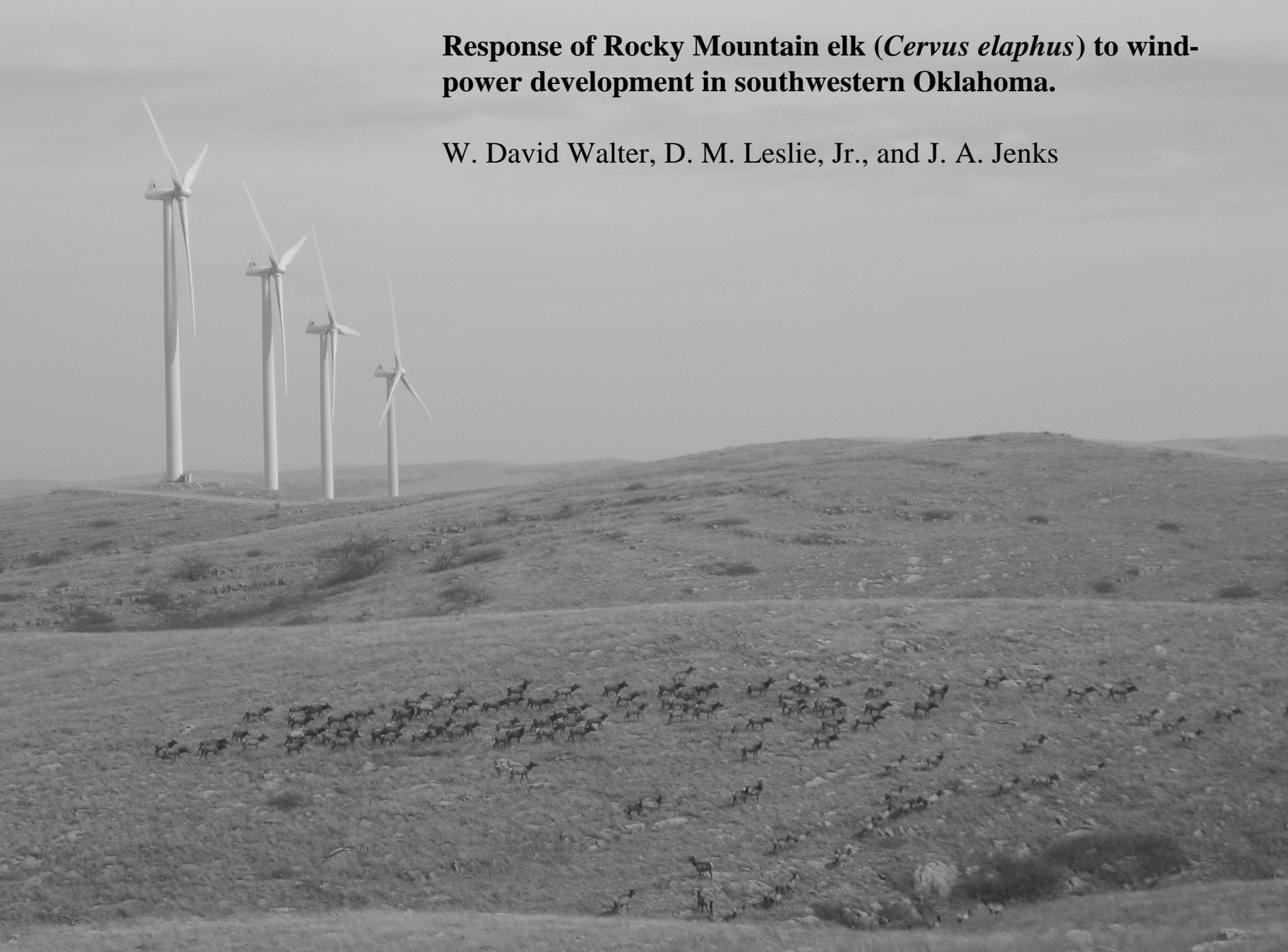


Response of Rocky Mountain elk (*Cervus elaphus*) to wind-power development in southwestern Oklahoma.

