

HURRICANE EXPOSURE & RESILIENCE

STORMS COST A FLORIDA POOL ROUTE 1.5 WORKDAYS A YEAR. THE REAL COST IS ONE LOST WEEK EVERY 12–20 YEARS.

Storm-wind exposure for 1,136 counties in 18 Gulf and Atlantic states, modeled from NOAA hurricane best tracks (2004–2025) and checked against FEMA's National Risk Index (Dec 2025), with a continuity plan for route owners.

THE FINDING

STORMS TAKE 1.5 WORKDAYS A YEAR FROM A FLORIDA POOL ROUTE. THE REAL EXPOSURE IS A 1-IN-3 TO 1-IN-2 CHANCE OF A HURRICANE-FORCE WEEK WITHIN TEN YEARS.

Model on 9,407 county storm-wind events (NOAA HURDAT2, 2004–2025), population-weighted across Florida. Low end: rolling ten-year windows (38%) and the long-run rate (37%); high end: the 2004–2025 rate (51%). A hit is modeled as about 6 lost workdays (an assumption).

CONTENTS

01 Key findings 3

02 Method: wind at the county, days lost at the route 3

03 Sample and coverage 4

04 Florida carries the most storm days by far 5

05 Where in Florida a hurricane-force hit is most likely 6

06 Small every year, big once 7

07 Two busy decades: why the ten-year chance is a range 8

08 Limitations 9

09 What an owner can do with this: a continuity plan 11

10 Sources 12

11 About this research 13

01 KEY FINDINGS

1 **The average year is cheap: 1.5 route workdays, about $720 for a 70-account route.**
Population-weighted across Florida, storms take 0.7–3.0 workdays a year (low–high case), about 0.6% of the working year. Only 33% of that comes from hurricane-force winds; 45% comes from ordinary tropical-storm days.

2 **The risk comes in rare, heavy weeks.**
The chance that hurricane-force winds reach a typical home in a Florida route's area within ten years is 37%–51%, depending on whether the next decade looks like the long run or like 2004–2025. By county it ranges from under 5% (the Jacksonville area) to 90% (Brevard). We assume one such hit holds up about 6 workdays (about $2,900 on 70 accounts), up to 12 in a bad case.

3 **Florida stands alone.**
Its population-weighted exposure (1.49 days a year) is 1.3× the next state, Louisiana (1.12). Texas, the other big pool market on the coast, averages 0.27, because most of its population lives inland.

4 **The peak is September.**
34% of county storm-wind events start in September and 78% in August–October; for hurricane-force events September's share is 41%.

5 **The last two decades were unusually busy for Florida.**
Hurricane passages per Florida county ran 3.0× higher in 2004–2025 than in 1975–2003. That is why we report the ten-year chance as a range.

02 METHOD: WIND AT THE COUNTY, DAYS LOST AT THE ROUTE

We asked a narrow question: in a normal year, how many route workdays does storm wind take from a pool service business, and how lumpy is that loss? We answer it in three steps, all in the scripts that come with this report.

1. Where NOAA's wind radii put storm-force winds

NOAA's National Hurricane Center publishes HURDAT2, the official "best track" for every Atlantic storm: position, peak wind and, since 2004, estimates of how far tropical-storm-force (34 kt, 39 mph), 50-kt (58 mph) and hurricane-force (64 kt, 74 mph) winds extend in each quadrant. We interpolated every track to 10-minute steps for the 22 seasons from 2004 to 2025. For each county we placed a point at its 2020 center of population

(Census), because that is where the pools are. If the point fell inside a storm's wind radius for its quadrant, the county got an event at that wind class; each storm counts once per county, at its strongest class. Post-tropical stages count too (Sandy was post-tropical at landfall); a tropical-only version is in the data.

2. Rates for a route's area

A route covers an area, not a point, and 22 seasons is short for rare events. So each county's rate pools the event counts of every county whose population center lies within 40 miles, weighted by population: it is the rate at a typical customer's home in that area. The chance of at least one hurricane-force event in N years is $1 - e^{-\text{rate} \times N}$. That formula assumes storms arrive independently; in reality they cluster (2004–05, 2017, 2022–24), so we also report what actually happened in rolling ten-year windows.

