

**Hay-Zama Lakes Complex
Fisheries and Wildlife
Monitoring 1997 / 98**



Alberta Conservation
Association

*Funded by Alberta Anglers, Hunters,
and Other Conservationists*

by:

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Executive Summary

Results of the 1997 / 98 Hay-Zama Lakes Complex Fisheries and Wildlife Monitoring Project are presented in this manuscript. The project is a cooperative venture implemented by the Hay-Zama Committee (a joint industry / government / public committee designed to advise on operations within the complex). Monitoring of wildlife populations on the complex during critical waterfowl migration periods allows oil and gas production to continue until threshold levels in numbers of waterfowl are reached. The alternative, as defined by Alberta Energy and Utilities Board, is a general shut in of production for this same time period. The monitoring program was initiated in 1995 / 96 and is proposed to continue until 1999 / 2000. In addition to waterfowl monitoring, studies of migrating neotropical birds, nesting raptors and young-of-year northern pike were completed.

This report summarizes activities for the third year of the proposed five-year program and will be distributed to all Hay-Zama Committee members. Information collected for this project will be used to direct further biological studies on the complex and to aid in the development and planning of industrial activity compatible with the needs of fisheries and wildlife. Migrating waterfowl populations during this study period were stable and well dispersed throughout the complex. Oil and gas wells were able to stay in production throughout the 1997 migration periods.

Acknowledgements

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- Funding for the project was provided through contributions from: Alberta Conservation Association Trust Fund – Buck for Wildlife Program (formerly the Fish and Wildlife trust fund), Ducks Unlimited Canada, Dene Tha' First Nations, Amber Energy Inc., Colony Energy, Crestar Energy, Deep Basin Energy Inc., Gulf Canada Resources, Ltd., HCO Energy, Husky Oil Operations Inc., Imperial Oil Resources, Place Resources, Rainbow Pipeline Company Ltd., Samson, Scarlet Energy, Crispin Resources
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1.0 INTRODUCTION

1.1 Project Background

The 1997 / 98 Hay-Zama Lakes Complex Fisheries and Wildlife Monitoring Project is part of a five-year program initiated in 1995 to monitor waterfowl migrations and to gain baseline data on other wildlife and fisheries resources on the Hay-Zama Lakes complex. The project is jointly funded by “Buck for Wildlife” through the Alberta Conservation Association, Ducks Unlimited Canada, Dene Tha' First Nation and by the oil and gas industry, through the Hay-Zama Committee (a joint industry / public / government committee designed to direct activities within the complex).

The complex is recognized internationally as a critical staging and nesting area for waterfowl and shorebirds. It was designated as a “Wetland of International Importance, especially as Waterfowl Habitat” by the Ramsar Convention in 1981, and was nominated in 1990 to the World Heritage Convention as a World Heritage Site. The province of Alberta has designated the complex as a “Wetland for Tomorrow”.

The complex also supports a great diversity of other wildlife. Furbearers, large carnivores and raptors are common, and flooded grasslands in the springtime provide critical spawning habitat for northern pike (*Esox lucius*) (Shaffe and Wright. 1997; Moller and Rosin. 1994).

The oil and gas industry has a large presence in the Hay-Zama region, with several wells situated within the permanent waterbodies on man-made islands. To protect this unique and vulnerable wetland complex and minimize environmental impact, Alberta Energy and Utilities Board (EUB) drafted a series of Interim Directives to direct activities within the complex. The current Interim Directive (ID 96-1) provides the following clause as a general drilling and production requirement.

During a 5-week spring period (commencing mid-April) and a 8-week fall period (commencing mid-August) each year, the company shall:

- Suspend well production and helicopter operations, or
- AEP and operators within the Complex will monitor fish and wildlife activity in the Complex and, in consultation with the Fish and Wildlife Division of AEP, determine for which wells, if any, suspension of production and helicopter operations is required and for what period of time.

The criterion for suspension of production was defined by Fish and Wildlife in 1992 as 600 ducks and/or geese at an active well site. The Committee directed in 1995 that wildlife monitoring would be conducted by a Research Sub-Committee for a period of five years. This is the third year of the proposed five-year study.

1.2 Objectives

The objectives of the project were to assist in the development of a Hay-Zama Lakes management plan and continue our commitment with the various user groups in maintaining the integrity of the wetland by:

- Monitoring waterfowl numbers on the wetland complex as required by AEUB directive ID96-1, and documenting incidental sightings of other wildlife.
- Determining the seasonal distribution of northern pike early life stages within the complex.
- Strengthening lines of communication between the various user groups on the wetland.

1.3 Study Area

Hay-Zama Lakes are part of a unique and diverse wetland complex situated approximately 100 kilometers west of High Level (Figure 1). The complex, comprised of over 50,000 hectares of open water, wet meadows, rivers and floodplain woodlands, is characterized by severe seasonal and annual fluctuation of water level (Fearon and Larsen, 1986). Water levels during the 1997 study period were extremely high.

The complex's major river system, The Hay, meanders through the complex, separated from lake cells by high levees. Other river systems entering the complex include Sousa Creek, Mega River, Amber River, Zama River, Moody Creek as well as several unnamed creeks. Major lake cells include Hay Lake, Zama Lake, Duck Lake and Sand Lake. Numerous unnamed sloughs make up the remainder of the complex's wetted area.

During spring runoff, high water in the Hay River backs up the Omega River and Sousa Creek, filling the complex. After peak runoff, the complex slowly discharges via these same drainage's. By mid-summer some of the large lake cells recede into vast grasslands.

