



SURVIVAL OF FEMALE MALLARDS MOLTING AT LOWER KLAMATH AND TULE LAKE NATIONAL WILDLIFE REFUGE



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INTRODUCTION

The Klamath Basin in southern Oregon and northeastern California is one of the most important waterfowl areas in North America. In addition to providing important migration and breeding habitat, mallards (*Anas platyrhynchos*) and other ducks breeding throughout California and Oregon move into Klamath Basin marshes during late summer to undergo wing molt. During this 30 to 40-day flightless period, when old wing feathers are replaced by new ones, birds may be especially vulnerable to changing conditions of molting marshes and the surrounding landscape.

During most years, large interconnected complexes of seasonal, semi-permanent, and permanent marshes provide stable molting habitat on both Lower Klamath and Tule Lake National Wildlife Refuges (NWRs). These two refuges, which are separated by a high ridge, receive water to flood and maintain marsh habitats from different sources. Lower Klamath NWR receives much of its water from Upper Klamath Lake, home of two endangered sucker fish species, and the water source for the Klamath River, home of threatened coho salmon. Tule Lake NWR receives its water from a source without these endangered fish concerns. During 2001, severe drought and concerns of potential impacts of reduced Upper Klamath Lake water levels on endangered and threatened fish greatly reduced water supplies to Klamath Basin agricultural lands and Lower Klamath NWR habitats. Tule Lake NWR habitats were better maintained.

To determine impacts on molting mallards of changing water management practices in the Klamath Basin and help guide management of wetland habitats in the Klamath Basin we used radiotelemetry to study survival of female mallards molting on Lower Klamath and Tule Lake NWRs.

OBJECTIVES

- 1) Compare survival of female mallards molting on Lower Klamath and Tule Lake National Wildlife Refuges.
- 2) Determine causes of mortality of female mallards molting on Lower Klamath and Tule Lake National Wildlife Refuges.

