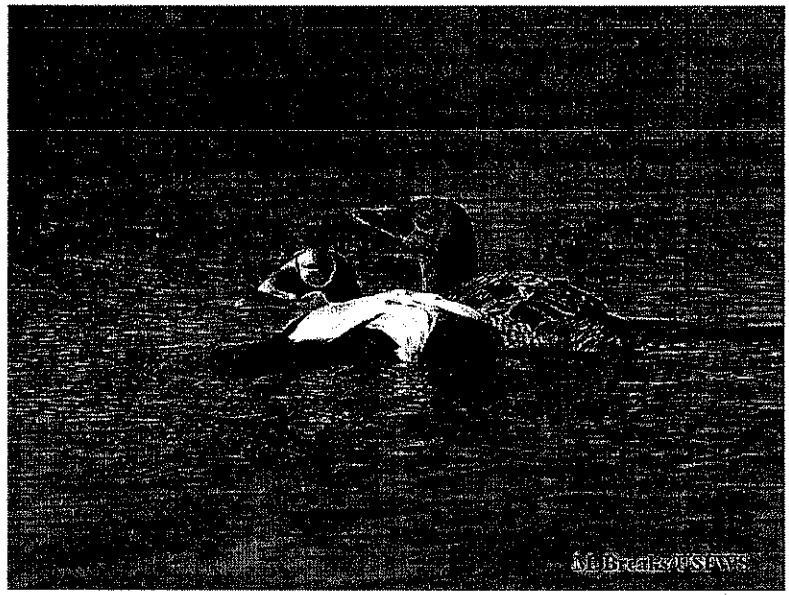
Spectacled eiders arrive on the ACP breeding grounds in late May to early June. Numbers of breeding pairs peak in mid-June and decline 4–5 days later when males begin to depart from the breeding grounds (Smith et al. 1994, Anderson and Cooper 1994, Anderson et al. 1995, Bart and Earnst 2005). Mean clutch size reported from studies on the Colville River Delta was 4.3 (Bart and Earnst 2005). Spectacled eider clutch size near Barrow has averaged 3.2–4.1, with clutches of up to eight eggs reported (Quakenbush et al. 1995, Safine 2011). Incubation lasts 20–25 days (Kondratev and Zadorina 1992, Harwood and Moran 1993, Moran and Harwood 1994, Moran 1995), and hatching occurs from mid- to late July (Warnock and Troy 1992).

Nest initiation on Kigigak Island on the YK-delta occurs from mid-May to mid-June (Lake 2007). Incubation lasts approximately 24 days (Dau 1974). Mean spectacled eider clutch size is higher on the YK-delta compared to the ACP. Mean annual clutch size ranged from 3.8–5.4 in coastal areas of the YK-delta (1985–2011; Fischer at al. 2011), and 4.0–5.5 on Kigigak Island (1992–2011; Gabrielson and Graff 2011), with clutches of up to eight eggs reported (Lake 2007).

On the breeding grounds, spectacled eiders feed on mollusks, insect larvae (craneflies, caddisflies, and midges), small freshwater crustaceans, and plants and seeds (Kondratev and Zadorina 1992) in shallow freshwater or brackish ponds, or on flooded tundra. Ducklings fledge approximately 50 days after hatch, when females with broods move from freshwater to marine habitat prior to fall migration.

Survivorship – Nest success is highly variable and thought to be influenced by predators, including gulls (*Larus* spp.), jaegers (*Stercorarius* spp.), and red (*Vulpes vulpes*) and arctic (*Alopex lagopus*) foxes. In arctic Russia, apparent nest success was estimated to be <2% in 1994 and 27% in 1995; low nest success was attributed to predation (Pearce et al. 1998). Apparent nest success in 1991 and 1993–1995 in the Kuparuk and Prudhoe Bay oil fields on the ACP was also low, varying from 25–40% (Warnock and Troy 1992, Anderson et al. 1998). On Kigigak Island in the YK-delta, nest survival probability ranged from 0.06–0.92 from 1992–2007 (Lake 2007); nest success tended to be higher in years with low fox numbers or activity (i.e., no denning) or when foxes were eliminated from the island prior to the nesting season. Bowman et al. (2002) also reported high variation in nesting success (20–95%) of spectacled eiders on the YK-delta, depending on year and location.

(A)



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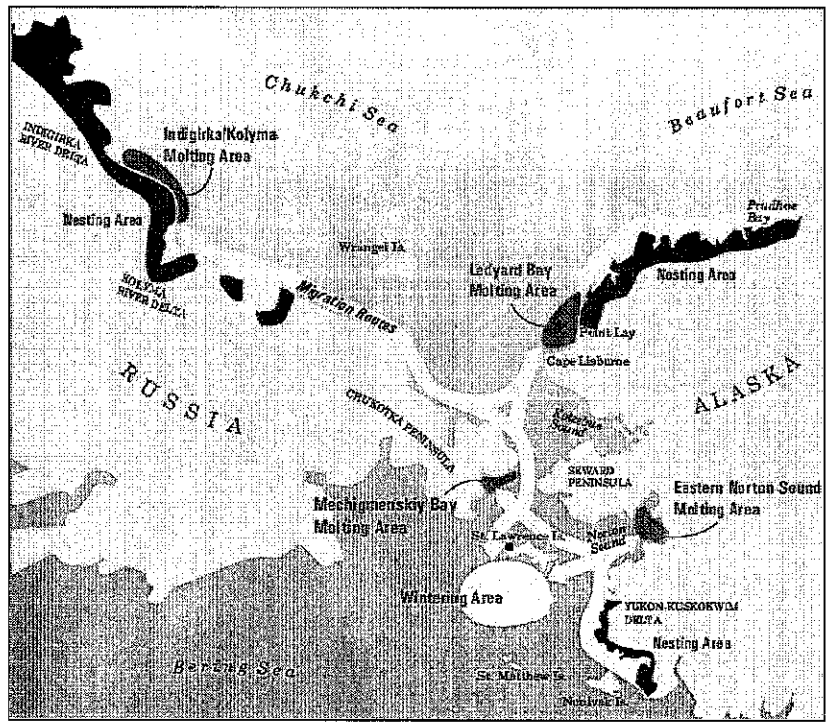

Figure 4.1. (A) Male and female spectacled eiders in breeding plumage. (B) Distribution of spectacled eiders. Molting areas (green) are used July –October. Wintering areas (yellow) are used October –April. The full extent of molting and wintering areas is not yet known and may extend beyond the boundaries shown.

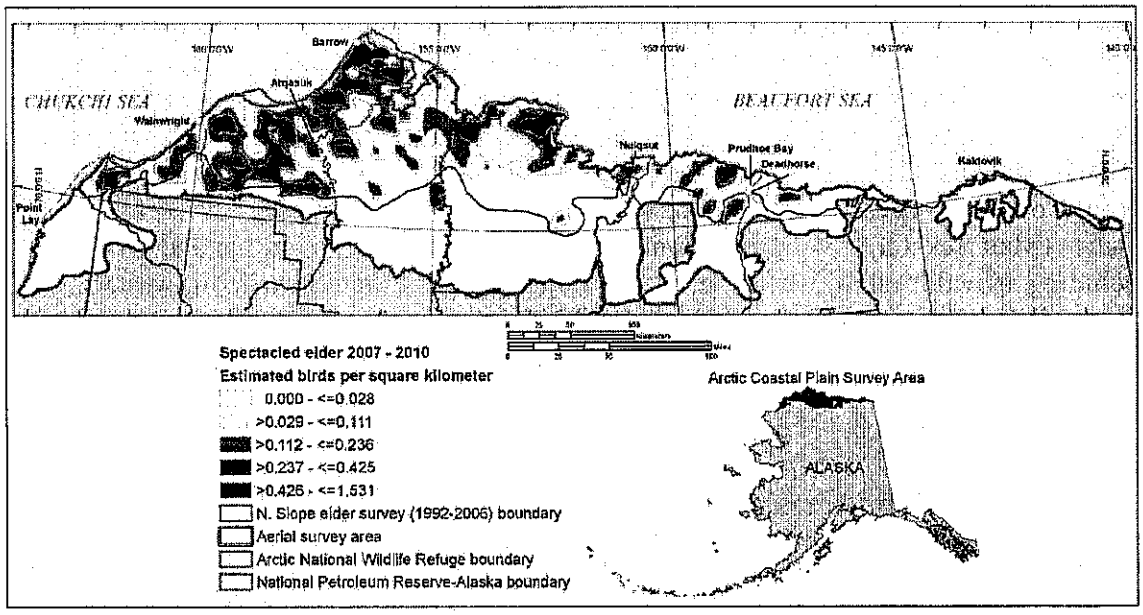

Figure 4.2. Density distribution of spectacled eiders observed on aerial transects sampling 57,336 km^2 of wetland tundra on the North Slope of Alaska during early to mid-June, 2007–2010 (Larned et al. 2011).