Hay Lake Indian Reserve, Amber River Indian Reserve, and Zama Lake Indian Reserve all border the wetland complex. People of the Dene Tha' First Nation have used the complex extensively for hundreds of years and continue today with traditional uses. Hunting, fishing, trapping, gathering and traditional ceremonies occur on the complex and surrounding areas throughout the seasons.

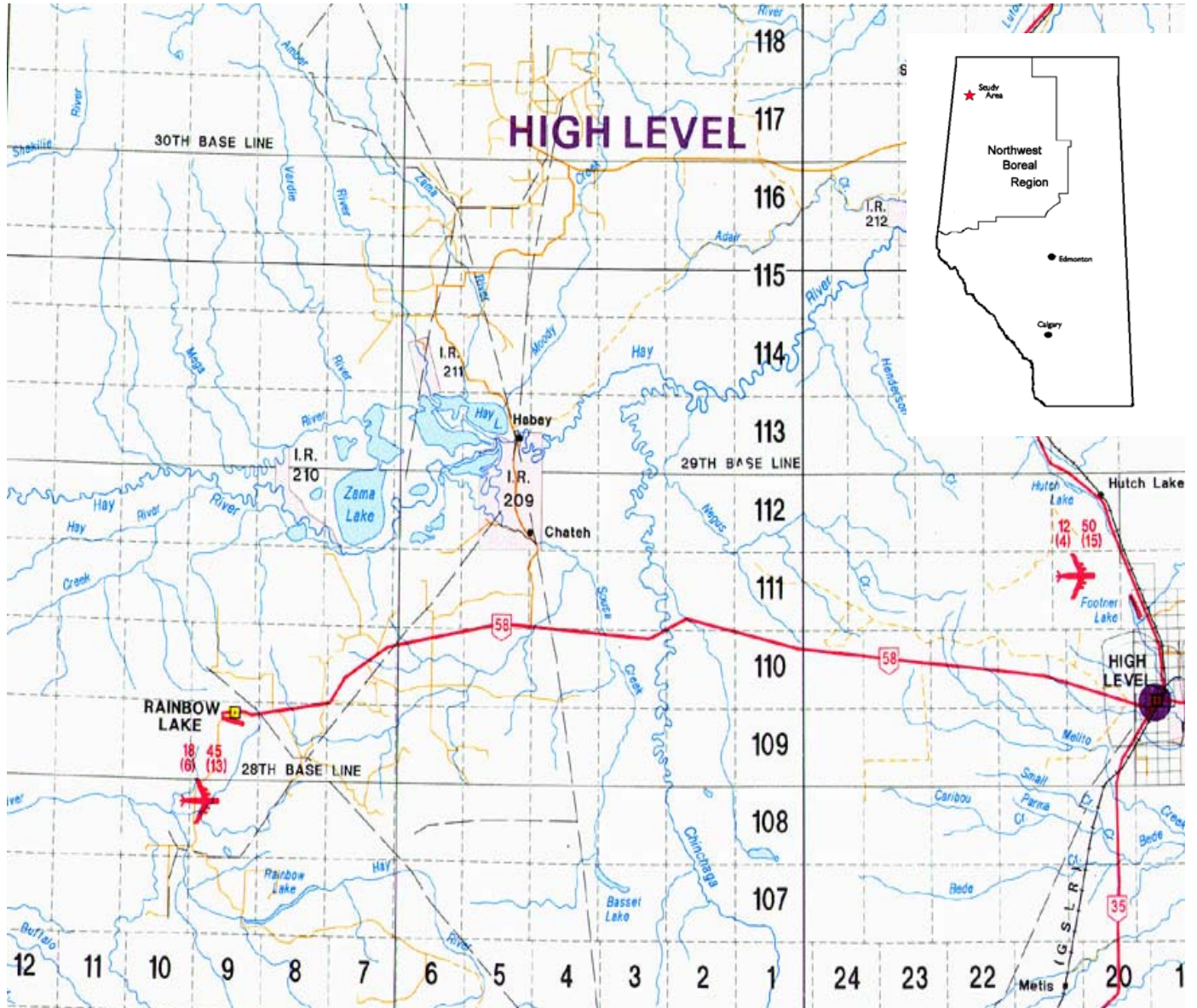


Figure 1. Location of Study Area

2.0 METHODS

2.1 Waterfowl Monitoring

Waterfowl populations on the complex were monitored during spring and fall migration periods. As specified in ID96-1, monitoring extended over a five-week period during spring migration and an eight-week period for the fall. Aerial surveys were conducted weekly in a 206 Jet Ranger rotary wing aircraft at approximately 30-meter altitude and 150 kilometer per hour ground speed. The survey route closely followed those from previous surveys and included flights over all active wells (Figure 2). All waterfowl observed on the survey route were recorded and, where practical, identified to species.