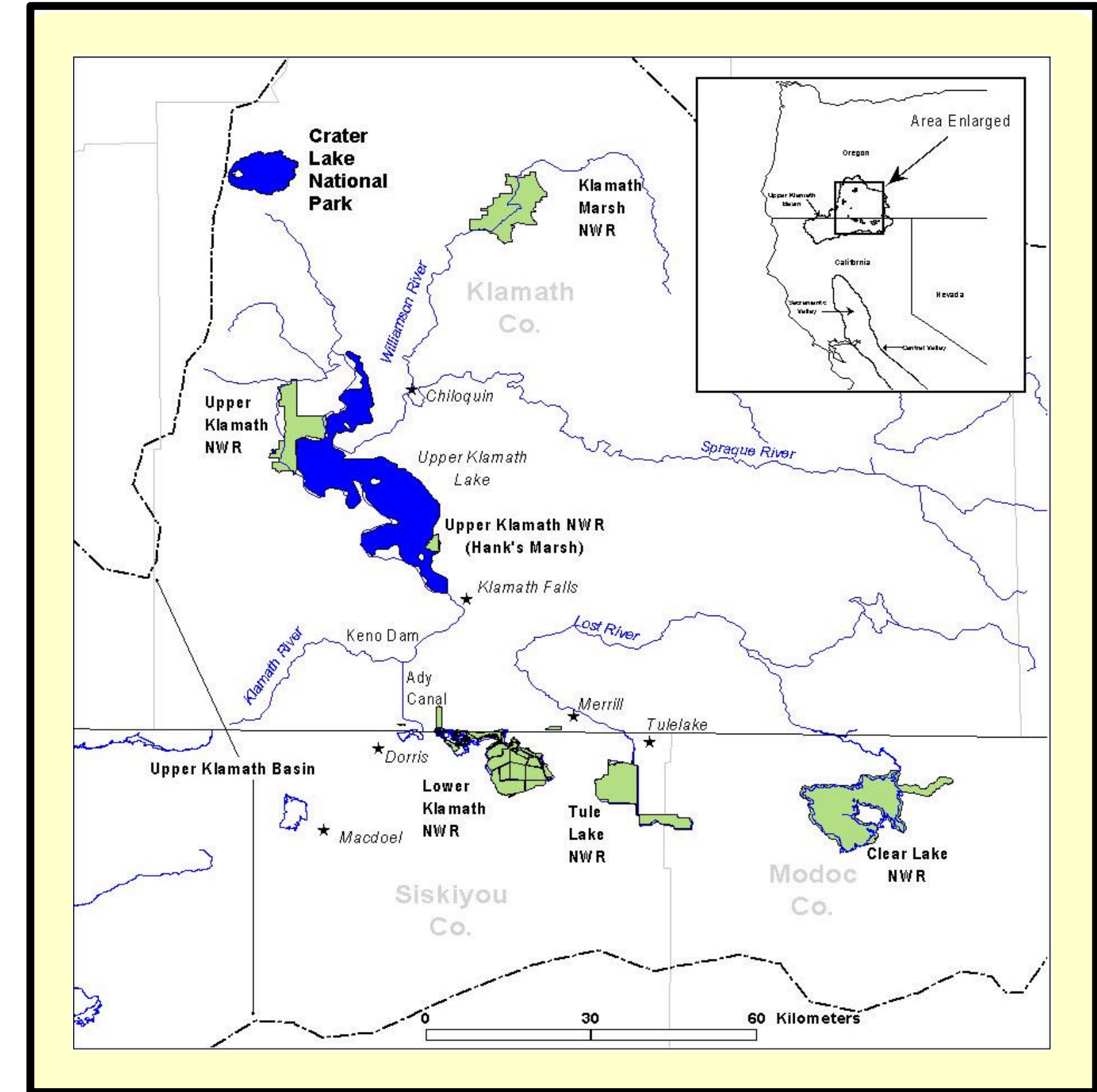
METHODS

We used night-lighting and swim-in traps during August 2001 to capture 58 pre- or early-molt adult female mallards, 19 on each of the 2 main molting marshes at Lower Klamath (Units 8B and 12C) and 20 on the main molting marsh at Tule Lake NWR (Sump-1A). We attached 26g backpack harness radiotags and released the mallards in the marsh where captured. Mallards were monitored regularly throughout the molting period and walked in on when a mortality signal or lack of signal fluctuation indicated possible death. Carcasses were sent to the National Wildlife Health Center for necropsy.

RESULTS

Molting mallard survival at Lower Klamath NWR, where wetland acreage declined during summer, was much lower than at Tule Lake NWR, where wetland acreage was maintained. Survival during August – November in Klamath Basin was 0.24 (95% CI= 0.08 – 0.39) for mallards molting at Lower Klamath NWR and 0.95 (95%= 0.85 – 1.00) for mallards molting at Tule Lake NWR. All