



ELSEVIER

Contents lists available at ScienceDirect

Mammalian Biology

journal homepage: www.elsevier.com/locate/mambio

Short communication

Do wolves hunt freshwater fish in spring as a food source?

Thomas D. Gable*, Steve K. Windels, Austin T. Homkes

Voyageurs National Park, 360 Highway 11 E, International Falls, MN, 56649, USA



ARTICLE INFO

Article history:

Received 2 November 2017

Accepted 18 March 2018

Handled by Mauro Lucherini

Available online 19 March 2018

Keywords:

Predation

Predator-prey

Minnesota

Prey switching

Alternate prey

ABSTRACT

In April–May 2017 we documented GPS-collared wolves (V034 and V046) from the same pack in northern Minnesota responding to a spring fish (northern pike and presumably white suckers) run, which to our knowledge is the first description of wolves outside of a coastal marine environment using fish as a seasonal food source. During this period, we opportunistically observed V046 hunting and consuming fish along a single creek, and documented a substantial number of wolf-killed fish in this area. We estimated V034 and V046 spent 43–63% of their daily time budget from mid-April to mid-May hunting and consuming fish at the same creek. Based on visual observation and the concentration of GPS locations, it appears the wolves targeted shallow, narrow areas along the creek to capture fish. Although short-term responses to alternate foods, such as fish, can be infrequent and challenging to document, they provide valuable insight to the flexibility of wolf hunting and foraging behavior.

Published by Elsevier GmbH on behalf of Deutsche Gesellschaft für Säugetierkunde.

Dietary plasticity can be advantageous for predators by allowing them to respond to temporary food sources, or to switch to alternate prey when primary prey becomes unavailable. Wolves predominantly hunt and kill ungulates but exhibit a relatively high degree of dietary flexibility for an apex predator (Gable et al., 2018; Newsome et al., 2016). Indeed, wolves will opportunistically kill and consume any prey that is abundant, easily captured, and large enough (Mech et al., 2015; Peterson and Ciucci, 2003). When not killing ungulate prey, wolves generally rely on other mammalian prey such as beavers (*Castor* spp.; Gable et al., 2016), hares (*Lepus* spp.; Gable et al., 2018; Nowak et al., 2011), and muskrats (*Ondatra zibethicus*; Chavez and Gese, 2005). However, non-mammalian foods such as fruits (Gable et al., 2017a; Papageorgiou et al., 1994), flightless molting birds (Wiebe et al., 2009), and salmon (*Oncorhynchus* spp.; Stanek et al., 2017) can be important seasonal food for wolves. Nonetheless, the importance of alternate foods for wolves has received relatively little attention (Watts and Newsome, 2017).

The predation and foraging habits of wolves in northern North America can vary based on pack cohesion and the time of year (Barber-Meyer and Mech, 2015). In the winter, wolves generally travel in packs and hunt ungulates (Mech et al., 2015). Once pups are born in early spring (~April–May), the den becomes the focal point of all pack activity. During the denning period, pack members typically radiate out from the den as individuals or in small groups to forage (Demma and Mech, 2009). As the snowpack disappears in

late winter or early spring and vegetation begins to grow, ungulate prey can become less vulnerable and harder for wolves to capture (Nelson and Mech, 1981). Thus wolves will commonly begin to hunt smaller prey such as beavers, or scavenge ungulate carcasses (Peterson and Ciucci, 2003). In April–May 2017, we documented 2 wolves from the same pack in northern Minnesota responding to an abundant spring fish run. To our knowledge, this is the first description of wolves outside of a coastal marine environment using fish as a seasonal food source.

Our study was conducted in and southerly adjacent to Voyageurs National Park (VNP; 48°30' N, 92°50' W), Minnesota, USA, an 882 km² protected area along the Minnesota–Ontario border. Voyageurs National Park contains numerous creeks and tributaries that are connected to the 4 large lakes (Kabetogama, Rainy, Namakan, and Sand Point) within the park. Several fish species, such as northern pike (*Esox luciosus*) and white suckers (*Catostomus commersoni*), inhabit these lakes and some use the creeks and tributaries as spawning habitat in the spring (Kallemeyn et al., 2003). The winter of 2016–2017, similar to that of 2015–2016, was mild, and all ice and snow was gone by early-to-mid April.

We captured wolves V034 and V046 as part of a larger project on wolf predation in Voyageurs National Park. We captured V034, the breeding male of the Bowman Bay pack, in April 2016 and fit him with a 12-h-fix-interval collar (Vectronic Globalstar Survey Collar, Vectronic Aerospace, Berlin, Germany). In February 2017, we captured V046, a yearling male (estimated via tooth wear; Gipson et al., 2000) of the Bowman Bay pack and fit him with a 20-min-fix-interval collar (Vectronic Iridium Survey Collar, Vectronic Aerospace, Berlin, Germany). Both wolves were processed via the

* Corresponding author.