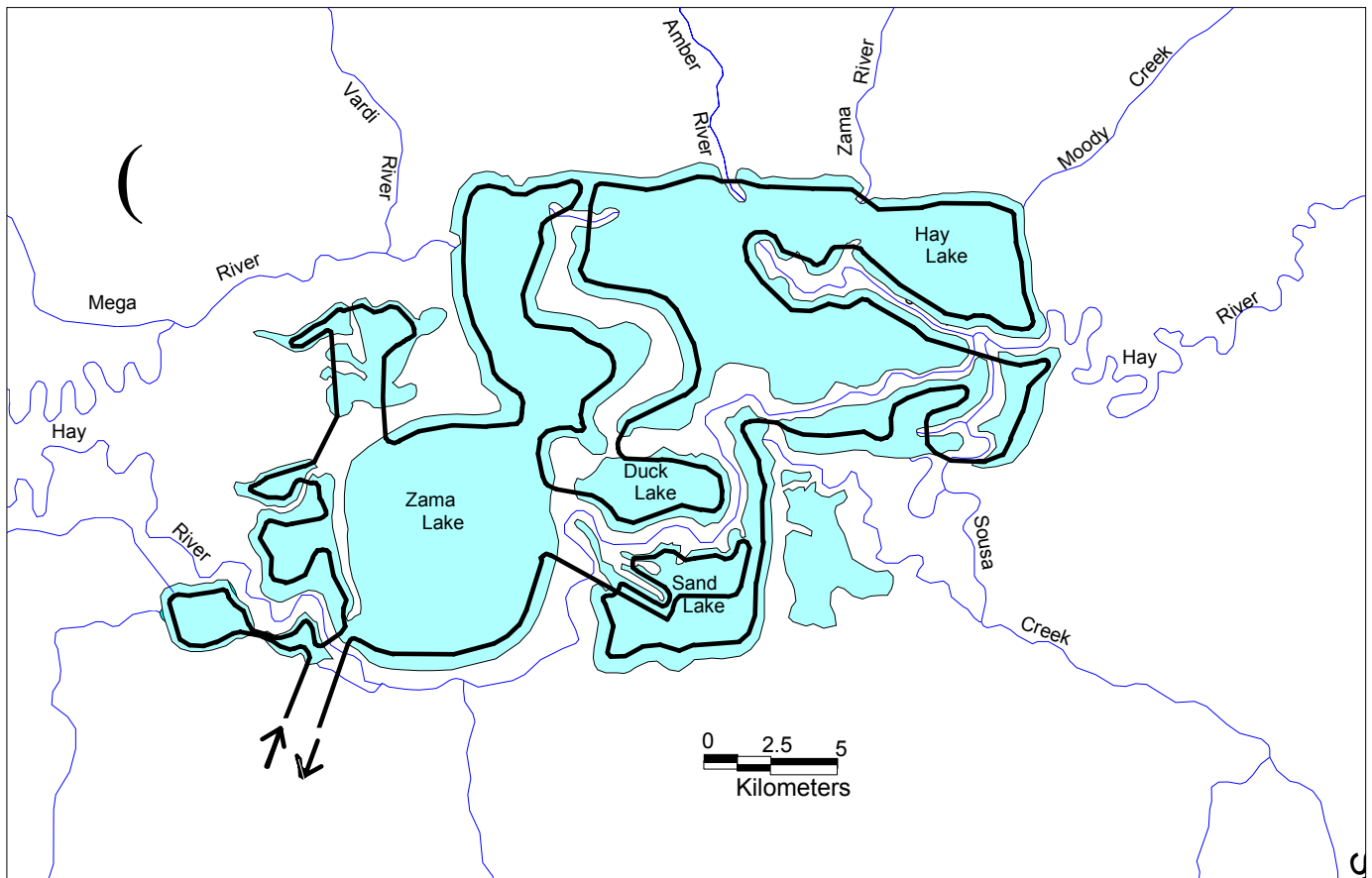


Figure 2. Aerial survey route for waterfowl monitoring

2.2 Raptor Nesting Survey

Raptor nesting sites on the complex were monitored in a single aerial survey June 5, 1997. The survey route covered areas with large mature trees suitable for nesting, and included all nesting sites identified in previous surveys (Saxena et al. 1994; Schaffe and Wright. 1997; Wright. 1997). Nest site locations were geo-referenced using the helicopter's GPS system. Numbers of bald eagle (*Haliaeetus leucocephalus*) adults, young or eggs were recorded and nest status was reported as brooding, if eggs or brooding adults were observed; rearing, if young were observed in the nest; or empty, if there was no evidence of nesting. In addition to the nesting survey, sightings of bald eagles and other raptors were recorded during other field operations.

2.3 Neotropical Migrant Bird Study

A preliminary study of migrating neotropical birds (songbirds) in the riparian portions of the complex was completed June 5 to 7, 1997. The purpose of the study was to determine species presence/absence and relative abundance in the complex, and to establish areas for a more detailed study in spring of 1998. Three sites were selected, covering a diversity of riparian habitat types. Mist-nets were standard four shelf, 1 ½ inch (38 millimeter) mesh, 7 x 30 foot (2.1 x 9.1 meter). Nets were checked every 20 minutes. Birds were identified to species, examined for evidence of breeding and released.

2.4 Fisheries Study

The fisheries study focused on distribution of northern pike young-of-year within the complex and monitoring of their movement from lentic waters to the river systems.

Collapsible wire minnow traps were baited with scented putty bait and deployed at 13 locations in the complex (Figure 3). Several habitat types were covered: flooded grasslands; small channels connecting the lake basins and rivers; and backwater areas in the rivers. Traps were left in from 24 to 72 hours.

Seine hauls were taken at seven additional locations (Figure 3) with a 9-meter length of 3.2 millimeter mesh seine net. One, 10 meter length of suitable habitat was sampled at each site. Catch per unit effort (CUE) for seining was reported as:

- Number of young-of-year northern pike / 100 m² of area sampled.

Seine sample sites were identified in previous studies as probable northern pike spawning areas. Sweep-net samples were collected randomly during other field operations.