W. David Walter, D. M. Leslie, Jr., and J. A. Jenks







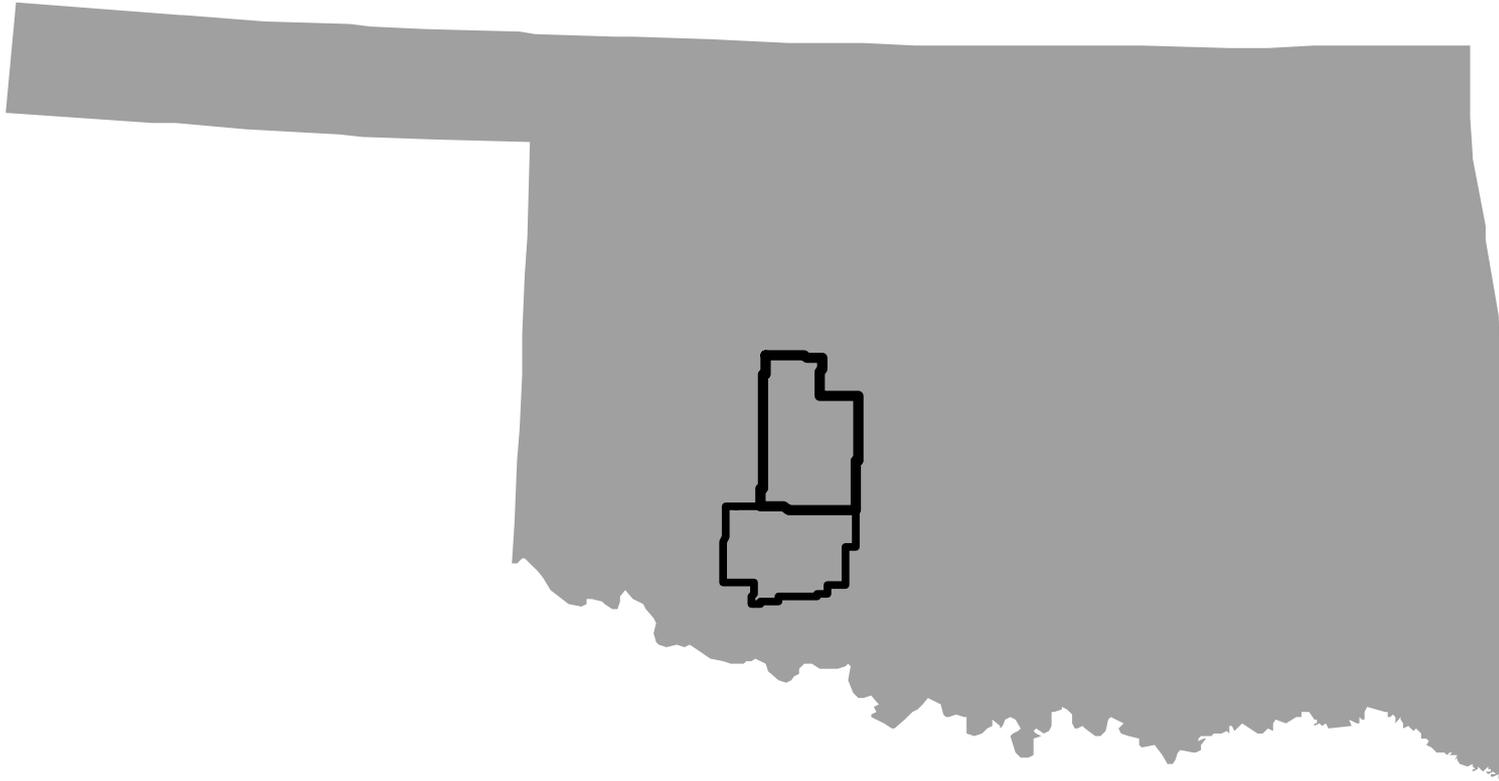
Possible Impacts of Wind-power Development

