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Stephen Collins
Colby College

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By C. B. B. B.

The Great Mudpuppy Escape (sort of)

By Stephen Collins '74

Illustration By Paul Breeden

Across the nation and around the world, introduced species are raising concerns, and sometimes havoc, in ecosystems. Central Maine is no exception.

America has become home to starlings and killer bees, zebra mussels and the northern snakehead fish. Fire ants, giant nutria rats, West Nile virus and monkey pox. By land, water, air, even in bloodstreams, invasive species have arrived, and they are here to stay.

A 1999 report from Cornell University's College of Agriculture and Life Sciences claims invading non-indigenous species in the United States do more than \$138 billion in damage per year. The report says there are some 50,000 foreign species and the number will only grow.

Many were introduced purposefully, often by people whose intentions were better than their judgment. (We have starlings, for example, because in 1890 Eugene Scheiffelin thought America should enjoy all the birds mentioned by Shakespeare.) Others show up accidentally, arriving in ships' ballast or the soil around nursery plants. Still others escape from well-intentioned scientists—and therein lies a Colby tale.

It begins in the late 1930s on Great Pond, the setting of E.B. White's "Once More to the Lake" and Ernest Thompson's *On Golden Pond*. Read White's elegant essay, published

in 1941, and you'll realize the lakes were quieter in his time. There were fewer people to notice a Colby biology professor and his students keeping salamanders in the stream between Salmon Lake and Great Pond. It was easier for White and his son to catch a bass then.

To a herpetologist (and, doubtless, few others), the common mudpuppy, *Necturus maculosus maculosus*, is a wonderful creature. It's a big salamander that never leaves the water, "breathing" through colorful external gills around its head. Because of its size, typically up to 13 inches long, it's a good lab specimen for dissections and the study of various parts.

But in the 1950s when ice-fishermen and -women hoping to land a trout or a white perch instead began to pull mudpuppies up through the ice, they were not pleasantly surprised—visualize an action-figure sized Creature from the Black Lagoon that thrashes.

"It's a terrifying childhood memory," recalls Leone Donovan, a Waterville native whose parents fished Great Pond when mudpuppies first began to freak out unsuspecting anglers. "It was like the devil incarnate. I had nightmares about mudpuppies."

To the uninitiated the mudpuppy is a brown, spotted, slimy creature that looks like a cross between an eel and a kimodo dragon. The literature describes its body as "muscular" with four

short legs. It has a broad, flat head and a face not unlike a turtle's, behind which a fan of bushy red external gills encircles its neck, like a stegosaurus wearing a feather boa.

The record specimen was 17 inches long.

It didn't just scare children, either. Great Pond was a serious sport fishery, sufficiently renowned that on the day the ice went out a notice was posted in New York's Grand Central Station. With increased pressure as an increasingly mobile American population gained access to the lakes, and following an earlier inadvertent introduction, this one of walleyed pike by the Department of Inland Fisheries and Wildlife, Great Pond could ill afford another threat.

In 1960, Denton W. Crocker, a biology professor at Colby, published an account in *Maine Field Naturalist* of the accidental introduction of mudpuppies into Great Pond. He quoted a letter from an earlier Colby biology professor, Henry W. Aplington, who described bringing about 200 very young *necturi* to Colby from Pennsylvania for study. "I arranged to keep the animals in a wire mesh trap in the stream at the fish hatchery (then in use) between Salmon Lake and Great Pond," wrote Aplington. "That autumn, about 85 got away through a hole which a stone must have punched in the wire netting." He and his students tried to recover the specimens, but it was too late.

Colby's Dana Professor of Geology Emeritus Donaldson Koons confided, "It was probably raccoons that got into the cage. That's what Aplington told me."

Rocks or raccoons, the mudpuppies got away.

"Unfortunately," Aplington's letter continues, "this is not the whole story." A subsequent batch of mudpuppies that he purchased from a scientific supply company were kept at the same hatchery several years later. "Despite the earlier experience these animals (all adults) also got away," he confessed.

After publishing a scholarly chapter about mudpuppies' gonads (ah, yes), Aplington departed Colby in 1947, for Muhlenberg College in Pennsylvania. No one thought much about mudpuppies for another 10 years. Giant aquatic salamanders were unknown in Maine waters, though they do

range north of the state in the St. Lawrence River and inhabit central portions of the Connecticut River, the border between Vermont and New Hampshire.

