NEFSC management support for WGOM cod and haddock

Andrew (Lou) Carr-Harris, Min-Yang Lee, Kim Bastille

January 20th RAP / Groundfish Committee meetings

Outline of presentation

- Recreation demand model overview
- Model updates
- Historical model predictions
- Model predictions for FY2026 under status quo
- Caveats
- Summary of policies evaluated by RAP members

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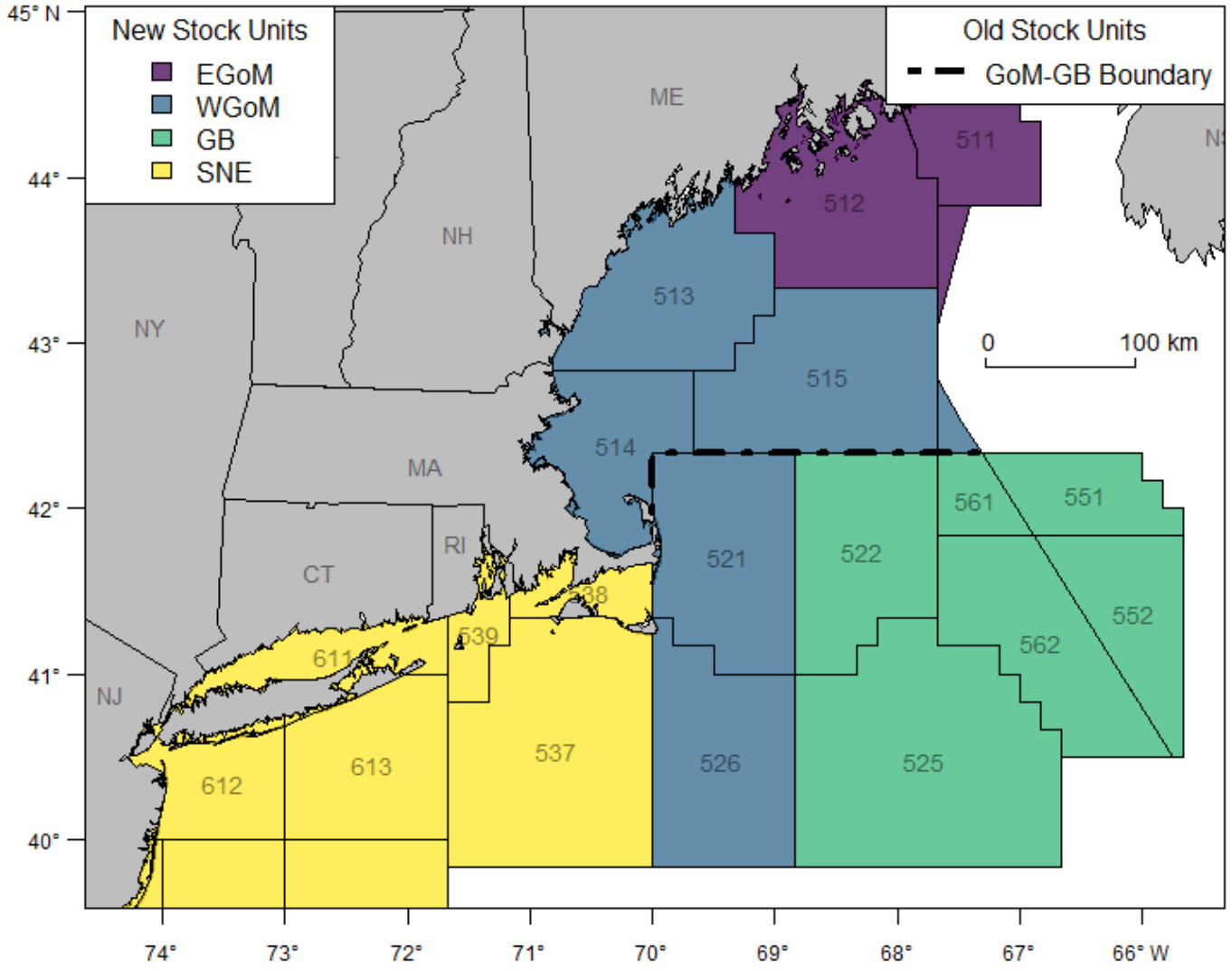
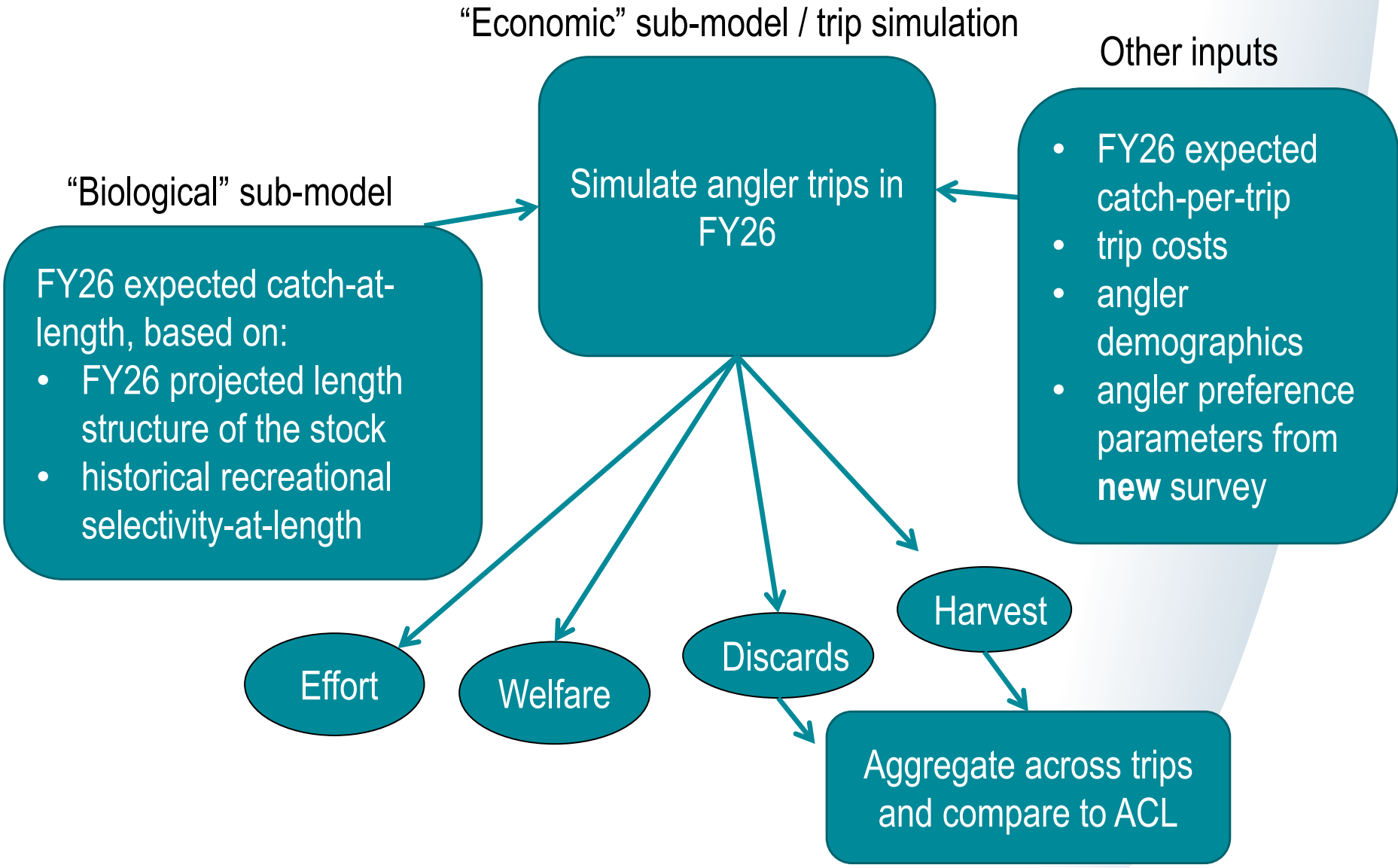
Cod stock units