3. From wind to lost workdays and revenue (a model)

Expected days lost per year = Σ (events per year in a wind class × days lost per event in that class). Revenue on hold = days lost × accounts × monthly price × 12 ÷ 260. Whether that revenue is really lost depends on your billing policy: if you credit missed visits it is lost; if you bill a flat monthly rate it shows up as catch-up work instead. The days per event are assumptions, anchored on the evidence in the table.

MODEL INPUT	LOW / CENTRAL / HIGH	ANCHOR
Tropical-storm-force (34–49 kt, 39–57 mph)	0.5 / 1 / 2 days	Prep day plus storm day; outages short (Debby 2024: nearly all power back by day 3)
Strong tropical-storm-force (50–63 kt, 58–73 mph)	1 / 2 / 4 days	Cat 1–2 Florida landfalls: ~95% of power back in 3–5 days (Milton public power, Isaias 2026)
Hurricane-force (64 kt+, 74 mph+)	3 / 6 / 12 days	Harvey: firms that closed were shut 5.5 days on average (Dallas Fed); Ian: disruption "up to two weeks" (FGCU)
Monthly price per weekly account	$130 / $150 / $175	Consumer cost guides and crowdsourced operator data (2026); not a census
Route working days per year	260	Weekly service, Monday–Friday
Service area for pooling counts	40 miles	Counties whose population centers fall within 40 miles, weighted by population

Cross-check: across the 1,132 study counties with a FEMA value, our expected days lost rank almost the same as FEMA's National Risk Index hurricane frequency (Spearman ρ = 0.93) and its expected-annual-loss score (ρ = 0.86). Both rest on NOAA's track data, so this checks our processing, not the underlying record.

03 SAMPLE AND COVERAGE

The study area is the 18 states on the Gulf and Atlantic coasts from Texas to Maine: 1,136 counties (Connecticut uses its nine planning regions, as in current Census and FEMA files). The

INPUT	VINTAGE
HURDAT2 Atlantic best track	1851–2025, released Sep 2026

calculation was also run for every other county in the lower 48 so that No. 08 in this series can use it; outside the coast the values are almost all zero.

Between 2004 and 2025, 111 Atlantic storms brought tropical-storm-force winds to at least one study county, producing 9,407 county events; 42 of them brought hurricane-force winds somewhere in the study area. The 2026 season, including Hurricane Isaias in the Florida Panhandle in October 2026, is not in HURDAT2 yet and is not in this model.

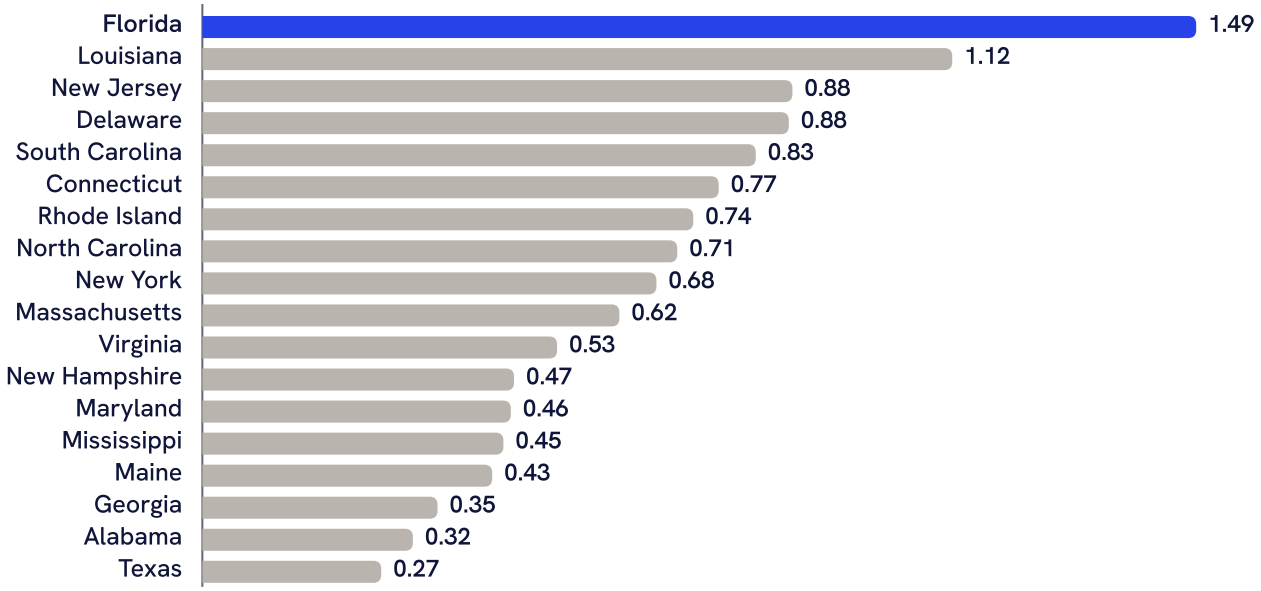
Alaska, Hawaii and Puerto Rico are outside the scope. Pacific storms are excluded.