E-mail address: thomasd.gable@gmail.com (T.D. Gable).

methods outlined in Gable et al., 2016, and followed Institutional Animal Care and Use Committee approvals by the U.S. National Park Service (MWR_VOYA_WINDELS_WOLF).

We searched all clusters of GPS locations from V046 during 28 March 2017–18 May 2017 (i.e., the beginning of our 2017 field season to the end of when V046 was hunting fish) to identify kills of typical mammalian prey. We did not continue searching clusters into the summer but do not include this information here because V046 had stopped hunting and consuming fish (i.e., V046 stopped spending time by Irwin Creek) after May 18. We defined a cluster as a group of consecutive locations that were within a 200 m radius of the first location of the cluster (Gable et al., 2016). Due to the high amount of scavenging that can occur during late March–May, we tried to get to clusters within 3 days of when the wolf was present so we could determine if the cluster was a kill or scavenging event.

While searching clusters from V046, the lead author opportunistically observed V046 hunting and consuming fish for 30 min along Irwin Creek (Fig. 1). We have included a description and video (Video 1) of the lead author's observation, which occurred in late April 2017. To avoid disturbing the wolves, we did not visit any further clusters around Irwin Creek (the only creek that V034 and V046 localized around) until late May 2017, when the wolves appeared to be done hunting fish. We did not search clusters of locations from V034 during this period because the long 12-h fix interval makes locating kill sites of small prey difficult (Palacios and Mech, 2010; Webb et al., 2008).

In total, V046 and V034 were in the Irwin Creek area where they were presumably hunting and consuming fish from 21 April 2017 to 18 May 2017 and from 17 April 2017 to 17 May 2017, respectively (Fig. 2). From here on, we refer to the period each wolf spent presumably hunting and consuming fish as the 'fishing period'. We estimated the time V034 and V046 spent hunting and consuming fish during the fishing period but did so differently for each wolf because of the substantial difference in fix interval length. We considered a wolf to be hunting and consuming fish if it was within a 500 m buffer around Irwin Creek. We did this because V046 would often spend substantial time at the creek, then bed down about 50–500 m from the creek for several hours, and often return to the creek to hunt and consume fish.

We estimated the time V046 spent around the creek by taking the mean of the minimum and maximum times spent within a 500 m buffer around the creek. We determined the minimum time V046 was at the creek based on the time between the first and last

location of each foray within the 500 m buffer of the creek, and the maximum time by taking into account the fix interval prior to and after the first and last locations in the buffer, respectively. For V034, we estimated the amount of time spent fishing by taking the proportion of locations that were within the 500 m buffer and multiplying that by the number of hours that had elapsed during the period (17 April to 17 May; total of 744 h) V034 appeared to be hunting fish during spring 2017. In doing so, we assumed that the GPS locations of V034 were representative of how V034 spent its time. We also assumed, based on data from V046, that V034 was hunting and consuming fish when a collar location was within 500 m of the creek. We then excluded locations at den sites to estimate how much of the time away from the den during the fishing period V034 and V046 spent fishing.

We recorded 2049 and 30 locations from V046 and V034, respectively, during the fishing period. In total, we estimate V046 and V034 spent 47% and 43%, respectively, of the fishing period (V046 = 316/672 h and V034 = 322/744 h) hunting and consuming fish. Excluding time spent at den sites, V046 and V034 spent 63% (316/497 h) and 59% (13/22 locations = 322/546 h), respectively, of the fishing period hunting and consuming fish. The majority of V034's locations (69% [9/13 locations]) when hunting and consuming fish coincided with when V046 was also hunting and consuming fish. Transmission rate of GPS locations from the GPS collars to the online webservice was 99% (2049/2077) and 81% (30/37) for V046 and V034, respectively, during the fishing period.

We searched all 262 clusters from V046 during 28 March 2017–18 May 2017. We located 7 kills, of which 4 were deer, 2 hare, and 1 beaver—all but one of which occurred between 28 March and 4 April 2017. We also documented 51 scavenging events where V046 had spent time feeding on remains of deer that died during the winter. Prior to first hunting fish, V046 had gone 17 days without making a kill. After V034 and V046 were done hunting fish, we searched all of the clusters near Irwin Creek. We documented a substantial number of wolf-killed fish but are unable to provide an estimate due to the large quantity of fish remains found. We know these were wolf-killed fish because there were no signs of other predators (e.g., black bears [*Ursa americanus*]) or scavengers near the fish remains, and there was abundant wolf sign everywhere (as described below). At one cluster along the creek we documented a beaver kill.

On 22 April 2017 at 11:10, the lead author opportunistically observed V046 attempting to catch fish along a shallow creek that



Fig. 1. A shallow section of Irwin creek, northern Minnesota where wolves from the Bowman Bay pack spent substantial time hunting and killing fish in April–May 2017.

Download English Version:

<https://daneshyari.com/en/article/8475606>

Download Persian Version:

<https://daneshyari.com/article/8475606>

[Daneshyari.com](https://daneshyari.com)