Mrs. Richard Adams of Waterville was the first angler reported to have caught a mudpuppy, according to Crocker's account. She did so ice-fishing on Great Pond in January 1957. That fall David Sirman '60 brought a specimen he caught at the Colby Outing Club on Great Pond to Crocker in the Biology Department, and the following spring Paul Reichert '59 brought another. A year later Jerome Boulette, a Waterville firefighter, showed up with several of the creatures in a bucket. Though he had speared them, they were still alive. "They're almost indestructible," said Boulette, now in his late 70s and living in Oakland. "At first I didn't know what they were because nobody had ever heard about them."

Ironically, Boulette was out with friends looking to spear walleyed pike on their spawning beds, part of a concerted effort to eliminate that species from Great Pond, when he discovered the mudpuppies. The walleyes had been introduced in the 1930s when a fish hatchery erroneously crossed up two orders and shipped the walleyed pike to Great Pond in Belgrade and a brood of landlocked salmon to a different Great Pond, in Minnesota, according to Bill Woodward, the Department of Inland Fisheries and Wildlife biologist now responsible for the Belgrade Lakes fisheries.

Boulette clearly remembers the night he caught the mudpuppies. Using flashlights to hunt for unwelcome walleyes on shoals near Pine Island, he found none. Instead he saw quite a few foot-long salamanders. "They seemed to change color with the bottom of the lake . . . like a chameleon," he said. "They looked like little dragons."

It's just as well that Aplington was far away 20 years after the first accidental release. Among local anglers, reaction to the invasion of *necturus maculosus* was hostile, according to Donald Mairs's report in the reference book *Maine Amphibians and Reptiles*. Dire concerns about the effects on game fish populations mobilized an echo of the anti-walleye campaign, and for a few years some residents killed as many as they could, mostly by spearing and netting them

around the old hatchery. John Caswell, who lives in North Belgrade and has fished Great Pond for decades, said that in the early 1960s he and friends used to spear 100 or more mudpuppies each year, cut their heads off and throw them on the stream bank.

Such efforts have ceased, but Caswell, Boulette and many other fishermen still resent the intruders, which are believed to live throughout the Belgrade Lakes chain now. "They're a big nuisance," Caswell said. "They go in the streams and eat the fish eggs when the fish go up the streams to spawn." They steal bait from ice-fishing lines, often without getting hooked or springing the trap, he said.

"They eat the fish spawn," echoed Boulette, who blames mudpuppies for the decline in the hornpout and brook trout populations.

It's not unusual that the fishermen and the official experts don't agree on all aspects of the controversy. State fisheries biologist Woodward, for one, isn't terribly concerned about the big, non-native salamanders. "They don't really seem to be a threat to any species," he said, summing up their impact as "incidental."

A report from McGill University's Redpath Museum, in Montreal, says, "Though mudpuppies do occasionally eat fish eggs and some fish, there is no evidence that they significantly reduce game fish populations."

Mairs, a naturalist, says in his article about the Great Pond mudpuppies that insects and crayfish have been identified as their primary food elsewhere, though small fish and fish eggs, worms, leeches, snails and other salamanders also are part of their diet. Mairs concluded that the significance of Belgrade's introduced mudpuppies on fish populations, either through competition or predation, hasn't been studied conclusively. "There are just so many questions," he said of the interaction among aquatic species. "Nobody's doing any research because there's no money for research on the subject."

As a lifelong resident of the area who lives near the stream where mudpuppies were introduced, Mairs says he's unfazed by the intruders. "I think they're great," he said, though he admitted it may be a creature only a herpetologist could love. Which is not to say he is unconcerned about intro-

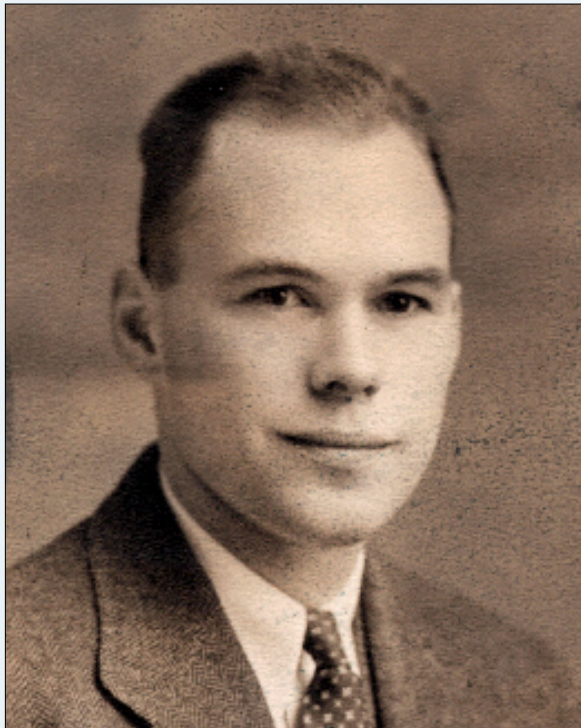
duced species. "Native biodiversity usually suffers," he said.