INPUT	VINTAGE
Wind radii used	2004–2025 seasons
Track record (check)	1975–2025 seasons
FEMA National Risk Index	Dec 2025 (counties)
Census centers of population	2020
County boundaries	Census 2023, 1:20M

04 FLORIDA CARRIES THE MOST STORM DAYS BY FAR

Expected route workdays lost per year (central case). The darkest counties sit on Florida's Atlantic coast and around Lake Okeechobee, on the Outer Banks of North Carolina, and on the Louisiana coast.

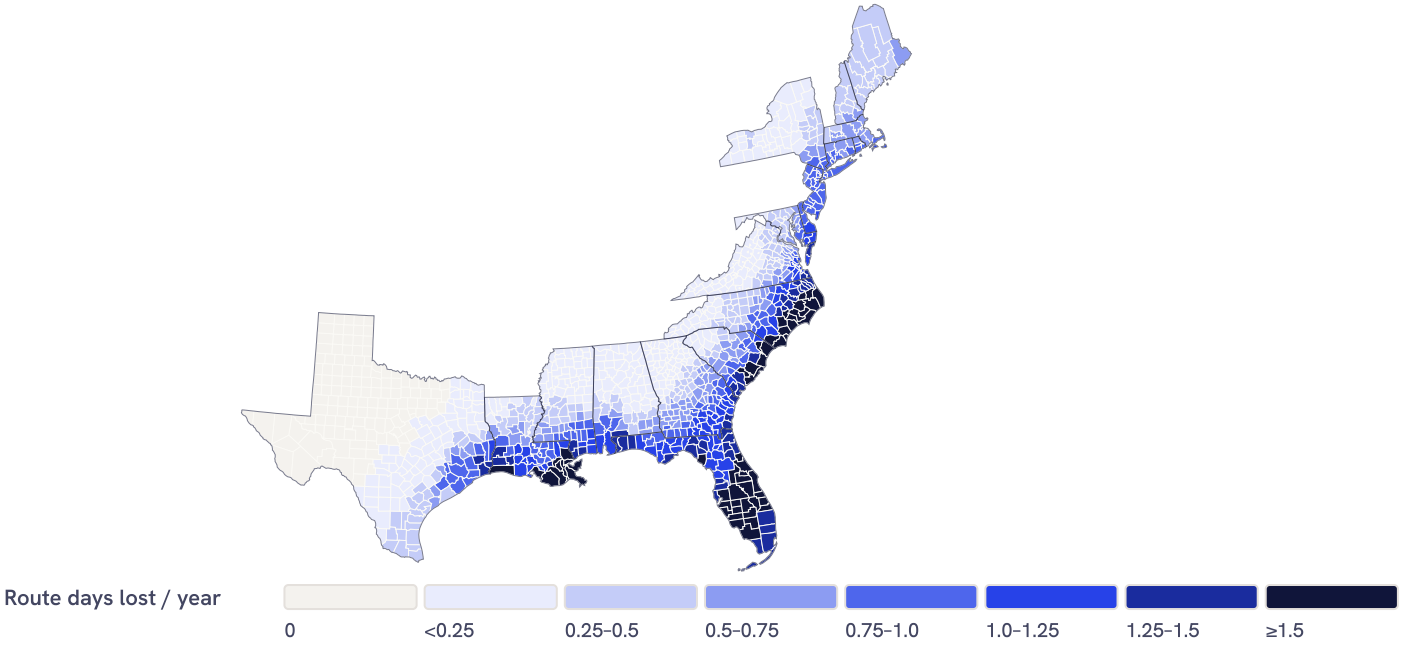
Population-weighted workdays lost per year: Florida is in a class of its own



