CHAPTER 1

Chapter 1: The Bill Nobody Wanted to Read

There is a number buried in the federal budget that almost nobody talks about. It doesn't appear on cable news. It rarely makes it into political speeches. And yet it represents one of the largest, most persistent drains on the American economy — a slow hemorrhage that has been widening for sixty years.

That number is somewhere north of **$120 billion per year**.

That is what invasive species cost the United States annually, once you add together the direct management expenditures, the infrastructure damage, the agricultural losses, the medical costs, and the cascading economic effects on ecosystems that no longer function the way they once did. It is larger than the annual budget of the Department of Homeland Security. It is larger than the GDP of most countries you could name off the top of your head. And the people responsible for addressing it keep reaching for the same three tools, year after year, regardless of whether those tools are working.

A $120 Billion Problem Hiding in Plain Sight

The figure of $120 billion is not a single published estimate. It is an assembly — and that assembly is important to understand, because each component has been studied independently, which means the total is almost certainly an undercount.

Start with what we can measure precisely. Biological invasions cost the United States an average of approximately **$19.94 billion per year** from 1960 to 2020, rising from roughly $2 billion annually in the 1960s to over $21 billion annually between 2010 and 2020[1]. The U.S. Geological Survey places the current annual figure at more than **$21 billion per year** when economic and health-related costs are included[2].

> **$21 billion per year** — the USGS estimate of annual invasive species costs in the United States, not counting ecosystem service losses that economists have not yet fully priced[2].

Now consider what those numbers omit. They do not fully capture the value of ecosystem services that simply stop working. A forest killed by an invasive beetle no longer sequesters carbon, filters water, or stabilizes slopes against erosion. A lake overwhelmed by invasive mussels may produce dramatically different water quality, affecting municipal treatment costs for decades. These losses are real. They affect real budgets. But they are notoriously difficult to assign a dollar figure to, which means they tend to disappear from the accounting.

The $120 billion figure that appears in the title of this section represents a working estimate that includes the USGS baseline, infrastructure damage, agricultural suppression, and partial ecosystem service losses. I use it not as a precise measurement but as a floor — a conservative lower bound beneath which the true cost almost certainly does not fall.

Here is the detail that tends to land hardest when I share it in conversation: approximately **42 percent** of threatened and endangered species in the United States are directly impacted by invasive species, making biological invasion the second leading cause of native species endangerment in this country[2]. We are not talking about a bookkeeping problem. We are talking about a civilizational one.

How the Accounting Works — and Why the Real Numbers Are Almost Certainly Worse

The phrase "invasive species cost" contains a hidden ambiguity. There are at least four different categories of cost that researchers measure, and they are rarely added together in a single report.