Available data indicate egg hatchability is high for spectacled eiders nesting on the ACP, in arctic Russia, and at inland sites on the YK-delta, but considerably lower in the coastal region of the YK-delta. Spectacled eider eggs that are addled or that do not hatch are very rare in the Prudhoe Bay area (Declan Troy, TERA, pers. comm. 1997), and Esler et al. (1995) found very few addled eggs on the Indigirka River Delta in Arctic Russia. Additionally, from 1969 to 1973 at an inland site on the Yukon Delta National Wildlife Refuge, only 0.8% of spectacled eider eggs were addled or infertile (Dau 1974). In contrast, 24% of all nests monitored in a coastal region of the YK-delta during the early to mid-1990s contained inviable eggs and ~10% of eggs in successful nests did not hatch due to either embryonic mortality or infertility (Grand and Flint 1997). This relatively high occurrence of inviable eggs near the coast of the YK-delta may have been related to exposure to contaminants (Grand and Flint 1997). It is unknown whether hatchability of eggs in this region has improved with decreased use of lead shot in the region and natural attenuation of existing lead pellets (Flint and Schamber 2010) in coastal YK-delta wetlands.

Recruitment rate (the percentage of young eiders that hatch, fledge, and survive to sexual-maturity) of spectacled eiders is poorly known (USFWS 1999) because there is limited data on juvenile survival. In a coastal region of the YK-delta, duckling survival to 30 days averaged 34%, with 74% of this mortality occurring in the first 10 days, while survival of adult females during the first 30 days post hatch was 93% (Flint and Grand 1997).

Fall migration and molting – As with many other sea ducks, spectacled eiders spend the 8–10 month non-breeding season at sea, but until recently much about the species' life in the marine environment was unknown. Satellite telemetry and aerial surveys led to the discovery of spectacled eider migrating, molting, and wintering areas. These studies are summarized in Petersen et al. (1995), Larned et al. (1995), and Petersen at al. (1999). Results of recent satellite telemetry research (2008–2011) are consistent with earlier studies (Matt Sexson, USGS, pers. comm.). Phenology, spring migration and breeding, including arrival, nest initiation, hatch, and fledging, is 3–4 weeks earlier in western Alaska (YK-delta) than northern Alaska (ACP); however, phenology of fall migration is similar between areas. Individuals depart breeding areas July–September, depending on their breeding status, and molt in September–October (Matt Sexson, USGS, pers. comm.).

Males generally depart breeding areas on the North Slope (ACP) when the females begin incubation in late June (Anderson and Cooper 1994, Bart and Earnst 2005). Use of the Beaufort Sea by departing males is variable. Some appear to move directly to the Chukchi Sea over land, while the majority move rapidly (average travel of 1.75 days), over near shore waters from breeding grounds to the Chukchi Sea (TERA 2002). Of 14 males implanted with satellite transmitters, only four spent an extended period of time (11–30 days), in the Beaufort Sea (TERA 2002). Preferred areas for males appeared to be near large river deltas such as the Colville River where open water is more prevalent in early summer when much of the Beaufort Sea is still frozen. Most adult males marked with satellite transmitters in northern and western Alaska in a recent satellite telemetry study migrated to northern Russia to molt (USGS, unpublished data). Results from this study also suggest that male eiders likely follow coast lines but also migrate straight across the northern Bering and Chukchi seas en route to northern Russia (Matt Sexson, USGS, pers. comm.).

Females generally depart the breeding grounds later, when much more of the Beaufort Sea is ice-free, allowing more extensive use of the area. Females spent an average of two weeks in the Beaufort Sea (range 6-30 days) with the western Beaufort Sea the most heavily used (TERA 2002). Females also appeared to migrate through the Beaufort Sea an average of 10 km further offshore than males (Petersen et al. 1999). The greater use of the Beaufort Sea and offshore areas by females was attributed to the greater availability of open water when females depart the area (Petersen et al. 1999, TERA 2002). Recent telemetry data indicates that molt migration of failed/non-breeding females from the Colville River Delta through the Beaufort Sea is relatively rapid, 2–weeks, compared to 2–3 months spent in the Chukchi Sea (Matt Sexson, USGS, pers. comm.).

Spectacled eiders use specific molting areas from July to late October/early November. Larned et al. (1995) and Petersen et al. (1999) discussed spectacled eiders' apparently strong preference for specific molting locations, and concluded that all spectacled eiders molt in four discrete areas (Table 4.1). Females generally used molting areas nearest their breeding grounds. All marked females from the YK-delta molted in nearby Norton Sound, while females from the North Slope molted in Ledyard Bay, along the Russian

coast, and near St. Lawrence Island. Males did not show strong molting site fidelity; males from all three breeding areas molted in Ledyard Bay, Mechigmenskiy Bay, and the Indigirka/Kolyma River Delta. Males reached molting areas first, beginning in late June, and remained through mid-October. Non-breeding females, and those that nested but failed, arrived at molting areas in late July, while successfully-breeding females and young of the year reached molting areas in late August through late September and remained through October. Fledged juveniles marked on the Colville River Delta usually staged in the Beaufort Sea near the delta for 2–3 weeks before migrating to the Chukchi Sea.

Table 4.1 Important staging and molting areas for female and male spectacled eiders from each breeding population.

Population and Sex	Known Major Staging/Molting Areas
Arctic Russia Males	Northwest of Medvezhni (Bear) Island group
	Mechigmenskiy Bay
	Ledyard Bay
Arctic Russia Females	unknown
North Slope Males	Ledyard Bay
	Northwest of Medvezhni (Bear) Island group
	Mechigmenskiy Bay
North Slope Females	Ledyard Bay
	Mechigmenskiy Bay
	West of St. Lawrence Island
YK-delta Males	Mechigmenskiy Bay Northeastern Norton Sound
YK-delta Females	Northeastern Norton Sound

Avian molt is energetically demanding, especially for species such as spectacled eiders that complete molt in a few weeks. Molting birds must have ample food resources, and the rich benthic community of Ledyard Bay (Feder et al. 1989, 1994a, 1994b) likely provides these for spectacled eiders. Large concentrations of spectacled eiders molt in Ledyard Bay to use this food resource; aerial surveys on 4 days in different years counted 200 to 33,192 molting spectacled eiders in Ledyard Bay (Petersen et al. 1999; Larned et al. 1995).

Wintering – Spectacled eiders generally depart all molting sites in late October/early November (Matt Sexson, USGS, pers. comm.), migrating offshore in the Chukchi and Bering Seas to a single wintering area in openings in pack ice of the central Bering Sea south/southwest of St. Lawrence Island (Figure 4.1). In this relatively shallow area, > 300,000 spectacled eiders (Petersen et al. 1999) rest and feed, diving up to 230 ft (70 m) to eat bivalves, other mollusks, and crustaceans (Cottam 1939, Petersen et al. 1998, Lovvorn et al. 2003, Petersen and Douglas 2004).

Spring migration – Recent information indicates spectacled eiders likely make extensive use of the eastern Chukchi spring lead system between departure from the wintering area

in March and April and arrival on the North Slope in mid-May or early June. Limited spring aerial observations in the eastern Chukchi Sea have documented dozens to several hundred common eiders (*Somateria mollissima)* and spectacled eiders in spring leads and several miles offshore in relatively small openings in rotting sea ice (W. Larned, USFWS; J. Lovvorn, University of Wyoming, pers. comm.). Woodby and Divoky (1982) documented large numbers of king (*Somateria spectabilis*) and common eiders using the eastern Chukchi lead system, advancing in pulses during days of favorable following winds, and concluded that an open lead is probably requisite for spring eider passage in this region. Preliminary results from an ongoing satellite telemetry study conducted by the USGS Alaska Science Center (Figure 4.3; USGS, unpublished data) suggest that spectacled eiders also use the lead system during spring migration.

Adequate foraging opportunities and nutrition during spring migration are critical to spectacled eider productivity. Like most sea ducks, female spectacled eiders do not feed substantially on the breeding grounds, but produce and incubate eggs while living primarily off body reserves (Korschgen 1977, Drent and Daan 1980, Parker and Holm 1990). Clutch size, a measure of reproductive potential, was positively correlated with body condition and reserves obtained prior to arrival at breeding areas (Coulson 1984, Raveling 1979, Parker and Holm 1990). Body reserves must be maintained from winter or acquired during the 4-8 weeks (Lovvorn et al. 2003) of spring staging, and Petersen and Flint (2002) suggest common eider productivity on the western Beaufort Sea coast is influenced by conditions encountered in May to early June during migration through the Chukchi Sea (including Ledyard Bay). Common eider female body mass increased 20% during the 4-6 weeks prior to egg laying (Gorman and Milne 1971, Milne 1976, Korschgen 1977, Parker and Holm 1990). For spectacled eiders, average female body weight in late March in the Bering Sea was 1,550 ± 35 g (n = 12), and slightly (but not significantly) more upon arrival at breeding sites (1,623 ± 46 g, n = 11; Lovvorn et al. 2003), suggesting that spectacled eiders maintain or enhance their physiological condition during spring staging.

Abundance and trends

The most recent rangewide estimate of abundance of spectacled eiders was 369,122 (364,190–374,054 90% CI), obtained by aerial surveys of the known wintering area in the Bering Sea in late winter 2010 (Larned et al. 2012). Comparison of point estimates between 1997 and 2010 indicate an average of 353,051 spectacled eiders (344,147-361956 90% CI) in the global population over that 14-year period (Larned et al. 2012).