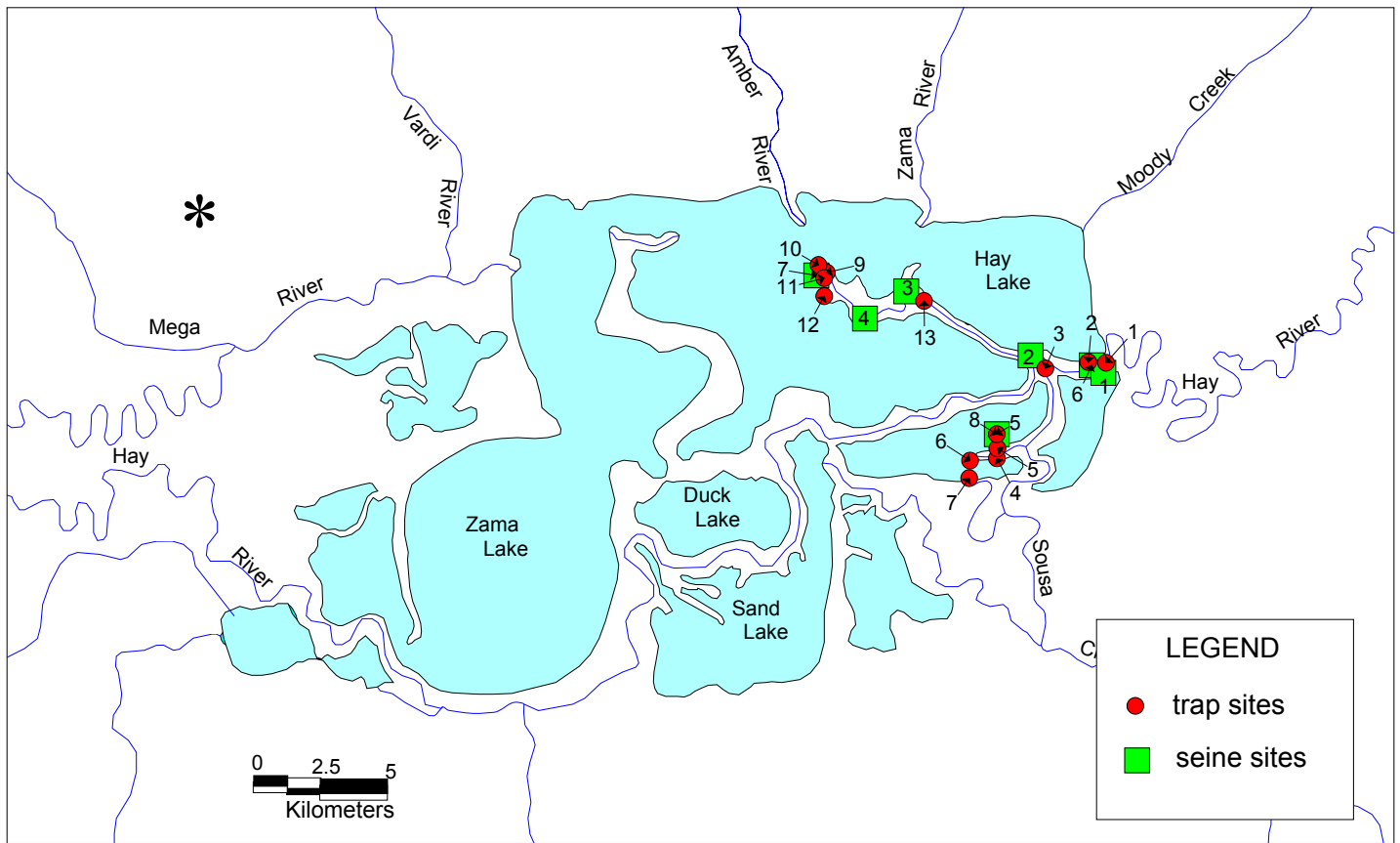


Figure 3. Locations of fisheries study sample sites, 1997

3.0 RESULTS AND DISCUSSION

3.1 Waterfowl Monitoring

3.1.1 Spring Migration

Peak spring migration occurred May 1 for ducks, and May 7 for geese. After May 7, duck numbers on the complex dropped sharply and, except for a few stragglers, geese were absent. Timing of peak spring migration and numbers of waterfowl observed were similar to the previous spring, and for geese, were consistent with the average for the past 20 years (Table 1).

Waterfowl were well dispersed throughout the complex and avoided concentrating near active well sites. Numbers of waterfowl reported in this document represent only what was actually observed on the survey route. Actual numbers present on the complex may be significantly higher.

Mallard (*Anas platyrhynchos*) was the most common duck species observed, followed by northern shoveller (*A. clypeata*), teal (*A. discors*, *A. crecca*), and pintail (*A. acuta*). Canvasback (*Aythya valisineria*) and redhead (*Aythya americana*) were abundant as well. Other species commonly observed include gadwall (*Anas strepera*), ruddy duck (*Oxyura jamaicensis*), scaup (*Aythya marila* or *A. affinis*), American widgeon (*Anas americana*), goldeneye (*Bucephala clangula*) and bufflehead (*B. albeola*). Canada goose (*Branta canadensis*) was the only goose species observed during spring migration.