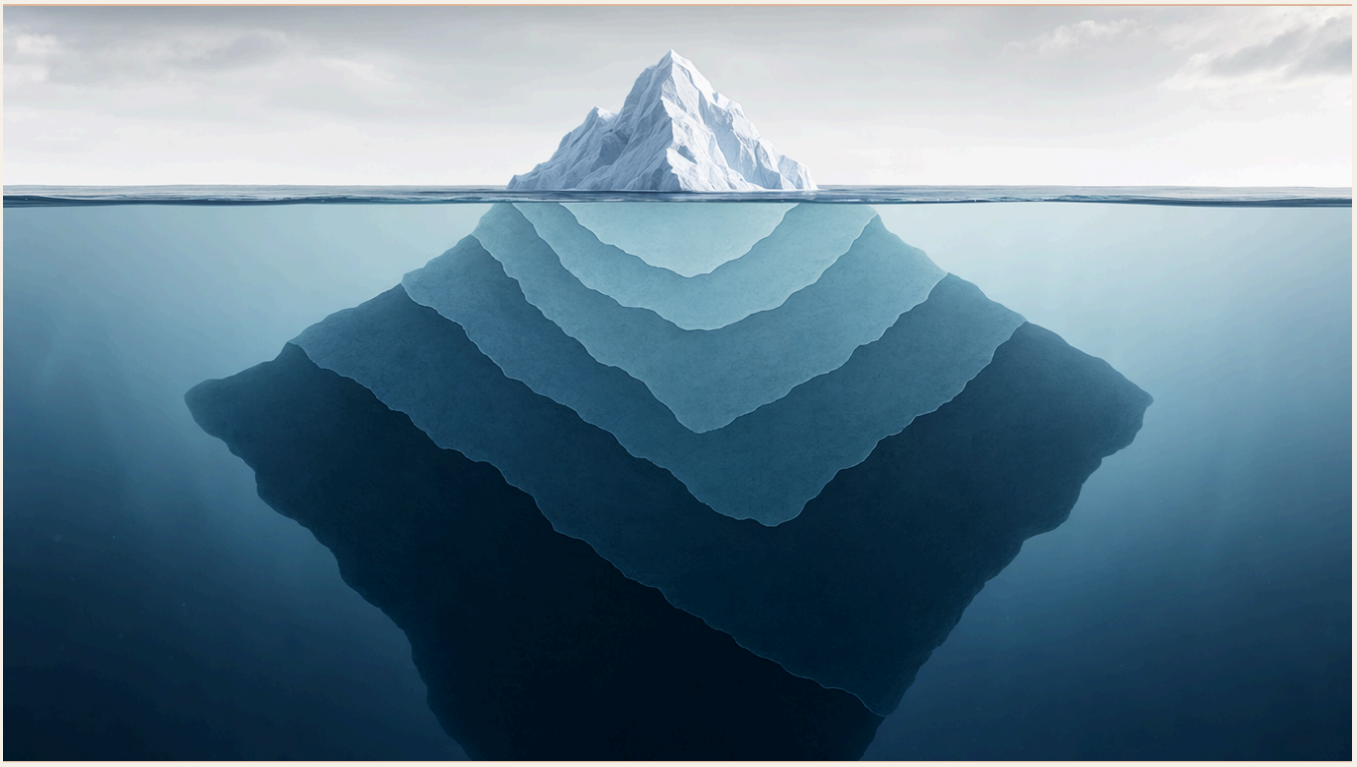
Direct management costs are the most visible: money spent on herbicides, mechanical removal, biological control programs, quarantine operations, public outreach campaigns, and the federal agencies that coordinate all of the above. These are the line items that show up in appropriations bills.

Infrastructure damage is the second category. Zebra mussels fouling industrial water intakes. Kudzu pulling down power lines. Invasive grasses driving wildfire costs upward. These costs are borne partly by government and partly by private industry, which is one reason they get undercounted — no single agency is responsible for tallying them.

Agricultural and forestry losses form a third category: crops destroyed, timber stands degraded, grazing land converted to monocultures of invasive plants. These losses are partly insured and partly absorbed by landowners, making systematic accounting difficult.

Ecosystem service losses are the fourth and least-counted category. This is where the accounting breaks down most dramatically. When a native predator population collapses because its habitat was disrupted by an invasive species, the downstream effects ripple through food webs in ways that can take decades to manifest — and that almost never appear in a budget line.

The honest answer is that we do not know the true annual cost of invasive species in the United States. What we know is the fraction of it that someone was paying enough attention to measure. That fraction is already large enough to demand a serious response. The unfunded remainder is the part that should keep you awake.



The Three Tools America Reaches for First

When an invasive species is detected, the institutional response in the United States follows a remarkably consistent pattern. Regardless of whether the invader is a beetle, a vine, a fish, or a mollusk, the playbook rarely changes.

Tool one is chemicals. Herbicides for plants. Pesticides for insects. Piscicides — fish poisons — for invasive fish. The appeal is obvious: chemicals work quickly, they can be applied at scale, and their effects are legible. You spray a stand of kudzu; the kudzu dies. The fact that it grows back next season, requiring another application, and the season after that, and the season after that, does not immediately register as a design flaw. It registers as a budget line.

Tool two is machines. Mowing, cutting, physical removal, suction harvesting of mussels from intake pipes, aerial drops of fish, electroshocking of waterways. Mechanical control is labor-intensive and expensive per acre treated, but it produces visible results — trucks full of vegetation, tanks full of stunned fish — that are easy to photograph and report.