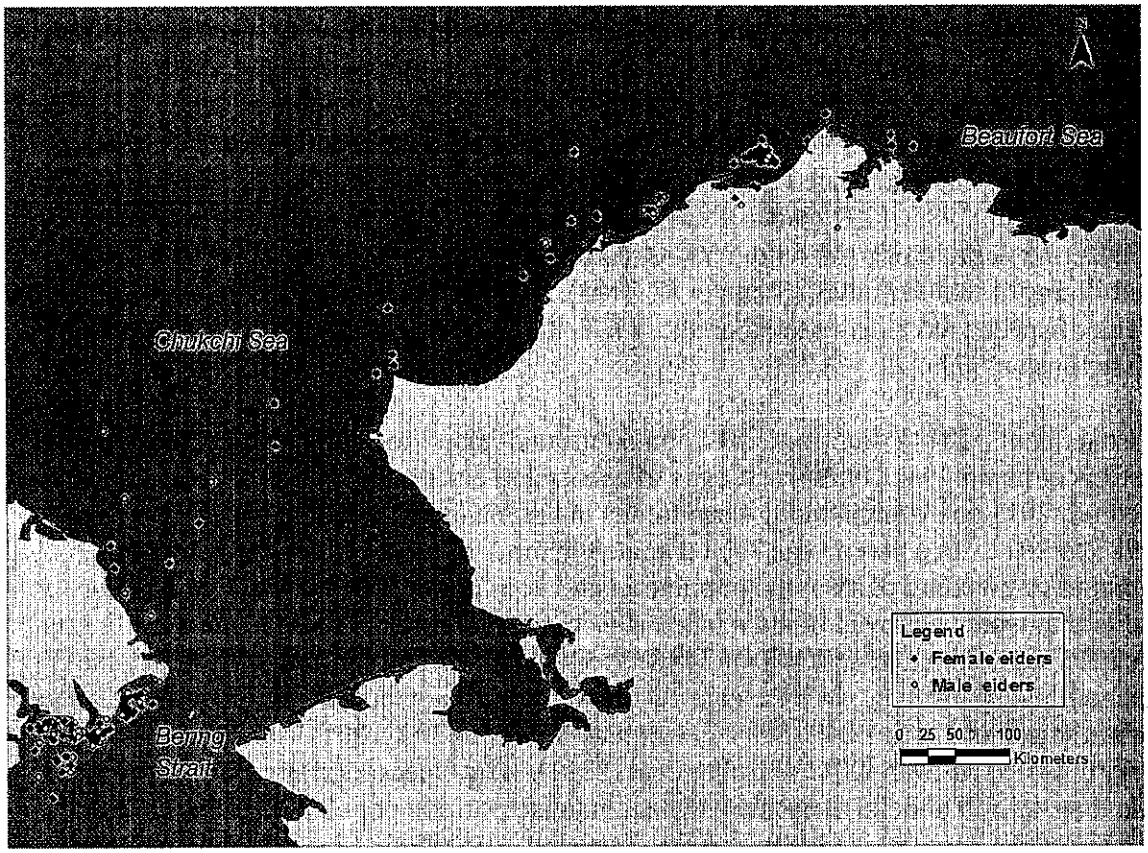

Figure 4.3. Spectacled eider satellite telemetry locations for 12 female and 7 male spectacled eiders in the eastern Chukchi Sea from 1 April – 15 June 2010 and 1 April – 15 June 2011. Additional locations from the northern coast of Russia are not shown. Eiders were tagged on the North Slope during the 2009 and 2010 breeding seasons. Data provided by Matt Sexson, USGS Alaska Science Center (USGS, unpublished).

Population indices for North Slope-breeding spectacled eiders are unavailable prior to 1992. However, Warnock and Troy (1992) documented an 80% decline in spectacled eider abundance from 1981 to 1991 in the Prudhoe Bay area. Since 1992, the Service has conducted annual aerial surveys for breeding spectacled eiders on the ACP. The 2010 population index based on these aerial surveys was 6,286 birds (95% CI, 4,877–7,695; unadjusted for detection probability), which is 4% lower than the 18-year mean (Larned et al 2011). In 2010, the index growth rate was significantly negative for both the long-term (0.987; 95% CI, 0.974–0.999) and most recent 10 years (0.974; 95% CI, 0.950–0.999; Larned et al. 2011). Stehn et al. (2006) developed a North Slope-breeding population estimate of 12,916 (95% CI, 10,942–14,890) based on the 2002–2006 ACP aerial index for spectacled eiders and relationships between ground and aerial surveys on the YK-delta. If the same methods are applied to the 2007–2010 ACP aerial index reported in Larned et al. (2011), the resulting adjusted population estimate for North Slope-breeding spectacled eiders is 11,254 (8,338–14,167, 95% CI).

The YK-delta spectacled eider population was thought to be about 4% of historical levels in 1992 (Stehn et al. 1993). Evidence of the dramatic decline in spectacled eider nesting on the YK-delta was corroborated by Ely et al. (1994). They documented a 79% decline in eider nesting between 1969 and 1992 for areas near the Kashunuk River. Aerial and ground survey data indicated that spectacled eiders were undergoing a decline of 9–14% per year from 1985–1992 (Stehn et al. 1993). Further, from the early 1970s to the early 1990s, the number of pairs on the YK-delta declined from 48,000 to 2,000, apparently stabilizing at that low level (Stehn et al. 1993). Before 1972, an estimated 47,700–70,000 pairs of spectacled eiders nested on the YK-delta in average to good years (Dau and Kistchinski 1977).

Fischer et al. (2011) used combined annual ground-based and aerial survey data to estimate the number of nests and eggs of spectacled eiders on the coastal area of the YK-delta in 2011 and evaluate long-term trends in the YK-delta breeding population from 1985 to 2011. In a given year, the estimated number of nests reflects the minimum number of breeding pairs in the population and does not include non-nesting breeders or nests that were destroyed or abandoned (Fischer et al. 2011). The total number of nests in 2011 was estimated at 3,608 (SE 448) spectacled eiders nests on the YK-delta, the second lowest estimate over the past 10 years. The average population growth rate based on these surveys was 1.049 (90% CI = 0.994–1.105) in 2002–2011 and 1.003 (90% CI = 0.991–1.015) in 1985–2011 (Fischer et al. 2011). Log-linear regression based solely on the long-term YK-delta aerial survey data indicate positive population growth rates of 1.073 (90% CI = 1.046–1.100) in 2001–2010 and 1.070 (90% CI = 1.058–1.081) in 1988–2010 (Platte and Stehn 2011).

Spectacled eider recovery criteria

The Spectacled Eider Recovery Plan (USFWS 1996) presents research and management priorities with the objective of recovery and delisting so that protection under the ESA is no longer required. Although the cause or causes of the spectacled eider population decline is not known, factors that affect adult survival are likely to be the most influential on population growth rate. These include lead poisoning from ingested spent shotgun pellets, which may have contributed to the rapid decline observed in the YK-delta (Franson et al. 1995, Grand et al. 1998), and other factors such as habitat loss, increased nest predation, over harvest, and disturbance and collisions caused by human infrastructure. Under the Recovery Plan, the species will be considered recovered when each of the three recognized populations (YK-delta, North Slope of Alaska, and Arctic Russia): 1) is stable or increasing over 10 or more years and the minimum estimated population size is at least 6,000 breeding pairs, or 2) number at least 10,000 breeding pairs over 3 or more years, or 3) number at least 25,000 breeding pairs in one year. Spectacled eiders do not currently meet these recovery criteria.

5. ENVIRONMENTAL BASELINE

This section provides an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or critical habitat within the action area.

Spectacled eider

Status of spectacled eiders within the action area

Spectacled eiders are present in the action area from late May through late October. In summer, spectacled eiders are widely distributed near lakes or coastal margins throughout this area with a trend toward higher abundance towards the coast and within the Colville River Delta. Just west of the project area, in the Kuparuk oilfield, spectacled eiders nested primarily in non-patterned wet meadows within wetland complexes containing emergent grasses and sedges (Anderson and Cooper 1994, Anderson et al. 2009). After hatching, spectacled eider hens and broods occupy deep *Arctophila* and shallow *Carex* habitat (Safine 2011).

Factors which may have contributed to the current status of spectacled eiders in the action area include environmental contaminants, increased predation, collisions with structures, long-term habitat loss through development and disturbance, and climate change. These impacts are occurring throughout much of the species' range, including within the action area.

For example, existing oil and gas industry developments in the nearby Kuparuk River Unit have resulted in long-term loss of spectacled eider breeding habitat in the action area directly through gravel fill and indirectly through disturbance from oilfield activities. Given the extent of development, it is likely that eiders in the action area have experienced some loss of reproductive potential resulting from direct and indirect habitat loss. However, the degree to which spectacled eiders can reproduce in disturbed areas or move to other less disturbed areas to reproduce, and the potential population level consequences of existing development near the action area, are unknown.