- **Loss of habitat**
- **Fragmentation**
- **Mortality (birds, bats)**

- **Behavior (aversion, disruption)**
- **Nutrition**



Study site



- ▶ **Southwest Oklahoma in 2 counties: Caddo, Comanche**
- ▶ **3 miles north of the Wichita Mountains Wildlife Refuge (WMWR)**
- ▶ **Elk dispersed to private lands from WMWR**

Slick Hills

- **27, 000 ha of limestone-derived rolling hills**
- **Wooded bottomlands of hardwoods and cedar**
- **Surrounded by residences, roads, and large wheat fields**





► **10 elk captured using nets on 31 March 2003**

► **Radiocollared; tracked biweekly beginning April**



- **Pre-construction: April-May 2003**
- **Construction: June 2003-August 2003**
- **Post-construction: April-August 2004**



Radiotelemetry

▶ **Minimum convex polygon (MCP)**
of all elk locations by month

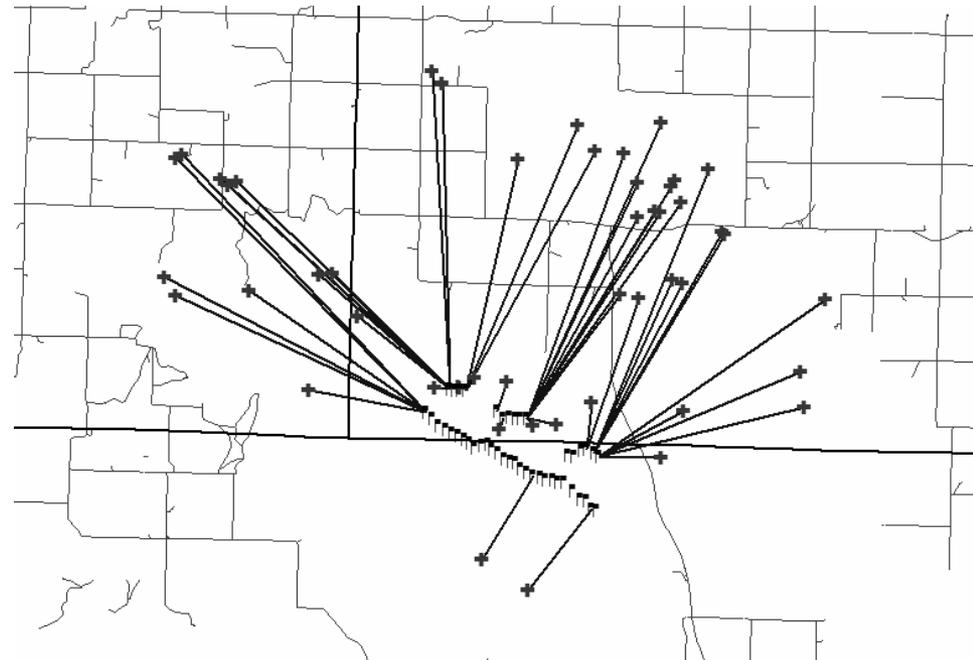
- **Animal Movement Extension**
in ArcView 3.3