but one mallard that survived molting and early hunting season emigrated to and wintered in the Central Valley; most left Klamath Basin during the last week of November but timing of emigration ranged from 22 August to 15 January.

Based upon field sign, 13 of the 22 female mallards that died in Lower Klamath NWR during molt were probably killed by predators, 3 were suspected dying of botulism (based upon presence of other duck carcasses or ongoing botulism outbreak), and 6 died of unknown causes. Of the nine necropsies performed on radiotagged birds, sign of predation was evident on 4 (including one with elevated levels of lead), and results were inconclusive for 5. Remains of the 3 that were suspected to have died of botulism were inadequate for necropsy. A greater percentage of female mallards that survived molt at Lower Klamath NWR than at Tule Lake NWR were later shot (7/16= 44% vs. 4/19= 21%).



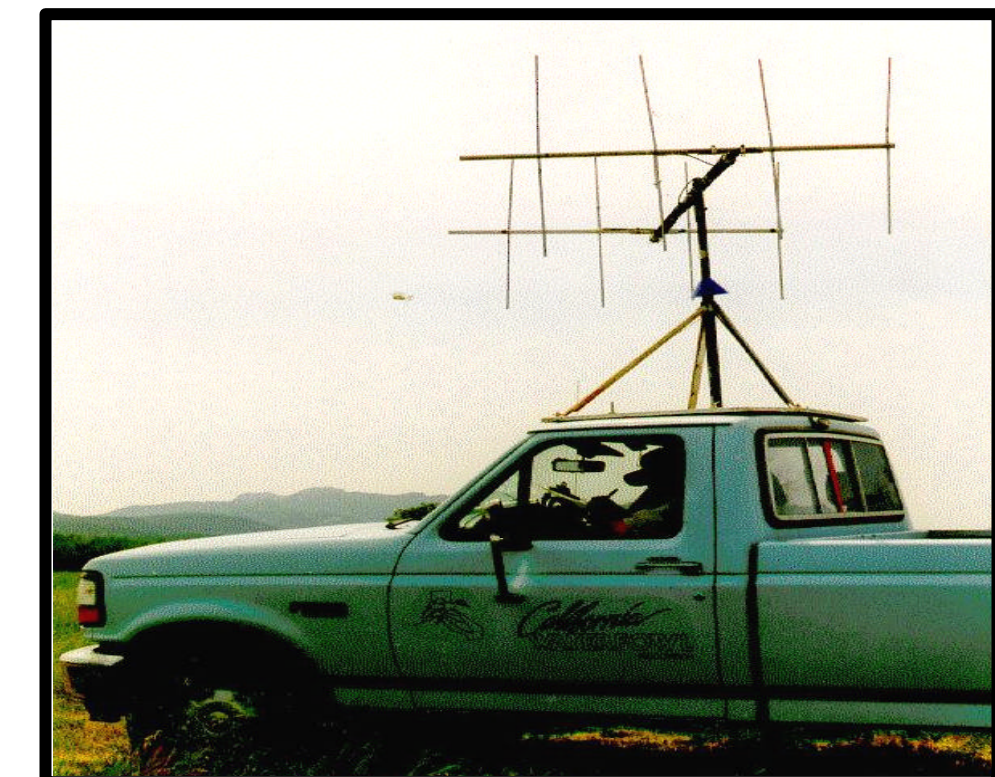
LOWER KLAMATH AND TULE LAKE NWRs IN THE KLAMATH BASIN