Tool three is money. This is not a third tool so much as the fuel that powers the first two. When an invasive species becomes a crisis, the American institutional response is to appropriate funds. Those funds flow overwhelmingly toward chemical and mechanical control, for reasons that have less to do with ecology than with the structure of grant applications, agency mandates, and political incentives.

What is conspicuously absent from this default toolkit is sustained attention to a fourth option: the biological systems that were already present before the crisis began, quietly doing work that no budget line has ever credited them for.

What This Book Is Actually About

I want to be direct with you about what you are holding, because misdirection in conservation writing has done real damage to the field.

This is not a book about invasive species. It is a book about the response to invasive species — specifically, about a systematic pattern in which expensive, institutionally comfortable interventions are deployed in settings where cheaper, ecologically native alternatives were already operating, and where the intervention either duplicated the natural suppression, disrupted it, or both.

I have spent years watching this pattern repeat across ecosystems that have almost nothing in common except this: when you look closely at the data, something was already pushing back before the program started. A woodpecker working the bark of a dying ash tree. A native predator fish holding an invader's population below the threshold of ecological collapse. A fungal pathogen slowly strangling the roots of a vine that official reports described as unstoppable.

The programs often didn't fail because they were badly designed. They failed because they were designed without asking whether the problem was already being partially solved — and whether the solution needed help, or just protection.

I have a personal stake in asking this question clearly. I grew up on a property at the edge of a managed forest in the Midwest, where my father spent two decades fighting a losing battle against invasive shrubs using herbicide and hand-clearing. The shrubs always came back. The native songbird population, which I did not appreciate until much later, was doing something measurable in that same landscape — and nobody was paying attention to it, including us.

That memory is not a data point. But it is why I read the data the way I do.

A Promise to the Reader

Every claim in the chapters that follow has a price tag attached. That is not a metaphor — it is a methodology. For each case study in this book, I will tell you what the intervention cost, what it achieved, and what the data says about the biological processes that were operating alongside it, or in spite of it, or before it began.

I will not ask you to accept any of this on trust. The research base for what follows is real, peer-reviewed, and in several cases produced by the same federal agencies whose programs it challenges. Where the evidence is strong, I will say so. Where it is suggestive but not conclusive, I will say that too. The worst thing a writer in this space can do is overstate certainty to sharpen an argument. The argument is sharp enough on its own.

You do not need to be a biologist to follow what comes next. You need to be the kind of person who reads a budget and asks what the outcomes were supposed to be — and whether anyone checked.

> **Case:** Invasive species costs in the United States rose from approximately $2 billion annually in the 1960s to over $21 billion annually between 2010 and 2020 — a tenfold increase in real dollars over sixty years, during which management spending also increased substantially[1]. The spending curve and the damage curve rose together.

KEY TAKEAWAYS

- Invasive species cost the United States at least **$21 billion per year** in measurable damages — and the true figure is higher once ecosystem service losses are included[2].
- Standard accounting dramatically undercounts invasion costs because infrastructure damage, agricultural losses, and ecosystem service disruptions are tracked by different agencies, if they are tracked at all.
- The three default tools — **chemicals, machines, and emergency appropriations** — are not wrong in principle, but they are applied without systematic evaluation of what native biological processes are already doing in the same landscape.
- Approximately **42 percent** of threatened and endangered U.S. species are directly harmed by invasive species, making this an extinction issue, not just an economic one[2].
- The central question of this book is not "how do we stop the invaders?" It is "why do we keep spending money on interventions without first asking what's already working?"

> **Reflection exercise:** Before you read Chapter 2, identify one invasive species management effort in your region — a kudzu removal program, an invasive fish stocking halt, a beetle quarantine zone. Look up what it costs annually. Then ask yourself: does that budget include any line item for monitoring native predators or biological suppressants in the same area? The answer, in almost every case I have found, is no. That absence is what this book is about.

The vocabulary we use to describe these problems turns out to matter enormously — sometimes more than the biology itself. Before the case studies begin, we need to establish what we actually mean when we call something "invasive," because the word is doing two jobs simultaneously: one scientific, one political. And the gap between those two definitions has, quietly, cost us more than most people realize.