Regional activities requiring formal section 7 consultation

Activities on the eastern ACP that required formal section 7 consultations, and the estimated associated incidental take of listed eiders, is presented in Table 5.1. The table illustrates the number and diversity of actions that have required consultation in the region. We believe these estimates have overestimated, possibly significantly, actual take. Actual take is spread over the life-span of a project, and is dominated by the potential loss of eggs/ducklings, which we expect to have substantially lower population-level effects compared to adult mortality for this species (see further discussion *Effects of the Action on Listed Species*).

Table 5.1 - Activities on the eastern Arctic Coastal Plain that required formal section 7 consultations and the amount of incidental take authorized. Listed activities include those where effects to listed eiders may occur in the Colville River Delta east to the Sagavanirktok River.

Project Name	Impact Type	Estimated Incidental Take
Intra-Service, Issuance of Section 10 permits for spectacled eider (2000)	Disturbance Collection	10 spectacled eiders 10 spectacled eider eggs 25 spectacled eiders
Alpine Development Project (2004)	Habitat loss Collisions	4 spectacled eider eggs/ducklings 3 adult spectacled eiders
ABR Avian Research/USFWS Intra-Service Consultation (2005)	Disturbance	5 spectacled eider eggs/ducklings
Pioneer's Oooguruk Project (2006)	Habitat loss Collisions	3 spectacled eider eggs/ducklings 3 adult spectacled eiders
Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2006)	Disturbance	7 spectacled eider eggs/ducklings
KMG Nikaitchuq Project (2006)	Habitat loss Collisions	2 spectacled eiders/year 7 adult spectacled eiders
BP 69kV powerline between Z-Pad and GC 2 (2006)	Collisions	10 adult spectacled eiders
BP Liberty Project (2007)	Habitat loss Collisions	2 spectacled eider eggs/ducklings 1 adult spectacled eider
Intra-service on Subsistence Hunting Regulations (2007)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2007)	Disturbance	21 spectacled eider eggs/ducklings
Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2007)	Disturbance	6 spectacled eider eggs/ducklings
Intra-service on Subsistence Hunting Regulations (2008)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2008)	Disturbance	56 spectacled eider eggs/ducklings
BLM Northern Planning Areas of NPR-A (2008)	Disturbance Collision	87 spectacled eider eggs/ducklings/year 12 Steller's eider eggs/ducklings/year < 7 adult spectacled eiders < 1 adult Steller's eider
MBM/USFWS Intra-Service, Shorebird studies and white-fronted goose banding in NPR-A (2008)	Disturbance	21 spectacled eider eggs/ducklings
BP Alaska's Northstar Project (2009)	Collisions	≤ 2 adult spectacled eiders/year ≤ 1 adult Steller's eider/year
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2009; North Slope field sites)	Loss of Production Capture/surgery	130 spectacled eider eggs/ducklings 4 adult spectacled eiders
Intra-service on Subsistence Hunting Regulations (2009)	No estimate of incidental take provided	

BLM Programmatic on Summer Activities in NPR-A (2009)	Disturbance	49 spectacled eider eggs/ducklings
Minerals Management Service Beaufort and Chukchi Sea Program Area Lease Sales (2009)	Collision	12 adult spectacled eiders <1 adult Steller's eider
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2010)	No estimate of incidental take provided	
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2010; North Slope field sites)	Loss of Production Capture/handling/ surgery	130 spectacled eider eggs/ducklings 7 adult/juvenile spectacled eiders (lethal take) 108 adult/juvenile spectacled eiders (non-lethal take)
BLM Programmatic on Summer Activities in NPR-A (2010)	Disturbance	32 Spectacled eider eggs
Intra-Service, USFWS Migratory Bird Management goose banding on the North Slope of Alaska (2010)	Disturbance	4 spectacled eider eggs/ducklings
Intra-Service, Section 10 permit for ABR Inc.'s eider survey work on the North Slope and at Cook Inlet (2010)	Disturbance	35 spectacled eider eggs/ducklings
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2011)	Shooting	400 adult spectacled eiders (lethal take) 4 adult Steller's eiders (lethal take)
Intra-Service, Section 10 permit for ABR Inc.'s eider survey work on the North Slope and at Cook Inlet (2011)	Disturbance	20 spectacled eider eggs/ducklings
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2011; Colville River Delta field site)	Capture/handling/ surgery	65 juvenile + 13 adult spectacled eiders (non-lethal take) 7 adult/juvenile spectacled eiders (lethal take)
ConocoPhillips Alaska, Inc's CD-5 Project (Alpine reinitiation; 2011)	Habitat loss	59 spectacled eider eggs/ducklings
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2012)	Shooting	400 adult spectacled eiders (lethal take) 4 adult Steller's eiders (lethal take)

6. EFFECTS OF THE ACTION ON LISTED SPECIES

This section of the BO provides an analysis of the effects of the action on listed species and, where appropriate, critical habitat. Both direct effects (effects immediately attributable to the action) and indirect effects (effects that are caused by or will result from the proposed action and may be later in time, but are still reasonably certain to occur) are considered. Interrelated and interdependent effects of the action are also discussed.

Our analyses of the effects of the action on species listed under the ESA include consideration of ongoing and projected changes in climate. The terms "climate" and "climate change" are defined by the Intergovernmental Panel on Climate Change (IPCC). "Climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or

longer periods also may be used (IPCC 2007). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Effects to spectacled eiders

Spectacled eiders in the action area could be subject to direct and indirect effects of the proposed activities. Direct effects are those that occur when there is an immediate effect on listed species or habitat (e.g., excavation of gravel material from tundra habitat). Indirect effects are caused by or result from the proposed action and may occur outside the directly affected area (e.g., disturbance from construction equipment may displace individuals from adjacent habitat).

Because development of the material sites would take place during the period when listed eiders nest (June 1 - July 31), disturbance of nesting females, eggs, or young broods from fill excavation could occur. Although site specific data are not available, aerial survey data from multiple years indicate listed eider density in the surrounding area is low (Larned et al. 2011). Furthermore, given levels of existing activity and disturbance in the action area (traffic), we would expect listed eiders nesting in the action area to be rare. Therefore, disturbance of nesting females or eggs would be unlikely. Finally, if project activities take place after July 31, we expect potential effects to broods would be unlikely because hens with ducklings more than a few days old would be able to move away from disturbances. Because hens with broods would not experience persistent disturbance or impairment of behavior to the point that injury or death would occur, we expect direct effects of the proposed action on reproductive eiders to be insignificant.

The proposed action would also result in direct and indirect habitat loss for spectacled eiders. Direct loss of nesting or brood rearing habitat would occur by development or expansion of several material sites along the proposed route (Appendix 1). However, not all material sites occur in tundra habitat (e.g., MS 65-9-026-2), or some portion of the proposed excavation is within the Sagavirniktok riverbed and therefore would not be suitable for nesting. We estimate remaining development or expansion of the proposed material sites would result in a direct loss of approximately 2,923.8 acres (11.8 km^2) of listed eider habitat. Additionally, indirect habitat loss may occur through increased activity at material sites over the life of the project, which could discourage nesting or displace listed eiders from adjacent habitat. To estimate indirect effects to adjacent habitat, we assume disturbance could displace eiders from habitat within a 200-m zone of influence surrounding the proposed material sites. Aerial survey data show the surrounding area is occupied by 0.029-0.111 spectacled eiders/km^2 (Figure 19 in Larned et al. 2011). To estimate the number of eider nests likely to be displaced, we multiplied

the median density of eiders in the region (0.07 eiders/km^2 or 0.035 nests/km^2) by the size of the disturbance footprint (approximately 4,460 acres or 18.05 km^2). Despite the admitted imprecision of this calculation, we estimate the proposed action could result in a potential loss in production of 0.63 spectacled eider nests/year. Because average clutch size for spectacled eiders in northern Alaska is 3.9 (Petersen et al. 2000, Bart and Earnst 2005, Johnson et al. 2008), this would translate to a loss of 6.5 eggs over the duration of the proposed action. This level of impact is minor, and population level effects from the loss of approximately 7 eggs are not anticipated.

In addition to reproductive eiders, non-breeding or migrating spectacled eiders could also be present in the action area as early as May, and these birds could be subject to potential disturbance from the proposed action. However, we expect disturbance to non-breeding or migrating eiders would be insignificant because birds would likely experience only minor and temporary changes in behavior such as moving away to a perceived safe distance. Because disturbance to non-breeding or migrating eiders would be so minor that injury or death would not occur, we expect project effects to these birds to be insignificant.

To summarize, we estimate that the proposed action would result in the loss of up to 2 spectacled eider nests or 7 eggs over an assumed 3-year span of the project through direct loss of breeding habitat and displacement from a 200-m zone of influence surrounding the project area. These estimates are based on a series of conservative assumptions and represent estimated maximum potential impact to spectacled eiders.

7. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. When analyzing cumulative effects of a proposed action, it is important to define both the spatial (geographic), and temporal (time) boundaries. Within these boundaries, the types of actions that are reasonably foreseeable are considered.

Future development by the State of Alaska or the North Slope Borough may occur in the area through developments like improved roads, transportation facilities, utilities or other infrastructure. However, the entire action area, and the undeveloped lands surrounding are wetlands, and are therefore subject to Section 404 permitting requirements by the USACE. This permitting process would serve as a federal nexus, and hence trigger a review of any major state or borough construction project in the area.