SWIM-IN TRAPPED MALLARDS

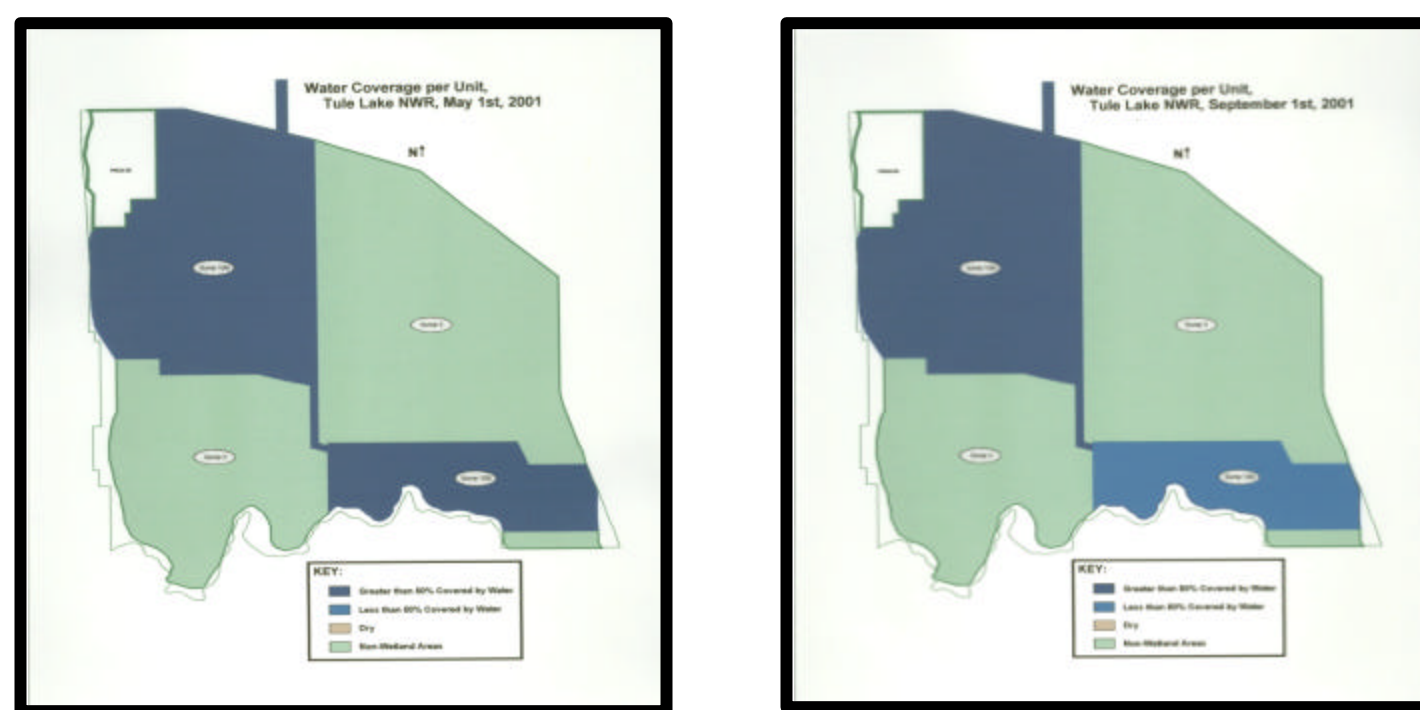


ATTACHING BACKPACK RADIOTAG

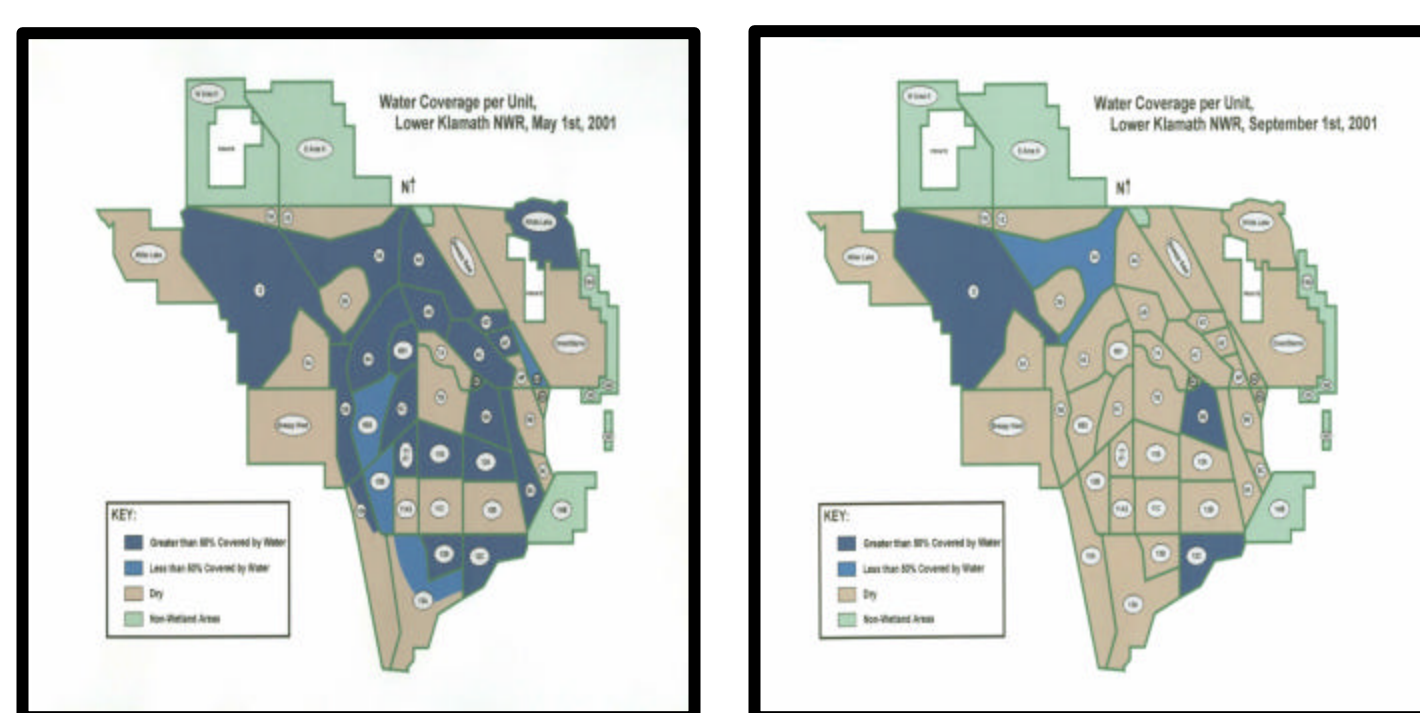


TRACKING RADIOTAGGED MALLARDS

TULE LAKE WETLAND ACREAGE WAS MAINTAINED



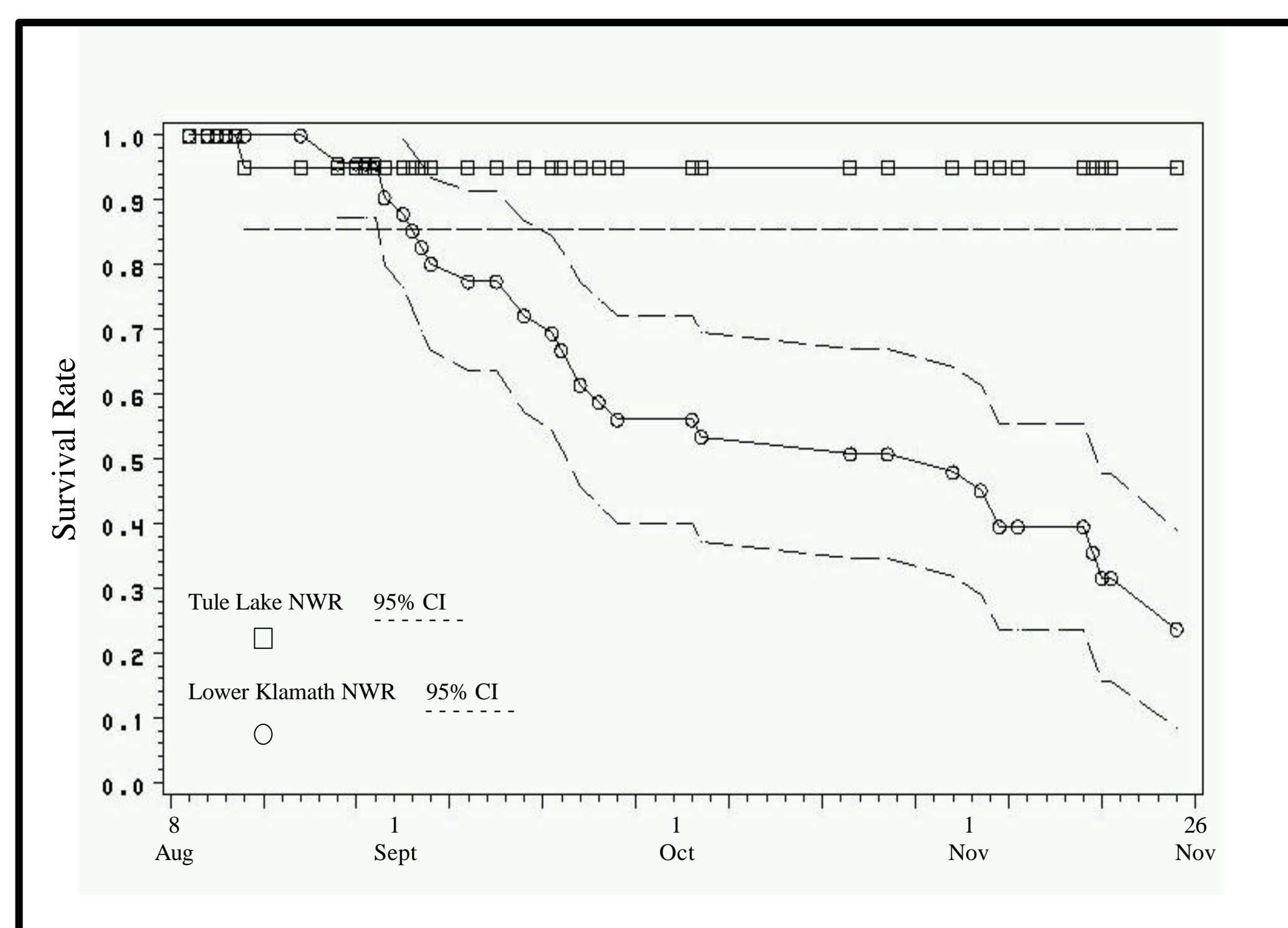
LOWER KLAMATH WETLAND ACREAGE DECLINED



1 May

1 Sept

MOLTING MALLARD SURVIVAL WAS GOOD AT TULE LAKE AND POOR AT LOWER KLAMATH



MALLARDS MOLTING AT LOWER KLAMATH DIED AT HIGHER RATES FROM ALL CAUSES

	Lower Klamath	Tule Lake
TOTAL RADIOTAGGED	38	20
DIED DURING MOLT		
Predation	13	0
Botulism (suspected)	3	0
Unknown	6	1
Total	22	1
DIED AFTER MOLT		
Shot in Klamath Basin	6	2
Shot in Central Valley	1	2
Total	7	4
SURVIVED FALL-WINTER		
Stayed in Klamath Basin	1	0
Moved to Central Valley	8	15
Total	9	15

CONCLUSIONS

Survival of female mallards molting in the Klamath Basin was related to local habitat conditions. We speculate that the higher predation rate of molting female mallards at Lower Klamath NWR was a result of a drying landscape that concentrated molting mallards and their predators and exposed mallards molting at Lower Klamath NWR to higher than normal predation. Higher disease losses at Lower Klamath NWR may indicate that the quality of molting marshes there was also reduced. The higher hunting mortality rate for mallards that molted at Lower Klamath NWR also suggests conditions at Lower Klamath molting marshes were poor relative to at Tule Lake NWR because individuals in poor condition are generally more vulnerable to hunting than individuals in good condition.

MANAGEMENT IMPLICATIONS

Wetland conditions in the Klamath Basin impact survival of molting mallards. Because breeding mallards throughout California and Oregon molt in Klamath Basin marshes, water management there has implications for waterfowl populations throughout the Pacific Flyway. The negative impact on molting mallard survival that would result if water supplies for Klamath Basin wetland habitats were reduced should be considered when developing water management plans for the region.