Each county weighted by its 2020 population, so inland counties with few people count little.

Source: Ruberio model; population: FEMA National Risk Index county table (Census-based), Dec 2025.

Expected route workdays lost to storm winds per year, central case



Source: Ruberio model on NOAA HURDAT2 (2004–2025) wind radii; counties pooled within 40 miles. Census 2023 boundaries.

05 WHERE IN FLORIDA A HURRICANE-FORCE HIT IS MOST LIKELY

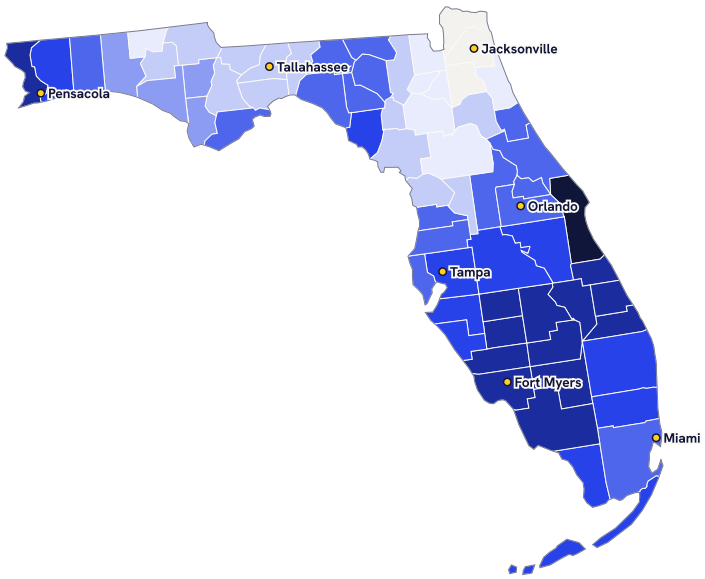
The map shows the modeled chance that hurricane-force winds reach a typical home in a route's area at least once in the next ten years, at the 2004–2025 rate (the upper end of our range); at that rate 78% of Floridians live where it is 50% or higher. The Space Coast, the Treasure Coast and the counties around Lake Okeechobee are highest, followed by Southwest Florida; the Jacksonville area (Bradford, Baker, Clay) had no hurricane-force winds at its population centers in 2004–2025 and the inland north is lowest.

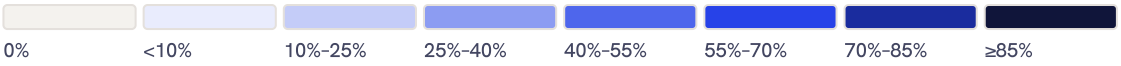
Twelve large pool-service counties

COUNTY	STORM-WIND EVENTS / YR	HURRICANE-FORCE / YR	10-YR CHANCE	DAYS LOST / YR (LOW · CENTRAL · HIGH
Brevard, FL	1.00	0.227	90%	1.2 · **2.3** · 4.
Lee, FL	0.79	0.163	80%	0.8 · **1.7** · 3.
Collier, FL	0.77	0.167	81%	0.8 · **1.7** · 3.
Sarasota, FL	0.92	0.119	70%	0.8 · **1.7** · 3.
Orange, FL	0.97	0.070	50%	0.8 · **1.6** · 3.
Palm Beach, FL	0.90	0.087	58%	0.7 · **1.5** · 2.
Hillsborough, FL	0.94	0.088	59%	0.8 · **1.5** · 3.
Pinellas, FL	0.97	0.070	51%	0.7 · **1.5** · 3.