Table 1. Summary of spring, 1997 waterfowl survey

DATE	DUCKS	CAGO ¹	GWFG ²	GSGO ³	SWANS
May 01	13,884	1,486	0	0	0
May 07	10,489	3,973	0	0	0
May 16	2,364	7	0	0	0
May 22	2,896	2	0	0	0
May 28	2,786	2	0	0	0
TOTAL	32,419	5,470	0	0	0

- 1 CAGO Canada Goose
- 2 GWFG Greater White-fronted Goose
- 3 GSGO Greater Snow Goose

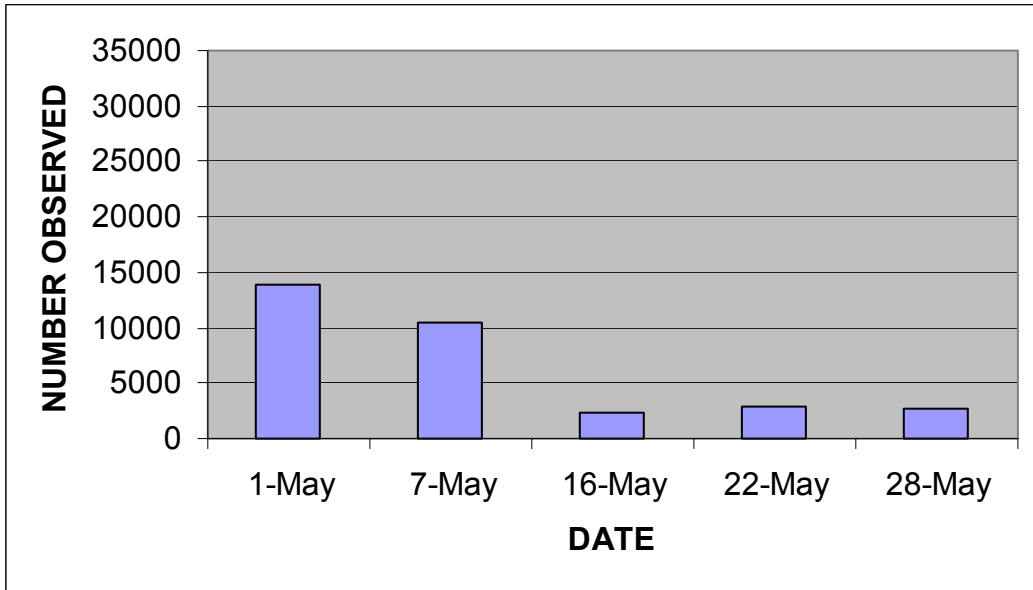


Figure 4. Numbers of ducks observed during spring migration, 1997

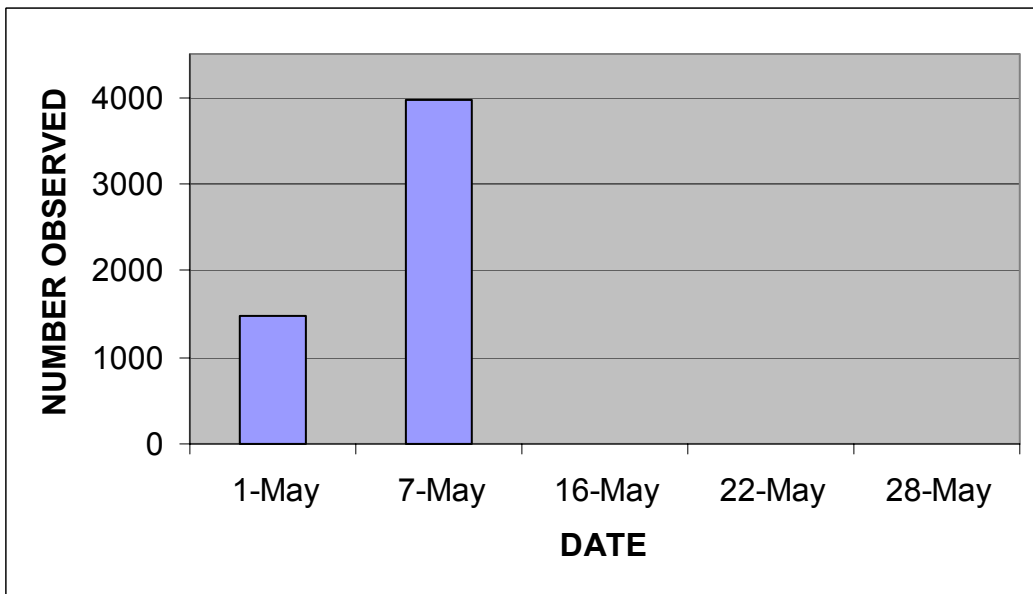


Figure 5. Numbers of geese observed during spring migration, 1997

3.1.2 Fall Migration

Peak fall migration occurred September 24 for ducks, and September 2 for geese. Ducks dissipated quickly after the peak migration period, and geese were not observed on the complex after September 16. Waterfowl were well dispersed throughout the complex and avoided concentrating near active well sites. Timing of peak duck migration and numbers of ducks observed during the peak were similar to the previous fall survey and consistent with the 20 year average (Table 3). Numbers of geese observed during fall migration were the lowest ever recorded. On the peak migration date, less than 200 Canada geese were observed. Exceptionally high water in the complex during the entire fall, 1997 migration period was likely a factor. Foraging areas generally used by geese in a typical year were under water until freeze-up.

Species composition for ducks was similar to that observed during spring monitoring with the exception of a sharp increase in American widgeons. Several thousand widgeon drakes were observed in flooded willow areas in the sloughs on the west part of the complex. Canada goose was the most common goose species, with a few white-fronts (*Anser albifrons*) present early in the fall survey. Snow geese (*Chen caerulescens*) were absent throughout the fall monitoring period.

