

Pike on the Prowl... a featured story from the March 2006 issue of *In-Fisherman Magazine*, Re-produced here with permission from Dr. Rob Neumann, author.

Pike are just plain designed to eat fish: elongated snout, strong jaws, and a mouth full of gnarly teeth; eyes strategically set forward; streamlined shape paired with power for rocket-like bursts at prey; and camouflage coloring for stealth in cover. Hooper had it right for pike when he was describing Jaws: “What we are dealing with here is a perfect engine. An eating machine. It’s really a miracle of evolution.”



Scientific food habit studies have found pike eat a variety of piscine subordinates, from minnows to bluegills, to suckers, to ciscoes and just about everything in between. Amphibians, small mammals, and ducks? Affirmative. Makes you wonder what kind of pike grub science hasn’t found.

Studies show that pike are flexible in what they eat, and a lot of it depends on what’s available. And it’s not always other fish species that are considered prey – pike eat pike, too, more so when they’re cannibals in systems that lack other prey species, or where the abundance of other baitfish is low or non-existent.

Mayfly nymphs, zooplankton, caddisflies, dragonflies, leeches, and scuds? Sounds like the diet of panfish, but these items are also on the record as pike food. They seem tiny for a predator that can eat things a whole lot bigger. Yet surprisingly, in some situations, even for big pike, smaller items dominate the diet.

A pike’s body coloration is well suited for blending into the backdrop of vegetated near-shore zones – an effective characteristic of a sit-wait-ambush type of predator. While the majority of tracking studies reveal the pike’s affinity for vegetation several show that they frequent open water and make regular excursions around and among areas, presumably to feed.

Generalizations about the seemingly preferred diet items and modes of feeding in pike are reflected in the standard repertoire of lures and tactics used among so many pike anglers today. Dig a little deeper though, and we find that pike are opportunistic creatures with flexible feeding patterns. Understanding this flexibility is a start, at least, to becoming better pike anglers by expanding the presentation factor.

Picky is for Wimps

Being a perfect engine means taking advantage of the optimum prey types available – consuming just the right amount of good fuel to run efficiently. Ecologists call this optimal foraging, selecting foods to maximize energy intake and at the same time minimizing the amount of energy expended while feeding.

The realities of optimal foraging often go by the wayside, where the mix of foods and sizes eaten are different from what might be considered optimal. That's because each waterbody presents different situations to pike. They're different in terms of the prey combinations they contain, how prey behave and thus how pike respond; what other predators are present, and the risks they impose. Habitat also enters the mix of explanations, when pike are restricted to particular habitats where they're forced to feed on suboptimal prey.

In a food habits study in several Wisconsin Lakes, DNR researchers Terry Margenau, Paul Rasmussen, and Jeff Kampa found that bluegills made up a substantial portion of the pike diet, even though bluegills might not be considered highly desirable prey because of their deep body shape, sharp spines, and ability to outwit pike in vegetation. Pike readily eat panfish like bluegills and perch, if that's what's available to them; and they can be a major factor controlling the abundance and size structure of panfish populations.



In other types of systems, like that of Coeur d'Alene Lake in Idaho, pike are presented with different options in terms of available foods and habitat. Here, trout appeared to be selected by pike, based on findings by Idaho Fish and Game biologist, Bruce Rich. Pike also ate yellow perch and suckers, among other species.

Finding out what pike eat is relatively straightforward – sample fish and examine gut contents. Narrowing down what pike prefer to eat is a bit trickier involving not only determining what pike eat, but also knowing how abundant each prey type is in the environment.

For example, if suckers make up 50 percent of what pike are eating, and suckers make up 50 percent of the available forage, then pike don't appear to be selecting for suckers. But if 90 percent of a pike's diet is composed of suckers, but suckers make up only 10 percent of the available forage, then this is a stronger case for selection. Sounds simple, but other complicating factors in nature can skew results, such as whether all prey types are equally available to pike.

Researchers often turn to controlled experiments in ponds and laboratories to investigate which types of prey are preferred. In one such study conducted by Missouri Cooperative Fishery Unit researchers Wilbur Mauck and Dan Coble, pike were held in pools, ponds and cases and presented with a mix of different preyfish types. The most vulnerable species to pike was gizzard shad, followed by carp, buffalo, fathead minnows and smallmouth bass. White sucker, green sunfish, largemouth bass, golden shiner, and yellow perch had intermediate vulnerability, and catfish, pike, and bullheads rounded out the bottom three.

Laboratory studies have also shown that pike select white suckers and golden shiners over perch, gizzard shad over sunfish, and carp and fathead minnow over green sunfish and bluegills. One study showed that pike spent a longer time following and pursuing bluegills, and had to make five times as many strikes to capture them, compared to fathead minnows or gizzard shad.

Most studies indicate the pike select for preyfish that have narrower profiles and soft rays rather than sharp spines. Fish with these shapes are easier to swallow, and representative species, like shad and suckers, are high in energy content. Although pike may avoid species with deeper bodies and sharp spines, they often dominate the diet where they're most abundant.