▶ **Distance of elk locations from**
nearest wind turbine

▶ **Mean distances of wind turbine to**
center of MCP

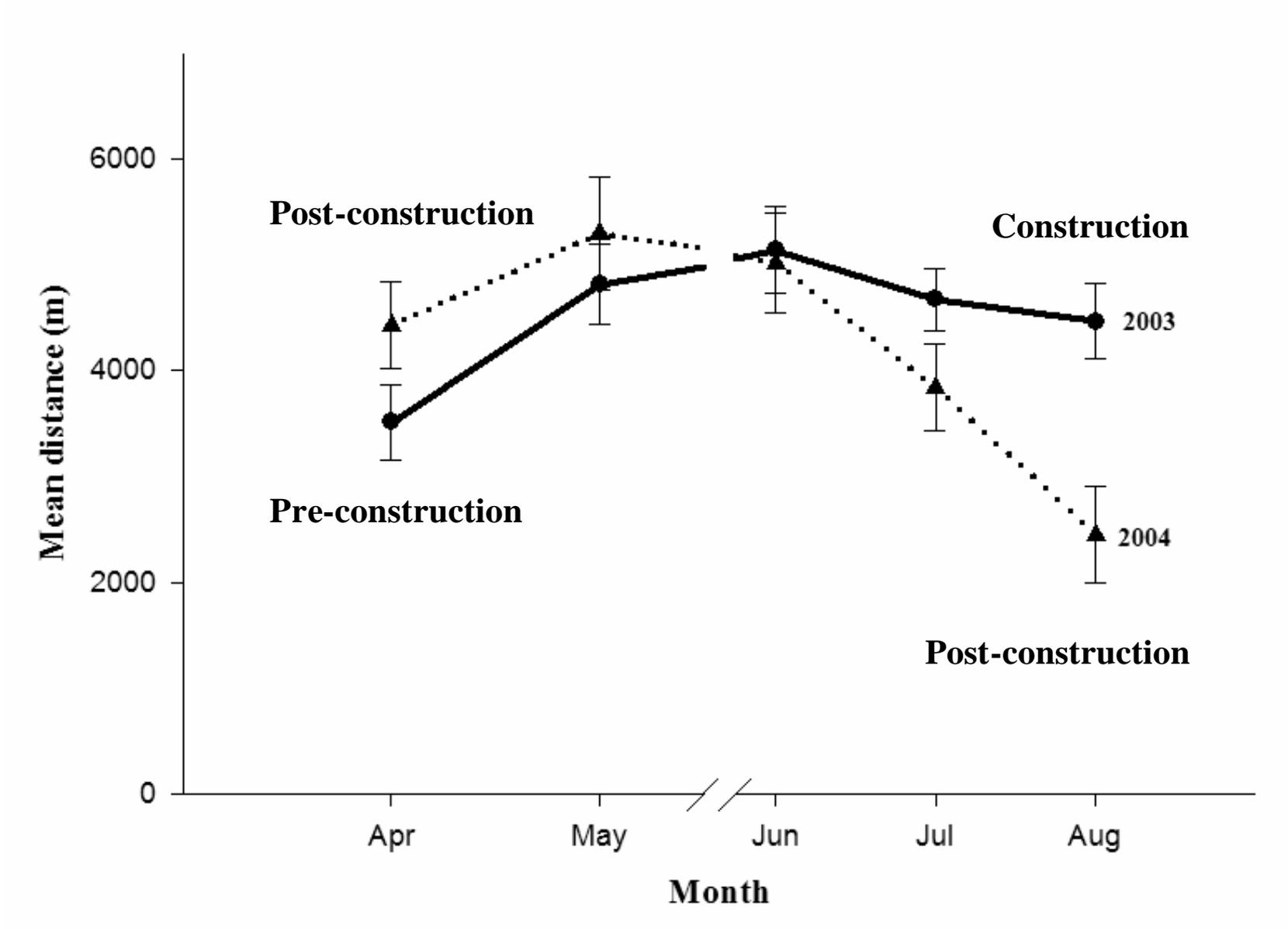
- **Spider distance in Animal**
Movement Extension



Nutrition

- **2 periods of fecal sample collection:**
 - **Pre-construction: May-August 2002 and January-March 2003**
 - **Construction: May-August 2003 and January-March 2004**
- **Feces were dried, ground, enclosed in 5x8-mm tin capsules for analysis at the University of California-Davis**
- **Carbon and nitrogen isotopes and percent nitrogen**