Mike Little, executive director of the Belgrade Regional Conservation Alliance, who has a degree in environmental management and a lifelong interest in "herps," started a conversation about mudpuppies with "I've got a couple in my freezer"—explaining that he's collecting samples to try to see what they've eaten. "They probably eat some fish eggs, but they're about as benign an invasion as you can get," was his preliminary conclusion. (This from one of the leaders of a mobilization to stop the spread of invasive aquatic plants, particularly variable milfoil, in central Maine lakes.)

Woodward added: "There have been other changes in the whole biological system that's made it [the effect of mudpuppies on fisheries] hard to track." Most prominent was the introduction of northern pike to the watershed 35 years ago. But a broader history of aquatic fauna puts the introduction of the mudpuppies in a different perspective. Nature isn't what it used to be. Those bass E.B. White caught, practically all of the game fish, most of the minnows and even crustaceans in the Belgrade Lakes, it turns out, are introduced species, scientists say.

It took about 20 or 30 years to eliminate the unwanted walleyed pike from the Belgrades, but soon after that was accomplished the northern pike was illegally introduced. A game fish prized by some for its size, strength and fighting ability, big northern pike can run four feet long. The Maine record, caught in North Pond, adjacent to Great Pond, weighed more than 31 pounds. It's a top-of-the-food-chain predator, so it comes to a body of water at a price, and that price is paid by other species, including brook trout, landlocked salmon and white perch.

Woodward said he heard a reliable account that an out-of-state land developer connected with a notoriously shady land deal west of Long Pond was seen deliberately dumping a tub of northerns into Little North Pond in 1969. Anglers started



Biology Professor Henry W. Aplington

catching pike in all of the downstream Belgrades during the 1970s ("We thought they were pickerel at first," said Boulette), and by the 1980s they were part of annual fishing derbies. Year after year, the winning fish got bigger.

"We get so used to having these things that it's old news," Woodward said of introduced species. "This is the way it is with pike now. We knew we couldn't get rid of them, so we started managing them." Some fishermen would argue that the pike could stand more heavy-handed management. While the Belgrade chain is the only lake system in Maine with an established pike population, a mature pike was found in Sebago Lake last summer, prompting concerns about the storied landlocked salmon fishing there.

While the burgeoning pike have been blamed for declines in other prized fish species, it turns out that all of those fish except the brook trout were themselves species introduced by previous generations.

Bass, landlocked salmon and chain pickerel were introduced by the state a century ago or more, Woodward said. White perch live in fresh or salt water and occur naturally in coastal drainages, but it's unclear whether they are native to lakes like the Belgrades,

Mairs said. Brown trout were originally from Germany, according to Little. Though there are a few native brook trout still in the lakes, most of that fishery has been a put-and-take operation, as the state stocked hatchery-raised trout for anglers to catch.

And it's not just the finned fish. To the extent that mudpuppies prey on crayfish and compete with them for food, the mudpuppies are dealing with more introduced species than native ones. More crayfish species have arrived in fishermen's bait pails than existed naturally in Maine ponds and streams, Mairs said.

So while the mudpuppy in central Maine is an exotic, introduced species, one view is that it is merely one more addition to an aquatic ecosystem that in some respects is a huge and evolving aquarium project. Nature here is untrammled in fewer ways than we might like to imagine.

And Maine is hardly unique in this respect. In the Cornell paper on introduced species cited above, Professor David Pimentel and his co-authors reported that 98 percent of the U.S. food system is provided by introduced species. Corn, wheat, rice, cattle, poultry and most other livestock and food crops fit that category.

Invasive species have been getting a lot of attention recently, in the news media and from a National Invasive Species Council, a federal interdepartmental initiative established in 1999 (www.invasivespecies.gov). The resulting awareness of risks seems to have raised the public's consciousness, but humanmankind's unprecedented mobility on a global scale makes it hard to be optimistic that the problem may diminish. Still, as with other threats to the status quo, it is important to distinguish between hype and hard facts, histrionics and helpful warnings, terror and trouble of a more routine nature.

Though some see the tale of the Great Pond mudpuppies as a Colby science project turned science fiction, others maintain that, despite its scary countenance, this is one puppy with neither bark nor bite.

What's microscopic and rides on a mudpuppy? What invasive species is directly beneath us? Go to www.colby.edu/colby.mag/issues/fall03/mudpup.html and find out.