COUNTY	STORM-WIND EVENTS / YR	HURRICANE-FORCE / YR	10-YR CHANCE	DAYS LOST / YR (LOW · CENTRAL · HIGH
Miami-Dade, FL	0.88	0.072	51%	0.7 · **1.4** · 2.
Broward, FL	0.89	0.088	58%	0.7 · **1.4** · 2.
Duval, FL	1.04	0.000	<5%	0.6 · **1.3** · 2.
Harris, TX	0.34	0.083	57%	0.4 · **0.8** · 1.

Chance of hurricane-force winds within 10 years, by county (2004–2025 rate)





Source: Ruberio model on NOAA HURDAT2 (2004–2025). Assumes storms arrive independently at the 2004–2025 rate.

06 SMALL EVERY YEAR, BIG ONCE

For a route owner the average is not the problem: $720 a year on a 70-account route is about 0.6% of the year's revenue. The problem is that the loss comes in one block, in the same weeks that power, roads and customers are also out. JPMorgan Chase Institute's bank data showed that in the worst week of Hurricane Irma, most small firms in the Miami area took in at least 82% less than in the same week a year earlier; most balances recovered within two to three weeks.

Revenue on hold, Florida population-weighted, at $150 per account per month

ACCOUNTS	REVENUE / YR	PER WORKDAY	AVERAGE YEAR	ONE HURRICANE HIT	BAD HIT
50	$90,000	$346	$515	$2,077	$4,154
70	$126,000	$485	$721	$2,908	$5,815
150	$270,000	$1,038	$1,546	$6,231	$12,462

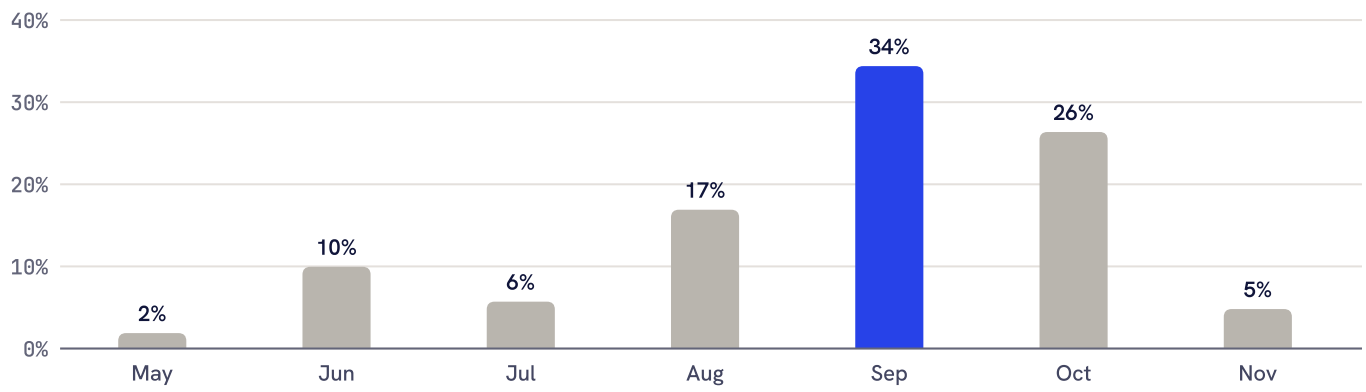
ACCOUNTS	REVENUE / YR	PER WORKDAY	AVERAGE YEAR	ONE HURRICANE HIT	BAD HIT
350	$630,000	$2,423	$3,607	$14,538	$29,077

Average year = 1.49 workdays (low–high 0.74–2.98). One hurricane hit = 6 workdays; bad hit = 12 (both assumptions).

BILLING POLICY DECIDES THE LOSS

Revenue on hold is only lost if you credit missed visits. Flat monthly billing turns it into unpaid catch-up work: 6 workdays of visits squeezed into the following weeks, while recovery stops (debris, green pools, equipment checks) take longer than a normal visit. Decide the policy before June, not after the storm.