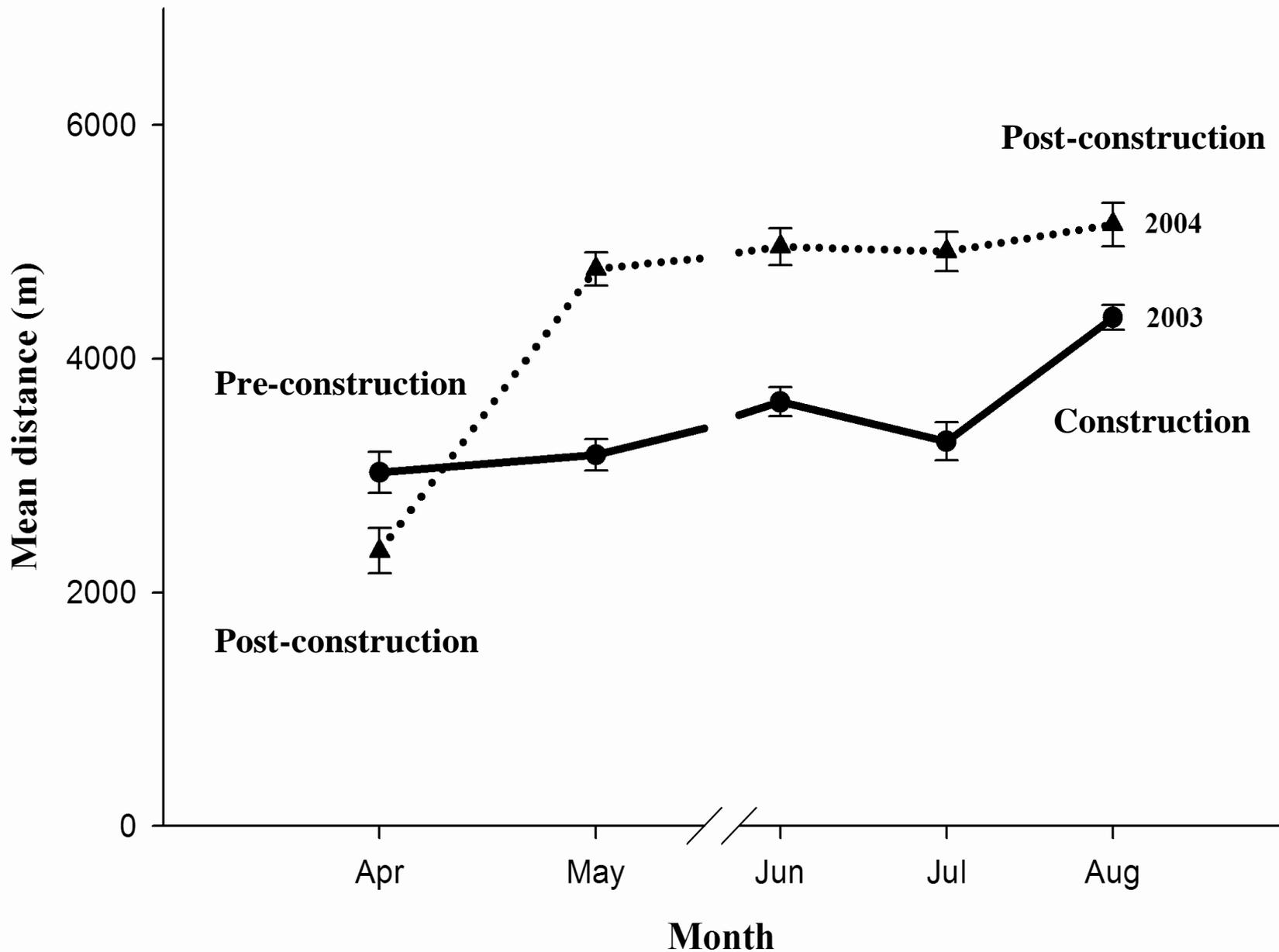
Mean distance (m) of elk locations to the nearest wind turbine