Table 2. Summary of fall, 1997 waterfowl survey

DATE	DUCKS	CAGO ¹	GWFG ²	GSGO ³	SWANS
Aug 25	17,618	189	6	0	1
Sept 02	15,929	198	24	0	0
Sept 09	15,204	148	0	0	0
Sept 16	17,800	51	0	0	0
Sept 24	29,165	0	0	0	0
Sept 30	11,233	0	0	0	0
Oct 07	5,118	0	0	0	0
TOTAL	112,067	586	30	0	1

- 1 CAGO Canada Goose
- 2 GWFG Greater White-fronted Goose
- 3 GSGO Greater Snow Goose

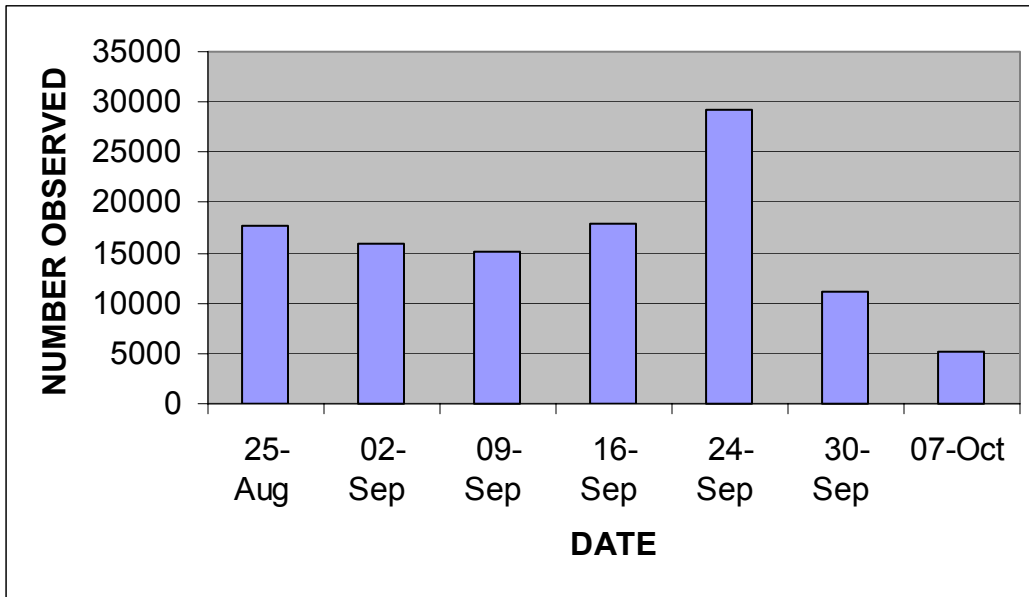


Figure 6. Numbers of ducks observed during fall migration, 1997

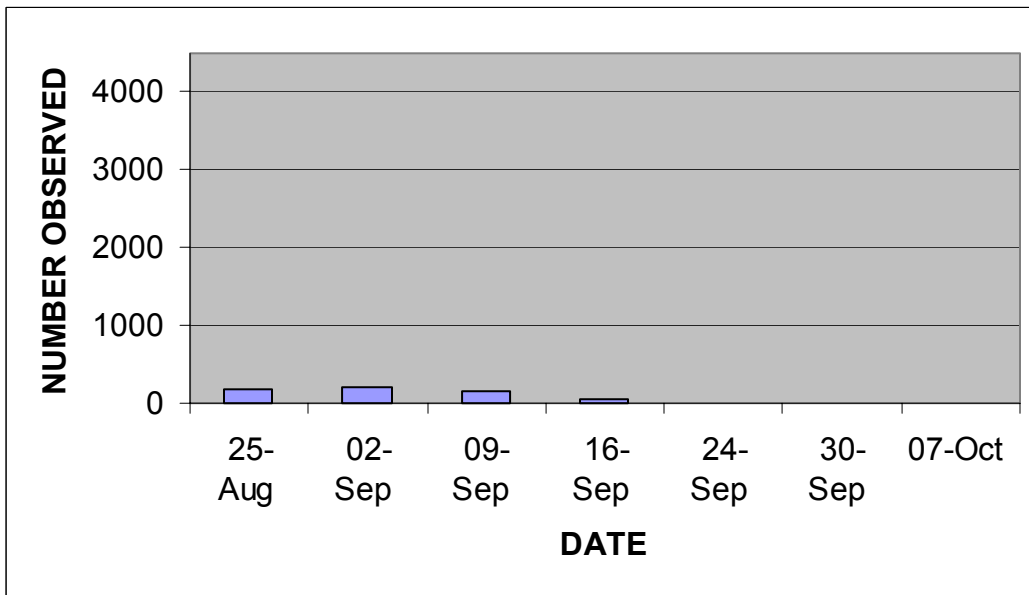


Figure 7. Numbers of geese observed during fall migration, 1997

Table 3. Date and number of geese observed during peak migration periods at Hay-Zama Lakes complex, 1978 to 1997

YEAR	SPRING MIGRATION		FALL MIGRATION	
	DATE OF PEAK	TOTAL GEESE	DATE OF PEAK	TOTAL GEESE
1978	28 April	5,588	27 Sep	13,688
1980	4 May	2,396	24 Sep	39,876
1981	6 May	6,278	20 Sep	8,417
1982	12 May	20,486	30 Aug	6,278
1983	5 May	22,064	10 Aug	7,604
1984	4 May	4,599	6 Sep	3,556
1985	8 May	3,529	20 Sep	5,445
1986	4 May	5,081	18 Sep	7,173
1987	5 May	8,588	31 Aug	3,692
1988	7 May	15,668	15 Sep	1,693
1989	29 April	6,398	2 Sep	1,317
1990	4 May	1,022	17 Sep	2,368
1991	2 May	817	10 Sep	4,062
1992	10 May	650	29 Sep	21,513
1993	7 May	1,068	24 Sep	4,724
1994	26 April	535	5 Oct	4,780
1995	3 May	9,082	8 Sep	7,122
1996	6 May	3,949	10 Sep	8,666
1978 – 96 AVERAGE	4 May	6544	13 Sep	8443
1997	7 May	3,973	2 Sep	222

Calverley et. al. (1993); Saxena et. al. (1994); Schaffe and Wright. (1997); Wright (1997)

3.2 Raptor Nesting Survey

The Hay-Zama Lakes complex supports a stable population of nesting bald eagles. Mature balsam poplar along the banks of the Hay River and shores of Sand Lake provide nesting habitat (Figure 8), and fish and waterfowl provide abundant prey. Recent surveys report from 4 to 6 active nesting pairs (Schaffe and Wright. 1997; Wright 1997).