34% of county storm-wind events start in September



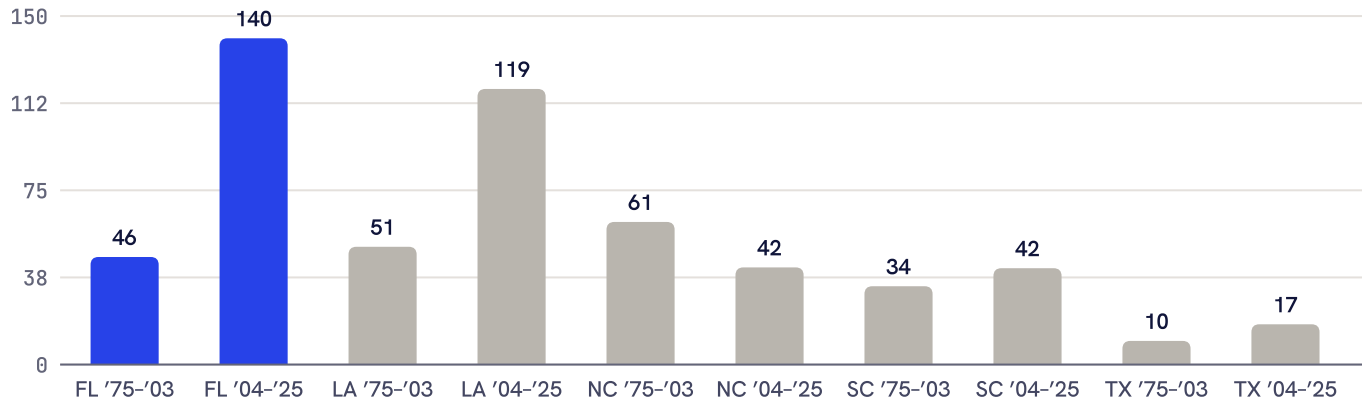
Share of 9,407 county events in the study area by month the winds arrived, 2004–2025 (no events in other months).

Source: Ruberio analysis of NOAA HURDAT2.

07 TWO BUSY DECADES: WHY THE TEN-YEAR CHANCE IS A RANGE

A 22-season window is long enough to see the pattern, but it was not an average stretch. Counting how often a hurricane's center passed within 50 nautical miles of a county's population center, Florida saw 3.0× as many passages per county per season in 2004–2025 as in 1975–2003. North Carolina went the other way.

Hurricane passages per 1,000 county-seasons: Florida's recent two decades were about three times as busy



Hurricane-strength center within 50 nautical miles of a county's 2020 population center; per county per season ×1,000.

Source: Ruberio analysis of NOAA HURDAT2 (1975–2025).

We keep 2004–2025 as the central case because it is the only period with best-track wind-radii estimates, and because it is the climate today's owners have actually operated in. For the long-run view we scale the hurricane-force rates by 0.62, the ratio of the 51-season to the 22-season passage rate; that is an approximation, because it borrows the ratio from a different measure.

51%
ten-year chance at the 2004–2025 rate

37%
at the long-run rate

38%
what happened in rolling ten-year windows, 2004–2025

08 LIMITATIONS

- **Wind radii are estimates of maximum extent.** NHC gives the farthest reach of each wind class per quadrant, mostly over water. Inland, sustained winds are usually lower, so our event counts lean high, especially for tropical-storm-force winds.
- **Days lost per event are assumptions.** No public data measure missed pool visits after storms. We anchored them on power-restoration records and business surveys; the low and high cases show how much they matter. Prep days for storms that miss are not modeled, which leans low.
- **Wind is not the only hazard.** Flooding, storm surge and long outages can keep a route down longer than wind alone suggests (Ian in Lee County, Michael in the Panhandle). Rainfall and surge are not in this model.
- **Pooling smooths local extremes.** Averaging over 40 miles steadies the rates but dilutes landfall counties: Bay County, where Michael came ashore in 2018, comes out lower than its own record.
- **Storms cluster.** The ten-year probabilities assume independent storms; actual decades were lumpier, which is why the rolling-window figure is lower.