8. CONCLUSION

Regulations (51 CFR 19958) that implement section 7(a)(2) of the ESA define "jeopardize the continued existence of" as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species."

Spectacled eider

In evaluating the impacts of the proposed project to spectacled eiders, the Service identified direct and indirect adverse effects that could result from habitat loss and disturbance. Using methods explained in the *Effects of the Action* section, the Service estimates the loss of 7 spectacled eider eggs from 2 nests. However, we expect this loss of production will not have a significant effect at the population level because only a small proportion of spectacled eider eggs or ducklings on the North Slope would eventually survive to recruit into the breeding populations.

Given that the potential loss in production from the proposed action is an extremely small proportion of the estimated North Slope-breeding population of spectacled eiders (10,942–14,890, 95% CI; Stehn et al. 2006), and this loss would be distributed across 3 years, we believe the loss of production that may result from the Dalton Highway rehabilitation project will not significantly affect the likelihood of survival and recovery of spectacled eiders. After reviewing the current status of the species, the environmental baseline, and effects of the proposed action, the Service concludes that the proposed action *is not likely to jeopardize the continued existence* of the spectacled eider by reducing appreciably the likelihood of its survival and recovery in the wild by reducing reproduction, numbers, or distribution of the species.

Future Consultation

In addition to listed eiders and polar bears, the area affected by the Dalton Highway rehabilitation project may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered. The Service, through future consultation may recommend alternatives to future developments within the project area to prevent activity that will contribute to a need to list such a species or their habitat. The Service may require alternatives to proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of designated or proposed critical habitat. The Federal action agencies should not authorize any activity that may affect such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended (16 U.S.C. 1531 et seq.), including completion of any required procedure for conference or consultation.

9. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. "Harm" is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, is not considered a prohibited taking provided that such taking is in compliance with the terms of this Incidental Take Statement (ITS).

ADOTPF has a continuing duty to regulate the activity covered by this ITS. If ADOTPF fails to require any applicant to adhere to the ITS through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse.

Spectacled Eider

As described in *Effects of the Action*, the activities described and assessed in this BO may adversely affect spectacled eiders through direct and indirect long-term habitat loss. Long-term habitat loss would occur directly from placement of gravel fill and indirectly through disturbance associated with project operations. Methods used to estimate loss of spectacled eider production resulting from long-term habitat loss are described in the *Effects of the Action* section. Based on these estimates of loss of spectacled eider production, the Service anticipates that up to *2 nests or 7 spectacled eider eggs or ducklings* are likely to be taken as a result of the proposed action through long-term direct and indirect habitat loss (harm).

While the incidental take statement provided in this consultation satisfies the requirements of the ESA, it does not constitute an exemption from the prohibitions of take of listed migratory birds under the more restrictive provisions of the Migratory Bird Treaty Act. However, the Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703–712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668–668d), if such take is in compliance with the conditions specified herein.

10. REINITIATION NOTICE

This concludes formal consultation for the Dalton Highway MP 362–414 Rehabilitation Project. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

1. The amount or extent of incidental take for spectacled eiders is exceeded;
    a. More than 2 nests or 7 spectacled eider eggs or ducklings taken over the life of the project;
2. New information reveals effects of the action agency that may affect listed species in a manner or to an extent not considered in this opinion;
3. The agency action is subsequently modified in a manner that causes an effect to listed species not considered in this opinion; or
4. A new species is listed or critical habitat is designated that may be affected by the action.

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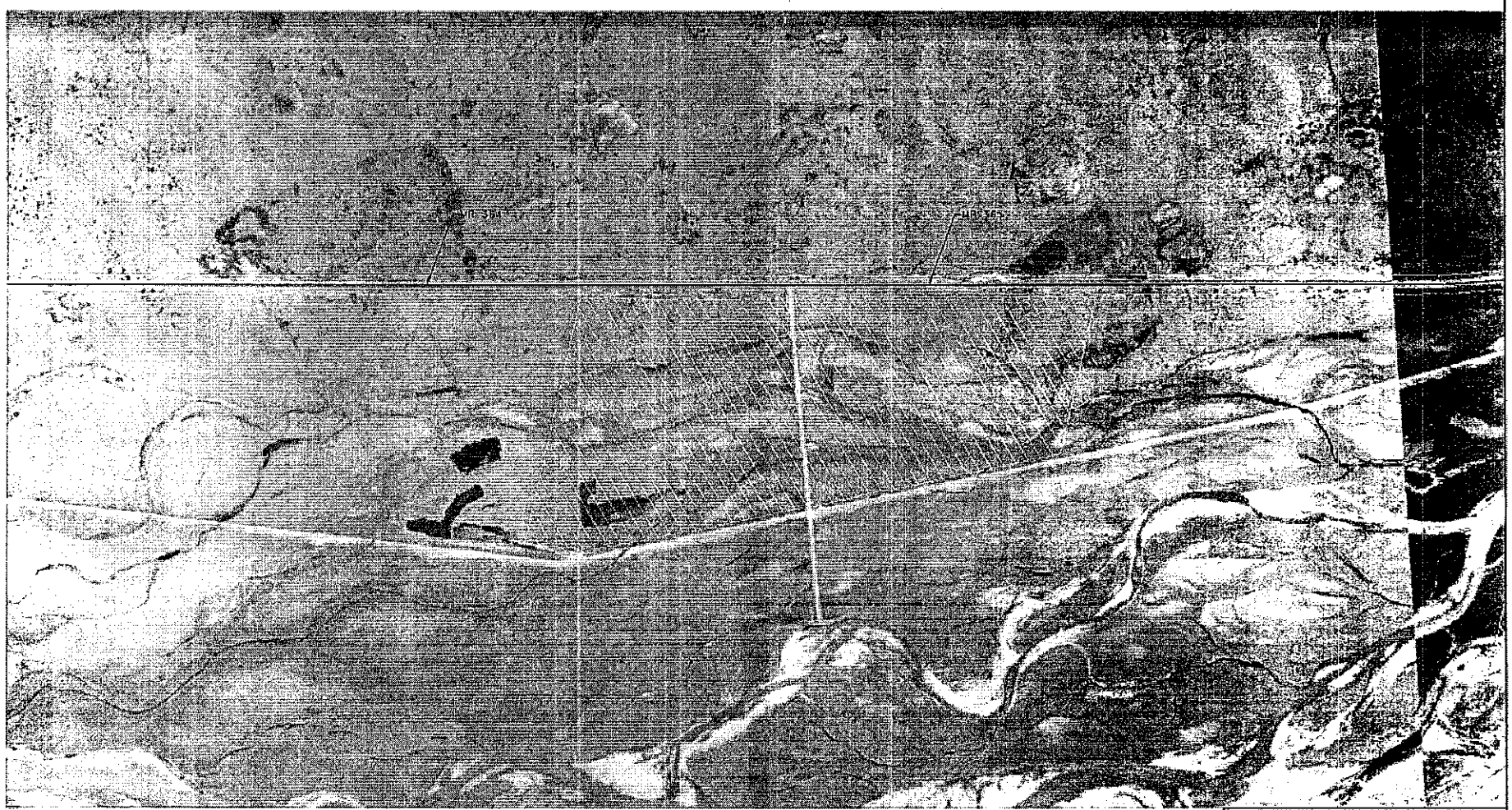
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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT
FIGURE: 6
DRAWN: EJM
APPROVED:
DATE: MARCH 2011
DALTON HIGHWAY
MP 362-414
RECONSTRUCTION
PROJECT NO. NH-HPP-DP-065-7(3)
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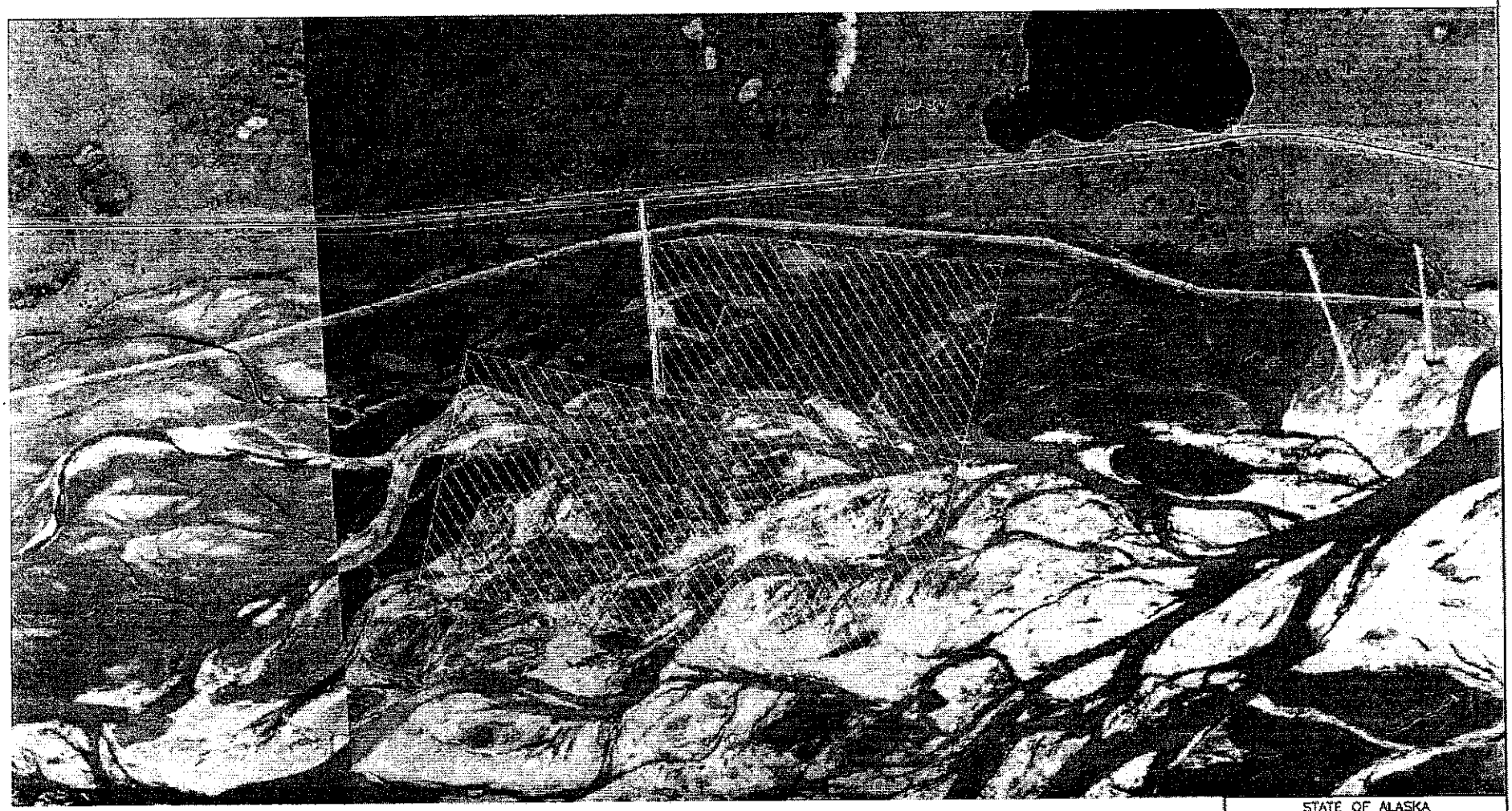