All Things Great and Small

While pike can be opportunistic in the types of foods they eat, the sizes of food items eaten are limited, at least on the large end, by mouth gape size (jaw dimensions). The optimum food size for pike has been calculated at between one-third to one-half the length of the pike. So, is a 13- to 20- inch bait the best size to throw for a 40-inch pike? Some recent research might help address that question.

While pike are capable of consuming fairly large prey, they readily eat prey of all sizes up to some maximum. They appear to be less size-selective than muskies, which might have a stronger correlation between body length and preferred prey size.

Consider findings of another Wisconsin DNR study, where stomach contents of pike were examined in Murphy Flowage. Biologist Leon Johnson reports that 95 percent of the prey items consumed by smaller pike (15 to 19.9 inches) were 1.5 inches or less in body depth. Pike 30 to 35.9 inches consumed those same prey sized 65 percent of the time.

Mostly these were 2- to 4.5- inch bluegills, perch less than 6.5 inches long, and other species with similar body proportions. This was despite the fact that there were a variety of prey sizes available. The body depth of prey, rather than length, appeared to be a more critical factor related to the maximum size of prey eaten.



And that's not to say that a pike won't try to engulf something approaching its mirror image. One 26-inch pike sampled from Murphy Flowage contained another pike that was over 13 inches long. The exact size couldn't be determined because the pike food was partially digested, and remains had to be compared to intact specimens to estimate its size.

More recent research shows that pike are able to eat deeper-bodied prey than estimated from mouth gape measurements. Swedish researchers P. Anders Nilsson and Christer Bronmark of Lund University presented pike with two European prey species, the common bream and roach, and pike ate deeper-bodied prey than assumed, based on mouth gape.

So as we've known all along, pike eat big things and take big baits. But big might not always be better. The window of prey sizes that pike are willing to eat appears much wider, and includes items that seem surprisingly small.

Kleptos and Cannibals

A few recent studies show that pike prefer to eat food items that are smaller than once thought. Small to intermediate size pike run the risk of being cannibalized by larger pike, and even big pike run risks of directly competing for food. These might be possible reasons why in some cases smaller prey or more slender prey is selected over larger, deeper-bodied prey.

Nilsson and Bronmark observed that prey handling time (the time needed to swallow prey) increased with prey size, and that longer handling times increased the risk of being cannibalized by or having prey stolen by other pike, the latter behavior called kleptoparasitism. Researchers speculate that smaller food items might be selected to reduce handling times to avoid these threats.

Kleptoparasitism in pike was briefly noted in a recent issue of *In-Fisherman*. Jeff Matity wrote that researchers in Saskatchewan have been collecting data on this phenomenon. They theorize that this behavioral strategy is perhaps a final step to reach maximum size, where meals can be had with lower energy costs than that expended during typical feeding.

During field experiments with angling, these researchers found that when a large pike was hooked, a second big pike often followed which could be caught, resulting in a “double-header.” The second pike was triggered by working a swimbait near the head of the first pike, then snapping the bait away and letting it free-fall. The theory is that pike could maximize their body growth by snatching prey from other pike or by forcing them to drop their food.

In the case of pike and other species, it’s a good idea to have throw-backs—a second lure ready on a nearby rod – available to quickly toss back to tempt fish that might be following a hooked fish. “I see this a lot when fishing smallmouths in early season, but pike commonly display this behavior,” says In-Fisherman Editor In Chief Doug Stange. “The second fish often responds immediately to a throw-back lure. Throw-backs are also important to have on hand to catch a fish that has followed but hasn’t been triggered by the primary lure. In this case, throw-backs often need to be something completely different than the primary bait being thrown.”

Little Buggers, Bread and Butter

A surprising finding of food habits studies is the heavy use of invertebrates by pike. This isn’t something that’s common across all or even most pike populations, but in some instances and seasons, invertebrates can be a primary component of the diet.



Researchers Lauren Chapman, William Mackay, and Craig Wilkinson of the University of Alberta studied the diet of pike in eight populations in Alberta and the Northwest Territories. They found that although pike were primarily fish eaters, the use of invertebrates was high during specific seasons in some lakes. In three lakes, for example, invertebrates made up at least 94 percent of the pike’s diet, based on the total number of items in the gut. The most common invertebrates eaten were amphipods, but mayflies and dragonflies were also consumed.

There also was a seasonal component to invertebrate feeding, with the highest rates for one lake recorded in May and June. Use of invertebrates declined in July, August, and September, which corresponded to an increase in fish in the diet.

“There are situations we’ve fished for pike when smaller baits were key,” says Stange. “In some lakes early in the spring, baits with a leech-like look, like dark jigs and plastics, out-produce spoons, spinnerbaits, and jerkbaits hands-down. We see this most in early season in the states and southern Canada, where pike might be keying in on leeches or mayflies rather than baitfish – it’s probably a matter of what’s abundant and what types of patterns pike are locked into at the time. This pattern often displays itself all season long in some far-north Canadian lakes. At times flies are another top producer.”

Science tell us that pike are flexible in what and how they eat, perhaps even more so than we typically believed. Understanding this flexibility is important, because it helps to fine-tune and expand the realm of presentation possibilities – something we cover n more detail in the next issue.

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