- **Post-tropical storms lift the Northeast.** Counting post-tropical stages (Sandy, for example) raises New Jersey and New England; the tropical-only version in the data lowers them.
- **Prices and route sizes are illustrative.** They come from consumer cost guides and operator-submitted data, not a survey.
- **Upside is not modeled.** Storm recovery work is often billed separately and can offset part of the loss.
- **The 2026 season is missing.** HURDAT2 is finalized after each season; this year's storms are not included.

09 WHAT AN OWNER CAN DO WITH THIS: A CONTINUITY PLAN

Find your county in section 05 and your route size in section 06, then fill in the worksheet. The first checklist is for before June 1; the other two are for storm week and the days after.

WORKSHEET · YOUR STORM RESERVE

LINE	YOUR NUMBER
A. Accounts on your route	
B. Average monthly price per account	
C. Revenue per workday = A × B × 12 ÷ 260	
D. Workdays on hold in a bad hit (we use 12)	
E. Revenue on hold = C × D (what you give back if you credit missed visits)	
F. Costs that keep running for 2–3 weeks while customer payments lag (truck note, insurance, software, pay you guarantee)	
G. Reserve to hold in cash by Aug 1: E + F if you credit visits, F if you bill a flat monthly rate	

Before the season (by June 1)

- [ ] Write down your missed-visit policy (credit, catch-up, or recovery fee) and put it in your service agreement.
- [ ] Set aside the reserve from the worksheet; know which credit line you would use.
- [ ] Photograph each customer’s equipment pad and note pump, filter and heater models (useful for insurance and for triage).
- [ ] Store chemicals dry, off the floor and above flood level, and keep acids, liquid chlorine, cal-hypo and trichlor apart from each other; keep the SDS sheets with your records.
- [ ] Read your policies. Business interruption cover typically needs direct physical damage, has a 48–72-hour waiting period and excludes flood without a separate flood policy (Triple-I); many small operators have none, so check your business owner’s policy. Check that your commercial auto policy covers a flooded truck (comprehensive).
- [ ] Decide your crew policy: who works, who is paid, and when it is safe to drive the route again.
- [ ] Save your fuel, chemical-supplier and parts-supplier contacts offline; agree on a backup supply source.
- [ ] Prepare two customer messages: “before the storm” and “after the storm” (what you will check, what costs extra).

When a storm is forecast

- [ ] Tell customers what you will and will not do. Industry guidance: don’t drain pools if you don’t know the groundwater level (an empty pool can lift out of the ground); turn off pool equipment at the breaker (PHTA

via ICC).

- [ ] Move the route schedule forward rather than skipping it; fuel trucks and fill chemical stock early.
- [ ] Secure the truck, chemicals and records; back up your customer list and schedule off-site.

After the storm

- [ ] Don't start cleanup until the area is safe (UF/IFAS Extension). Don't enter a pool or touch equipment until power to it is confirmed off, and don't restart submerged motors or heaters until they are dry and checked by an electrician.
- [ ] Triage: equipment underwater or damaged first, then green pools, then routine stops. Tell customers about any extra fees before you do the work.
- [ ] Keep receipts and photos. Check IRS disaster relief (deadline postponements by county), SBA disaster loans (physical damage up to $2 million; EIDL at up to 4% for up to 30 years, but SBA does not count a loss of expected profits alone as economic injury) and Florida's Small Business Emergency Bridge Loan when it is activated.
- [ ] Afterwards, compare the days you actually lost with this model and adjust your reserve for next season.

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11 ABOUT THIS RESEARCH

WHO MADE THIS

Ruberio is a Dutch design studio: Ruben designs, Sven answers every email. We’re focused on websites for pool service companies and fence contractors in Florida. We ran this study because every route owner we talk to plans around hurricane season, and nobody had put a number on what it actually costs a route.

We don’t sell routes, software, insurance or financing, and nobody named here paid for or reviewed this report. The data and scripts are available on request; the county file is *hurricane_risk_by_county.csv*. If you spot an error, email hello@ruberio.com and we’ll correct it and note the change.