MS 65-9-038-2

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT

FIGURE: 7	DALTON HIGHWAY MP 362-414 RECONSTRUCTION
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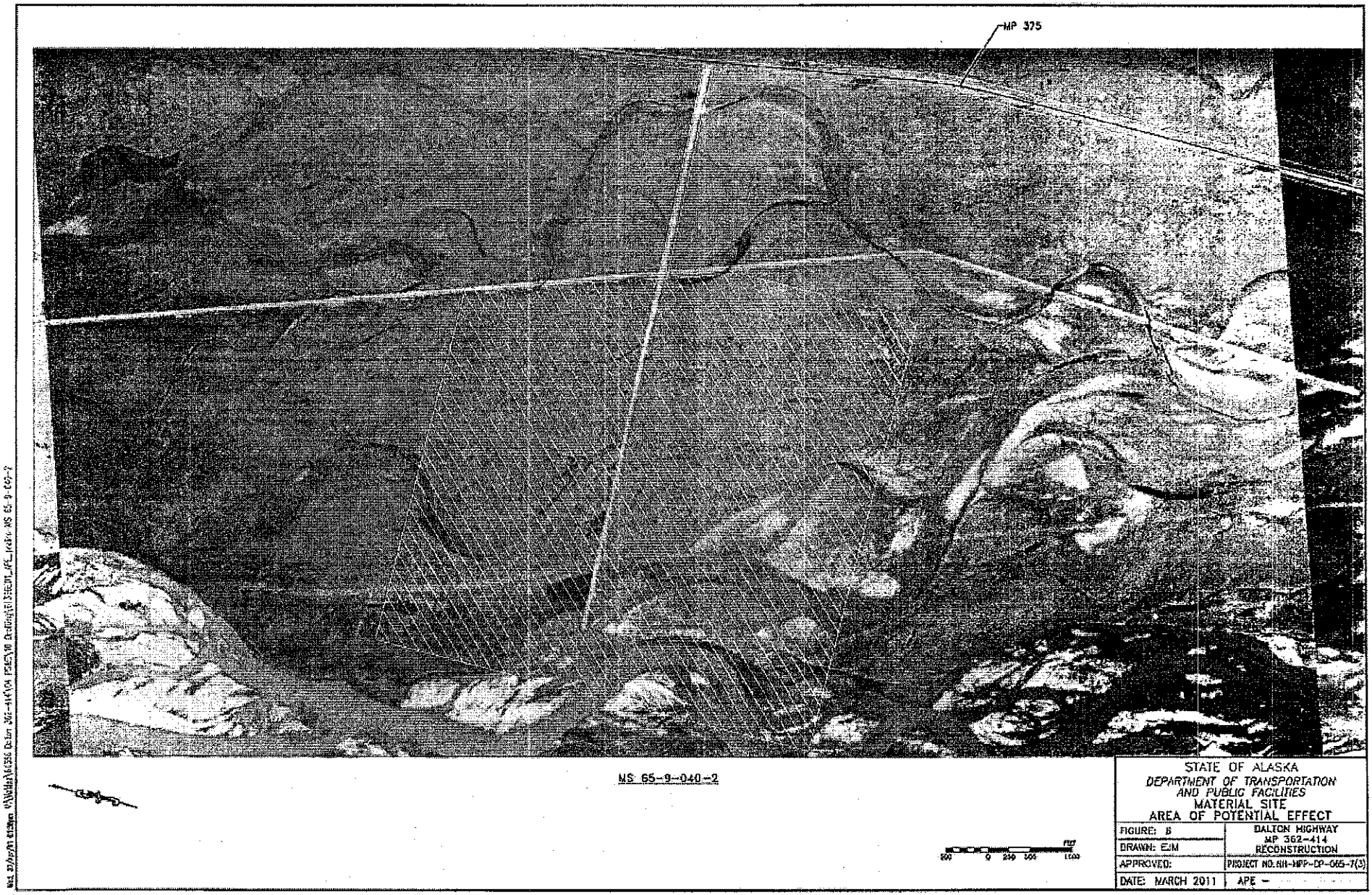
APPROVED:	PROJECT NO. NH-HPP-0P-065-7(3)
DATE: MARCH 2011	APE -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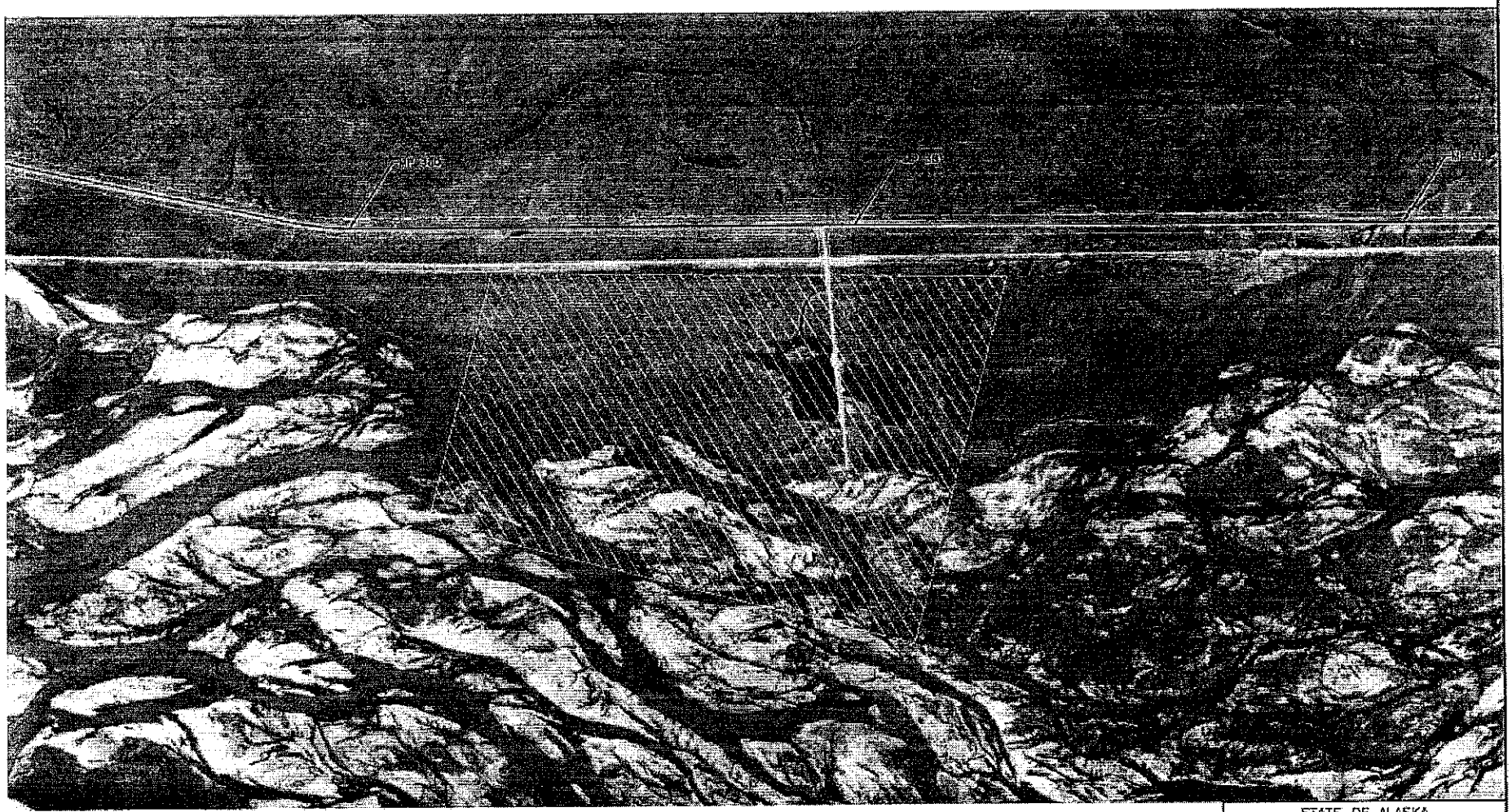
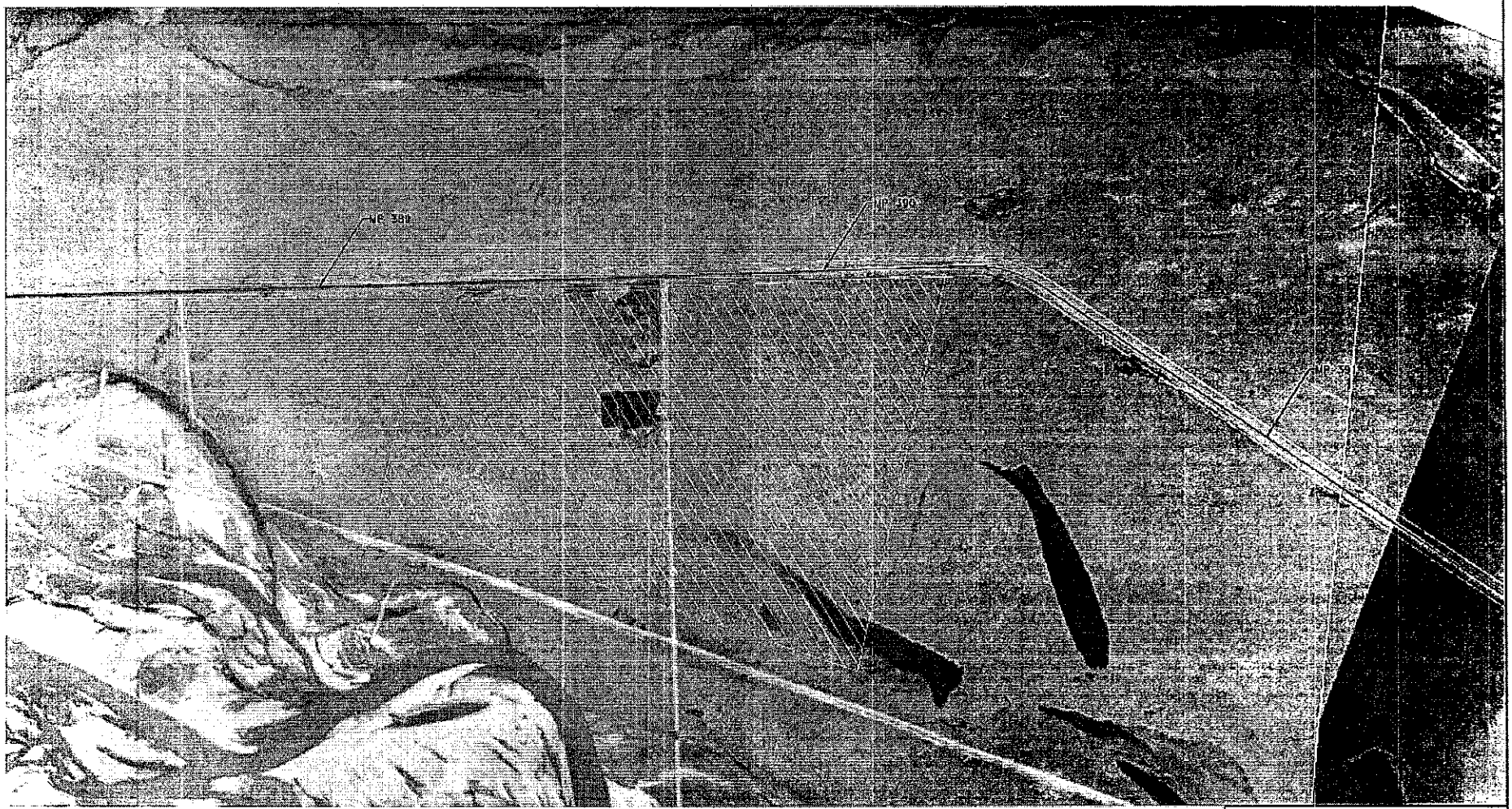
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT
FIGURE: B
DRAWN: EJM
APPROVED:
DATE: MARCH 2011
DALTON HIGHWAY
MP 362-414
RECONSTRUCTION
PROJECT NO. NH-HPP-DP-065-7(3)
APE -