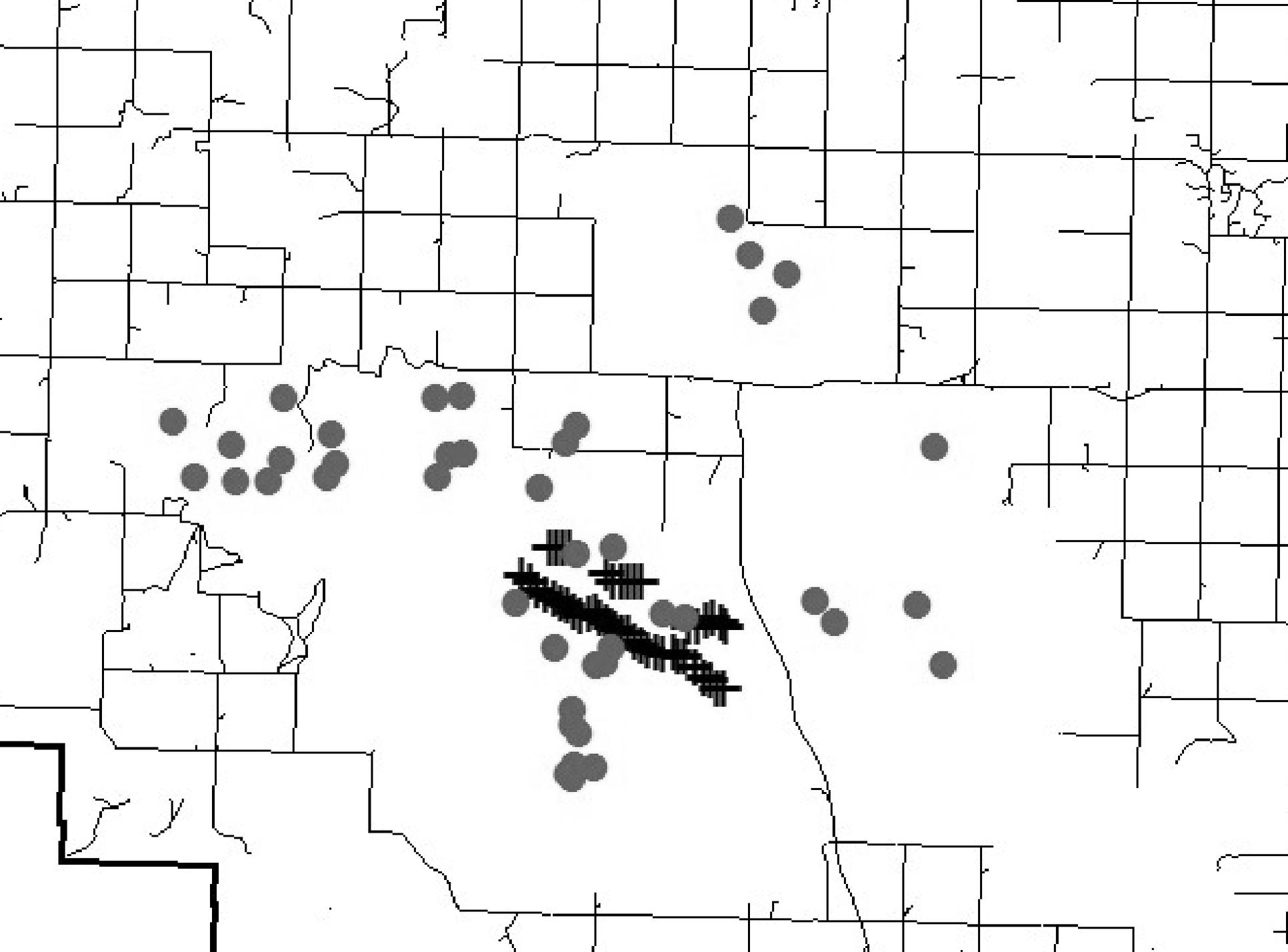


MCP area (ha)