Five of the eight nests observed in the June 5, 1997 survey contained either eggs, young or brooding adults (Table 4). Incidental observations of bald eagles were recorded on 10 of the 12 waterfowl surveys, with a maximum of 9 individual eagles observed during a flight on September 30, 1997. Golden eagle (*Aquila chrysaetos*), Merlin (*Falco columbarius*) and numerous northern harriers (*Circus cyaneus*) were observed as well during waterfowl surveys and other field activities.

Table 4. Summary of raptor nesting survey, June 5, 1997

SITE NO.	LOCATION (UTM)		STATUS	NO. OBSERVED			COMMENTS
	EASTING	NORTHING		ADULTS	EAGLETS	EGGS	
1	376268	6506428	brooding	1			Adult did not flush
2	383089	6512964	rearing	1	3	0	
3	385171	6511939	empty	N/A	N/A	N/A	
4	388791	6517128	?				Live mallard hen in nest
5	390532	6516769	rearing	2	1	0	Duck carcass in nest
6	394660	6517862	empty	N/A	N/A	N/A	
7	390374	6511172	brooding	1			Adult did not flush
8	389422	6507145	brooding	2	0	2	
TOTAL			5 active nests	7	4	2	

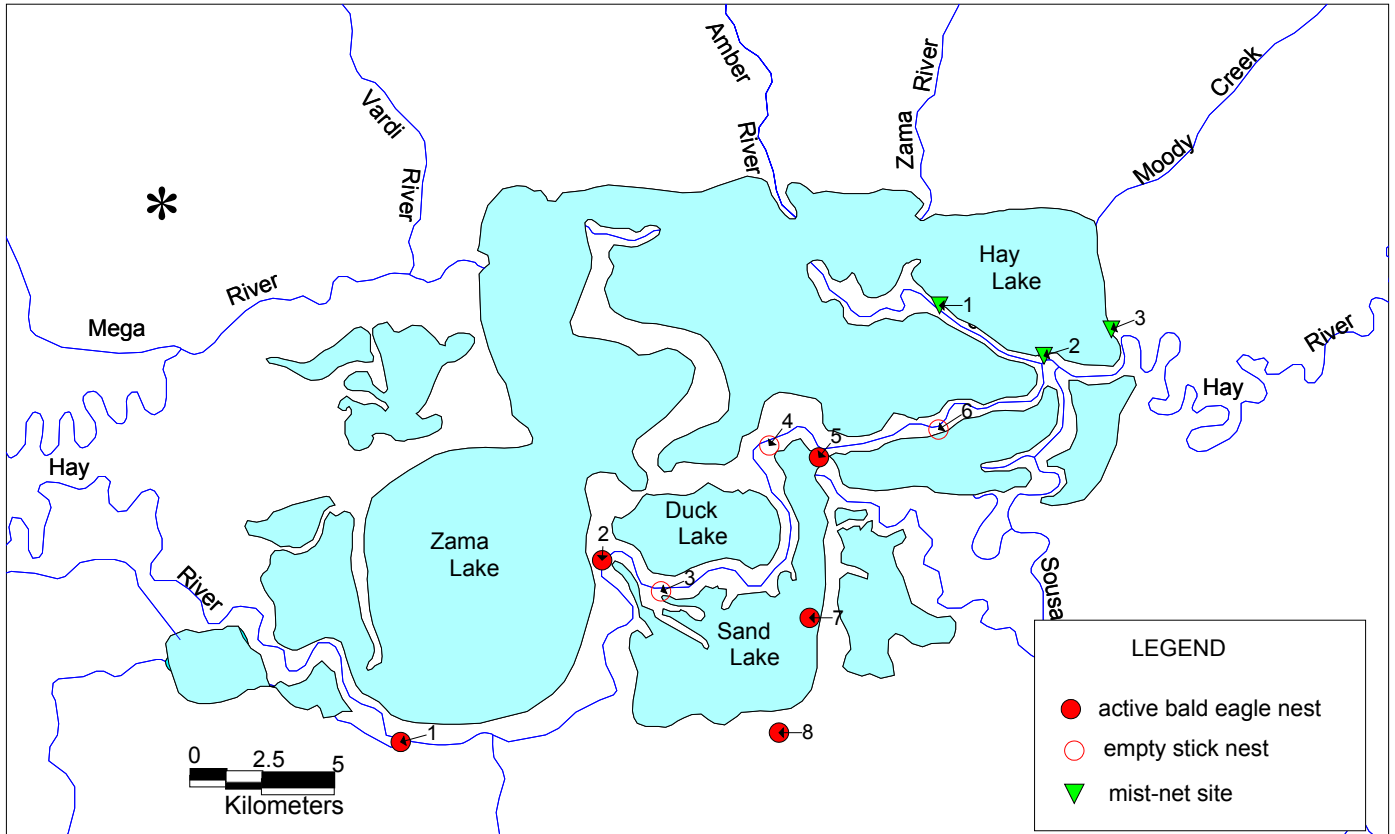


Figure 8. Locations of eagle nests and mist-netting sample sites at Hay-Zama Lakes complex, 1997

3.3 Neotropical Migrant Birds

Wildlife monitoring on the Hay-Zama complex has focused primarily on waterfowl, shorebirds and raptors. Information on the current status of other avian species in the area is minimal. The 1997 mist-netting program provided some of the preliminary information needed to determine the significance of the complex for migrating neotropical bird species.