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT

FIGURE: 9	DALTON HIGHWAY MP 362-414 RECONSTRUCTION
DRAWN: EJM	
APPROVED:	PROJECT NO. NH-HFP-DP-065-7(3)
DATE: MARCH 2011	APE -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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT
FIGURE: 10
DRAWN: EJM
APPROVED:
DATE: MARCH 2011
DALTON HIGHWAY
MP 362-414
RECONSTRUCTION
PROJECT NO.NH-HPP-CP-065-2(3)
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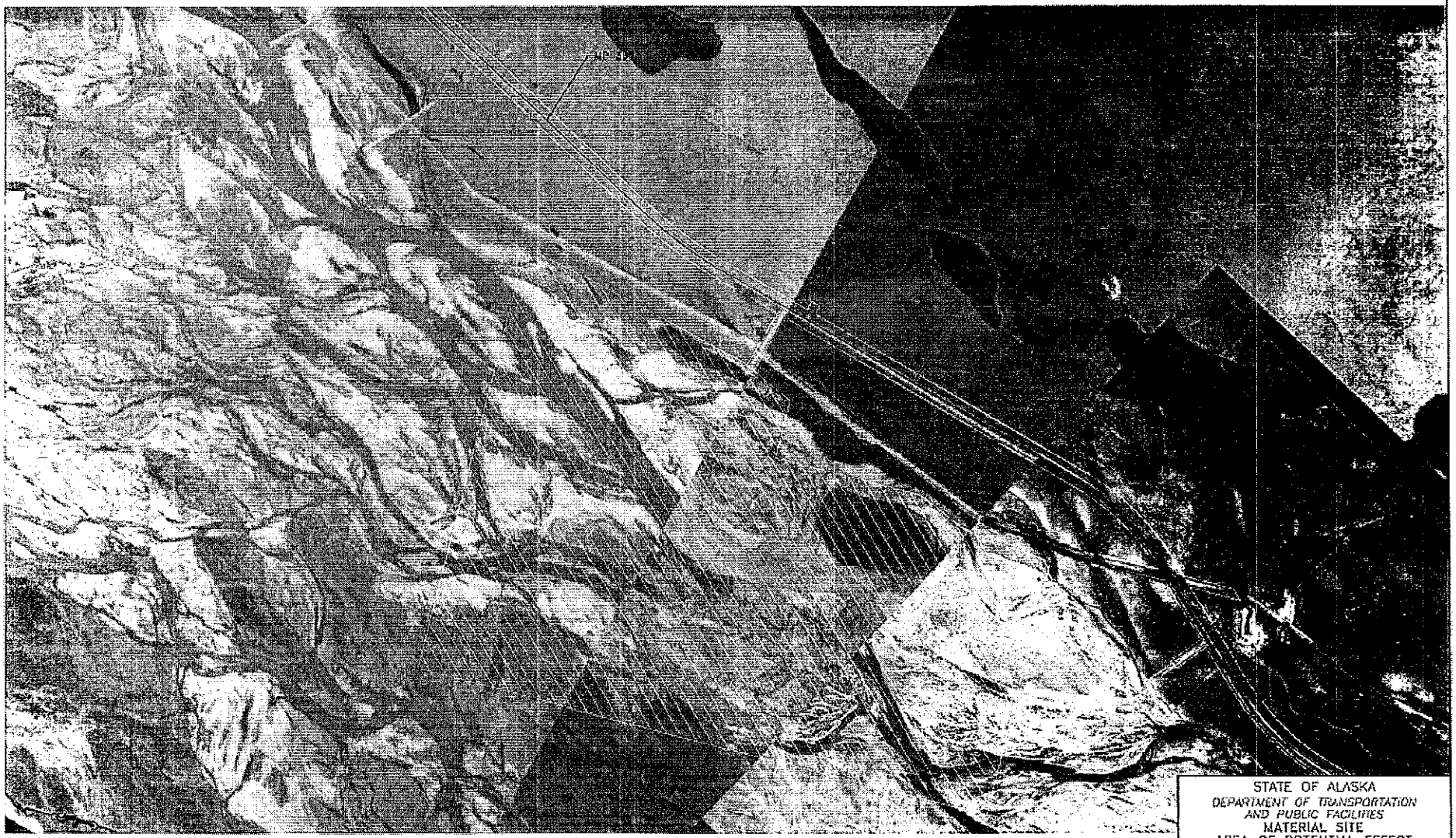
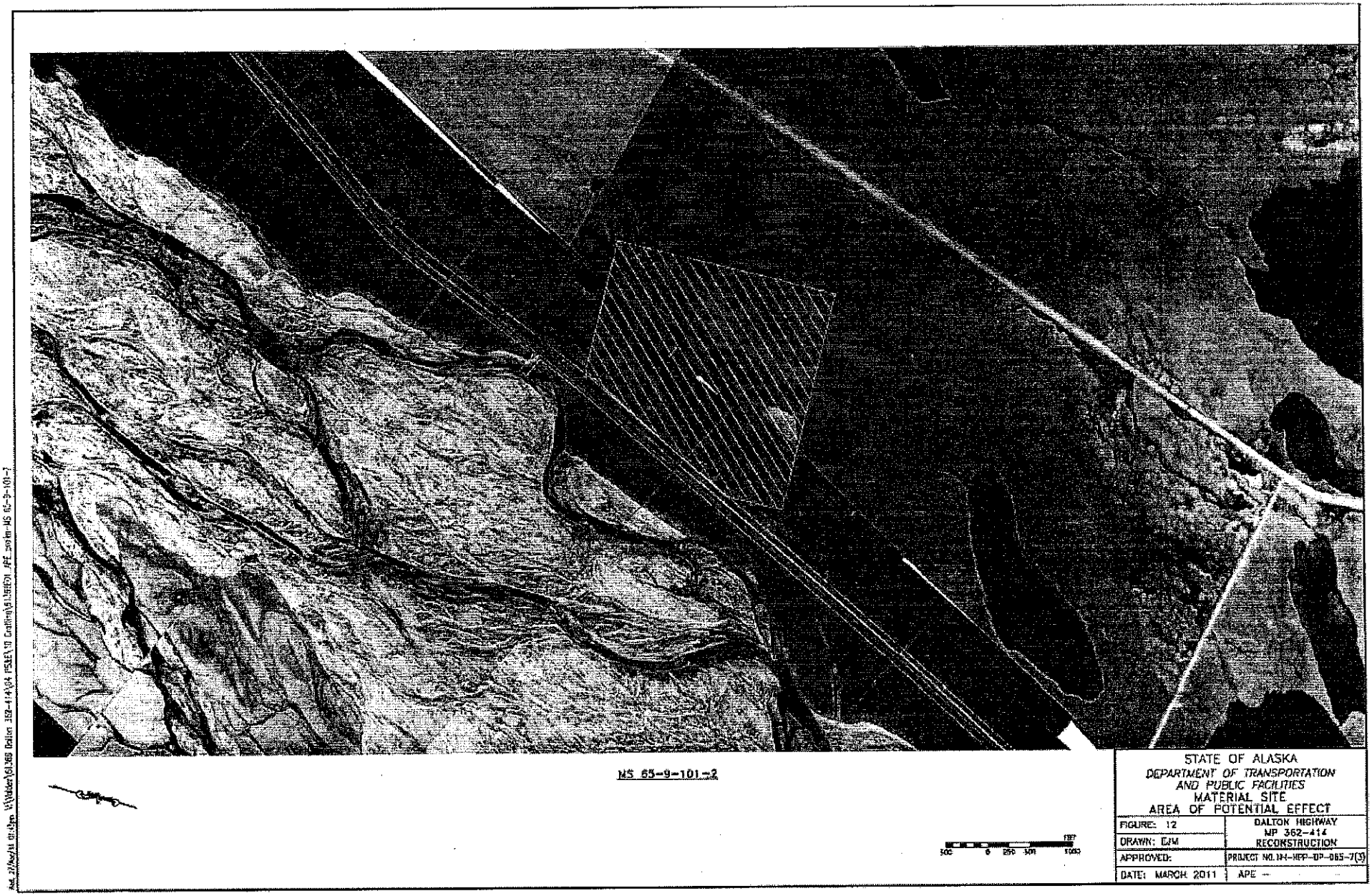


MS 65-9-026-2

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT

FIGURE: 11	DALTON HIGHWAY MP 362-414 RECONSTRUCTION
DRAWN: EJM	
APPROVED:	PROJECT NO. NH-TFP-DP-065-7(3)
DATE: MARCH 2011	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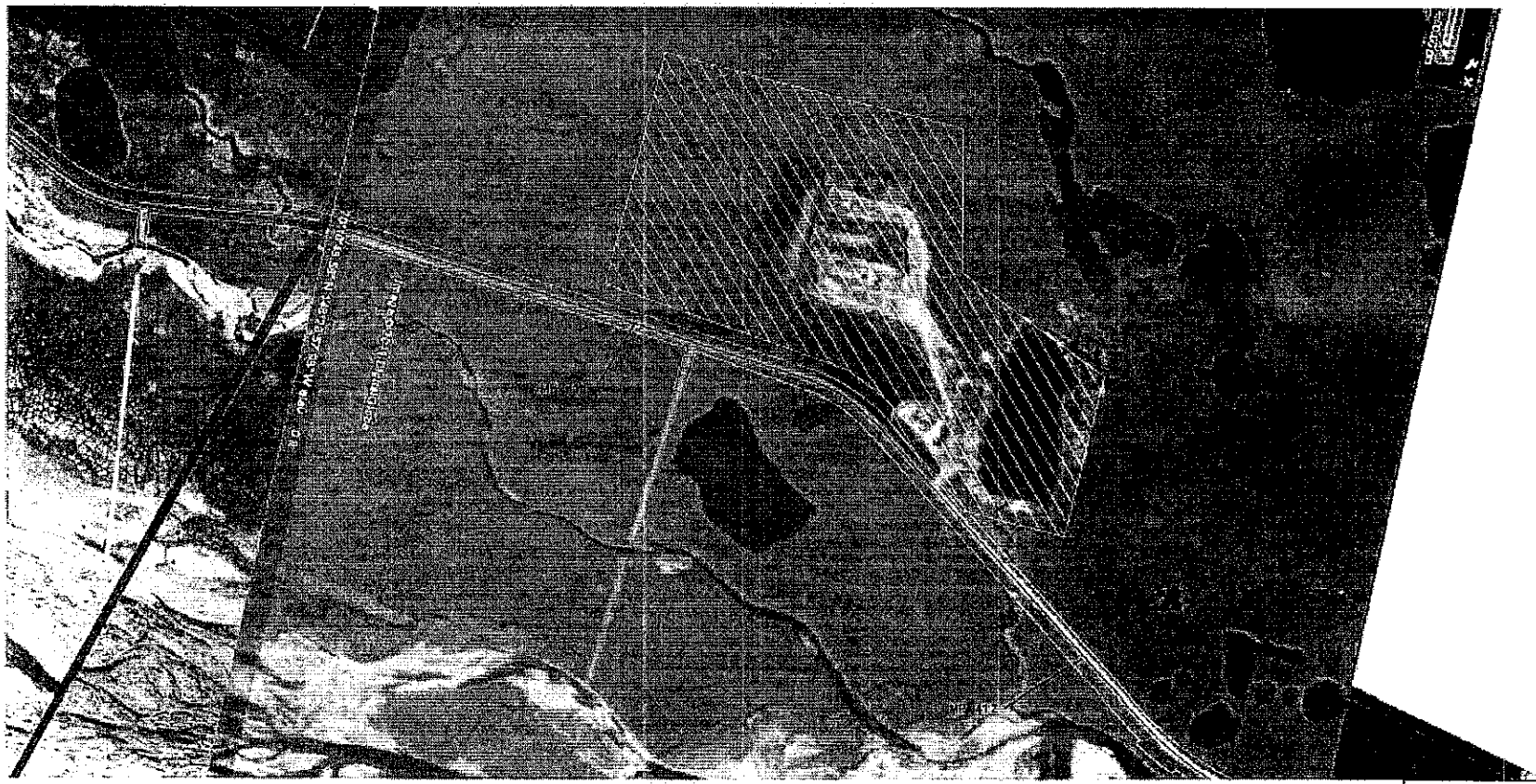
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT
FIGURE: 12
DALTON HIGHWAY
MP 362-414
RECONSTRUCTION
DRAWN: EJM
APPROVED:
PROJECT NO. NH-HPP-0P-065-7(3)
DATE: MARCH 2011
APE --



MS 65-9-102-2

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
MATERIAL SITE
AREA OF POTENTIAL EFFECT

FIGURE: 13	DALTON HIGHWAY MP 362-414 RECONSTRUCTION
DRAWN: EJM	
APPROVED:	PROJECT NO: NH-HPP-DP-065-2(3)
DATE: MARCH 2011	APE –