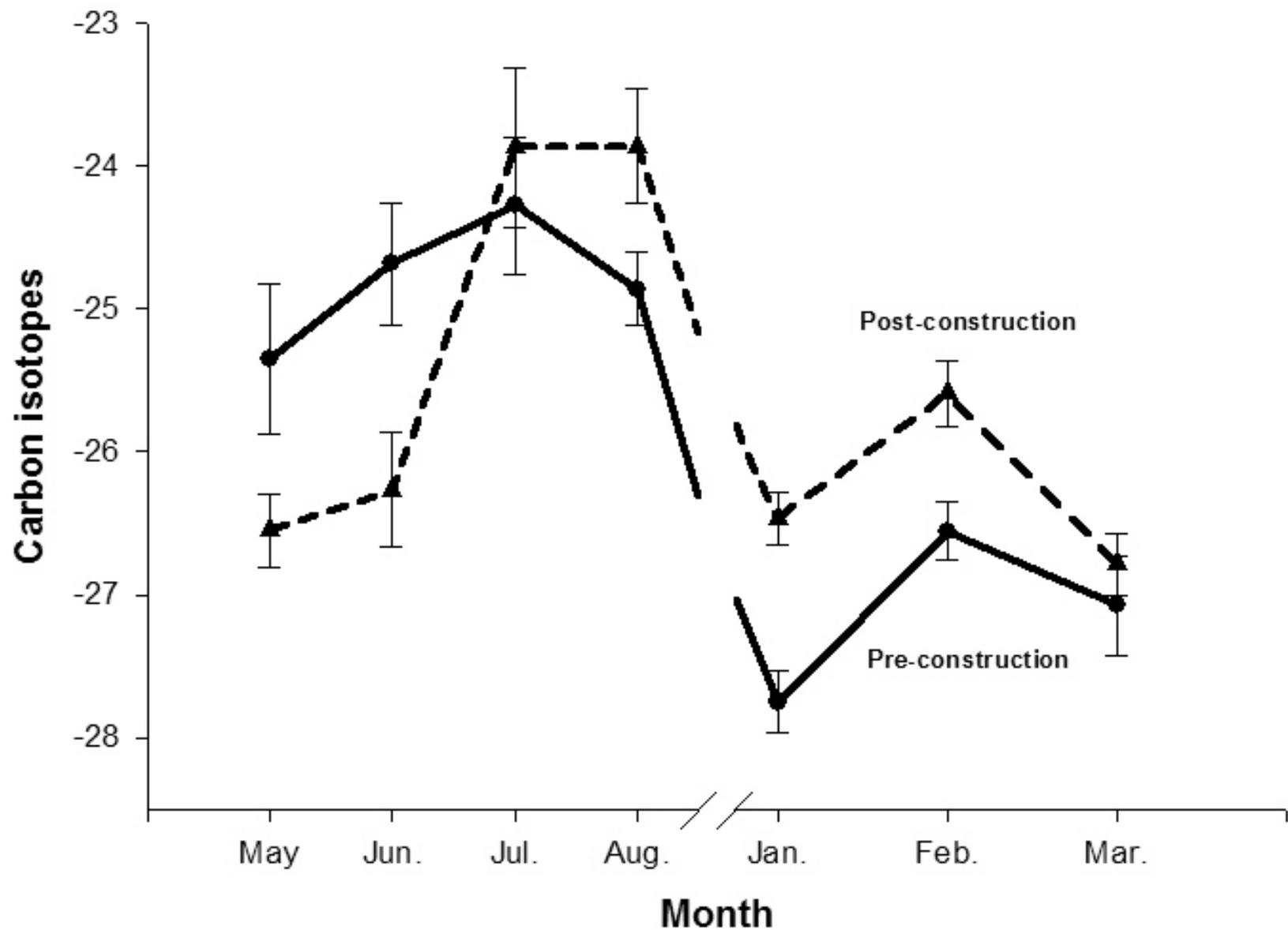
<u>Month</u>	<u>2003</u>	<u>2004</u>
April	11,480 (43)	12,999 (36)
May	13,151 (50)	9,256 (31)
June	13,199 (44)	9,931 (36)
July	7,456 (45)	5,625 (38)
August	3,531 (40)	8,388 (44)