Mist-netting efforts produced a total of 29 individual birds, and nine separate neotropical species (Table 5). Incidental observations at the mist-net sites include an additional eight species. Nets at site two caught more birds and a greater diversity of species than the other sites. Although site three produced the fewest birds actually captured in the nets, the greatest species diversity was observed at this site. Site three also exhibited the greatest habitat diversity, with

riparian lakeshore, grasslands and mature boreal mixed-wood all in the immediate area. Habitat types at sites one and two were strictly lakeshore and river riparian.

The most common species captured were Savannah sparrow (*Passerculus sandwichensis*) at site one, song sparrow (*Melospiza melodia*) and yellow warbler (*Dendroica petechia*) at site two and white-throated sparrow (*Zonotrichia albicollis*) at site three.

Table 5. Summary of neotropical migrant bird study at Hay-Zama Lakes complex, June 5 to 7, 1997

SPECIES	TAXA	ALPHA ¹ CODE	SITE		
			One	Two	three
captured					
Savannah sparrow	<i>Passerculus sandwichensis</i>	SAVS	6	1	
Song sparrow	<i>Melospiza melodia</i>	SOSP		7	
Chipping sparrow	<i>Spizella passerina</i>	CHSP		1	
Clay-colored sparrow	<i>Spizella pallida</i>	CCSP		2	1
Yellow warbler	<i>Dendroica petechia</i>	YWAR	1	3	x
Alder flycatcher	<i>Empidonax alnorum</i>	ALFL	1		1
Swainson's thrush	<i>Catharus ustulatus</i>	SWTH		1	
Red-eyed vireo	<i>Vireo olivaceus</i>	REVI		1	x
White-throated sparrow	<i>Zonotrichia albicollis</i>	WTSP			3
observed					
Red-winged blackbird	<i>Agelaius phoeniceus</i>	RWBL	x		x
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	YHBL		x	
Rusty blackbird	<i>Euphagus carolinus</i>	RUBL			x
Eastern kingbird	<i>Tyrannus tyrannus</i>	EAKI			x
Common yellowthroat	<i>Geothlypis trichas</i>	COYE			x
Common grackle	<i>Quiscalus quiscula</i>	COGR	x		
American robin	<i>Turdus migratorius</i>	AMRO			x
Brown-headed cowbird	<i>Molothrus ater</i>	BHCO			x

¹ (Pyle, 1997)

3.4 Fisheries Study

Young-of-year northern pike were found at three of the seven sites sampled by seining (Table 6). All three sites were in shallow, flooded grass areas close to the river system and were areas where adult pike had been observed in earlier studies (Shaffe and Wright, 1997; Wright, 1997). One burbot (*Lota lota*) young-of-year was also collected from the seine net at site one. Wire mesh minnow traps were very effective for capturing burbot young-of-year, however this method failed to capture northern pike of any life stage.

Table 6. Summary of fisheries study

DATE	SITE	LOCATION (UTM)		RESULTS ¹			CUE ² (NRPK only)
		easting	northing	NRPK		OTHER	
				yoy	juv.		
trapping							
July 11	1	400943	6520239	0	0	0	0
	2	400535	6520163	0	0	0	0
	3	398671	6519959	0	0	2 BURB	0
	4	396956	6516535	0	0	0	0
	5	396957	6516909	0	0	1 BURB	0
	6	395948	6516415	0	0	2 BURB	0
	7	395933	6515758	0	0	0	0
	8	396919	6517439	0	0	0	0
July 16	9	390291	6523210	0	0	0	0
	10	390068	6523247	0	0	1 BURB	0
	11	390265	6523102	0	0	0	0
	12	390287	6522427	0	0	3 BURB	0
	13	394040	6522357	0	0	6 BURB	0
TOTAL (trapping only)				0	0	15 BURB	0
seining							
	1	401098	6520200	1	1	1 BURB	1.11
	2	398103	6520432	0	0	0	0
	3	393361	6522699	0	0	0	0
	4	391834	6521633	0	0	0	0
	5	396919	6517439	0	1	0	0
	6	400800	6520280	1	2	0	1.11
	7	390258	6523201	1	0	0	1.11
TOTAL (seining only)				3	4	1 BURB	0.48

1 NRPK = northern pike; BURB = burbot; yoy = young-of-year; juv. = juvenile
2 CUE - catch per unit effort

4.0 CONCLUSION

Waterfowl populations were stable for 1997, with the exception of fall geese. Goose populations on the complex were down considerably for the fall migration period. Migrating waterfowl were well dispersed throughout the complex for the duration of both spring and fall migration periods allowing oil and gas wells to stay in production throughout the study period.

Presence of young-of-year northern pike has been confirmed in the complex. This life-stage was found in close proximity to the complex's river systems in grassland areas which are typically dry in an average or low-water year but were flooded throughout the 1997 rearing period. Water level remained extremely high throughout the open-water season and into freeze-up. All life stages of this species have now been confirmed.

Hay-Zama Lakes complex continues to support a stable population of breeding bald eagles. The East shore of Hay Lake provides the greatest opportunity for an effective neotropical migrant bird study in 1998 / 99.

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