Mean distance (m) of wind turbines from center of elk minimum convex polygons

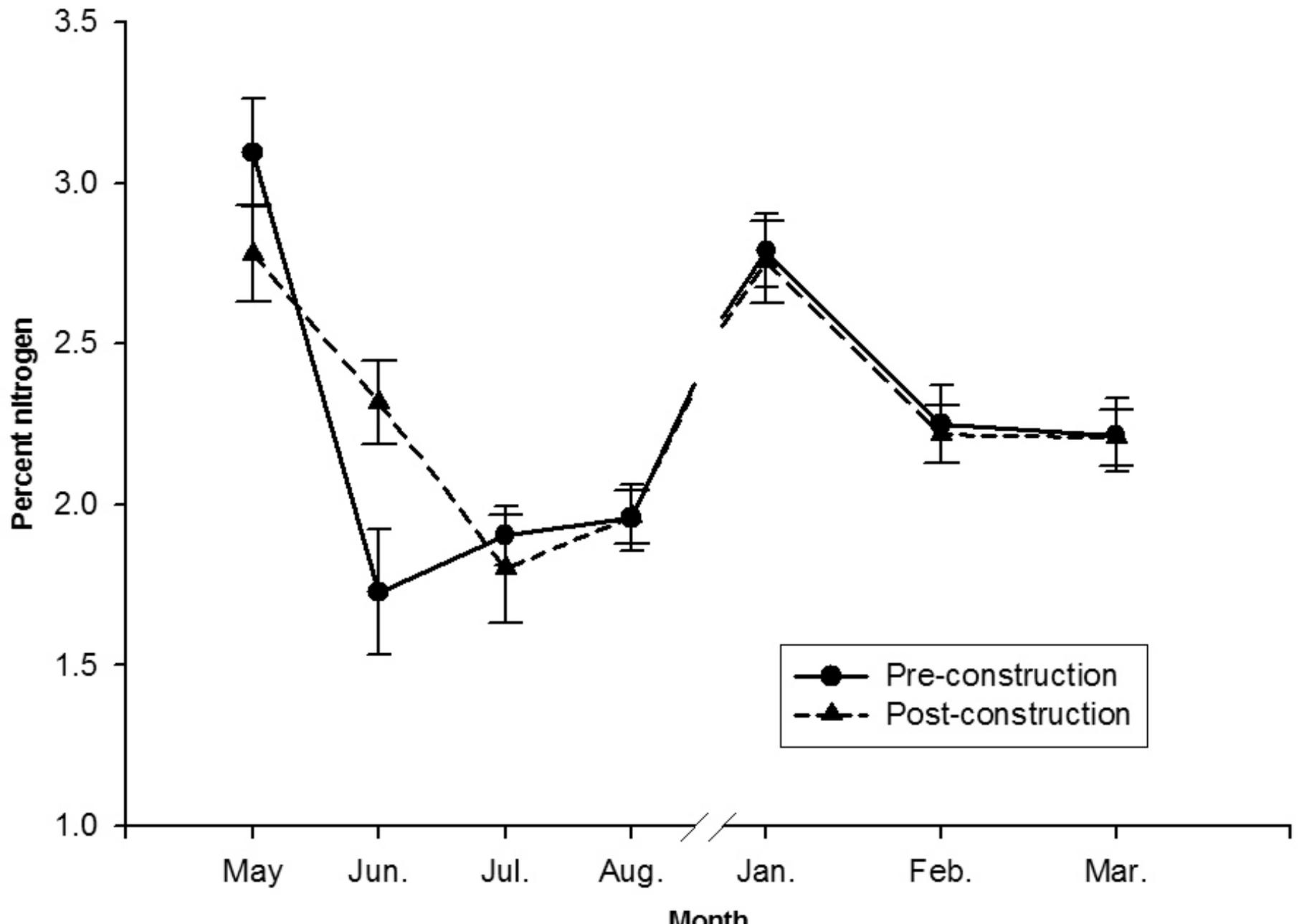




Carbon isotopes for feces collected from the Slick Hills for May 2002-March 2003 and May 2003-March 2004



Percent nitrogen for feces collected from Slick Hills elk
from May 2002-March 2003 and May 2003-March 2004



➤ **Elk did not abandon the Slick Hills in response to wind-power construction**



MCP size and distance from wind turbines was influenced by:

Forage availability



Human presence for construction



➤ **Fecal analysis suggested nutrition of elk was not adversely affected by development**



➤ **Further monitoring to assess elk response post-construction and future construction**



Acknowledgments



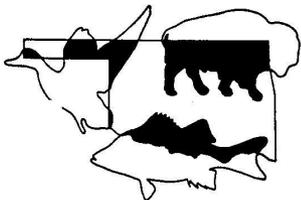
Rocky Mountain Elk Foundation



**Oklahoma Department Of Wildlife
Conservation**



Nature Works



*through the Oklahoma Cooperative
Fish and Wildlife Research Unit*