Recreation demand model overview



Trip simulation

- Simulates angler trips using historical data relationships
- Trips evaluated under FY26 projected stock length-structure and regulations
- Policies evaluated 100 times to reflect sampling uncertainty in input data:
  - catch-per-trip, directed trips, trip costs (MRIP)
  - catch-at-length adjusted by 2026 projected numbers-at-ages (MRIP & stock assessment)
  - angler demographics (MRIP & angler survey), and angler survey parameters
- Model produces a distribution of results

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Angler survey data

- Angler survey data is used to estimate how trip outcomes affect the decision to fish

- When integrated into the trip simulation, results allow us to compute:
  - the likelihood of going fishing (demand for fishing)
  - expected harvest and discards
  - angler satisfaction (consumer surplus $) – how much better off will anglers be next year compared to last year, in dollars?

Angler survey data

- New survey implemented summer 2022
- Collected data on fishing experiences/avidity, demographics, and trip preferences
- Sampling and responses:
  - Mail push-to-web with $2-bill incentive
  - Distributed to 4,200 rec. license holders in MA/ME/NH
  - 1,195 total responses (raw response rate 28%)
  - 432 “eligible” responses – fished for cod, haddock, or pollock in past 5 yrs
  - 355 anglers included in estimation sample

Choice experiment questions

B5. Your Saltwater Fishing Trip Preferences

Suppose that you have the choice between two recreational saltwater fishing trips (**Option 1 or Option 2**) and not going recreational saltwater fishing (**Option 3**). Below the table, indicate which of these three options would be your first choice.

REGULATIONS
You are legally allowed to keep: 6 cod, 21" or longer 16 haddock, 17" or longer

*

Trip Features	Option 1	Option 2	Option 3
Total number of fish you catch that can be kept *Based on the regulations and the number of legal-sized fish you catch.*	6 cod 4 haddock	2 cod 16 haddock	Do something other than saltwater fishing.
Total number of fish you catch that must be released *Undersized fish and/or fish in excess of the legal limit.*	2 cod 4 haddock	2 cod 4 haddock	
Trip cost per person *Your share of all fishing trip-related expenses.*	$150	$275	

	Option 1	Option 2	Option 3
If you were presented with these three options, which one would you choose? **(Choose only one option.)**	○	○	○

Choice experiment results

Willingness-to-pay ($) for first fish caught, 2019 vs. 2025 survey

Attribute	*2019 survey (inflation adjusted estimates)*	*2025 survey*
Cod kept	$40.32	$53.31
Haddock kept	$30.24	$37.15
Cod released	$7.31	$5.65
Haddock released	$3.60	$11.55

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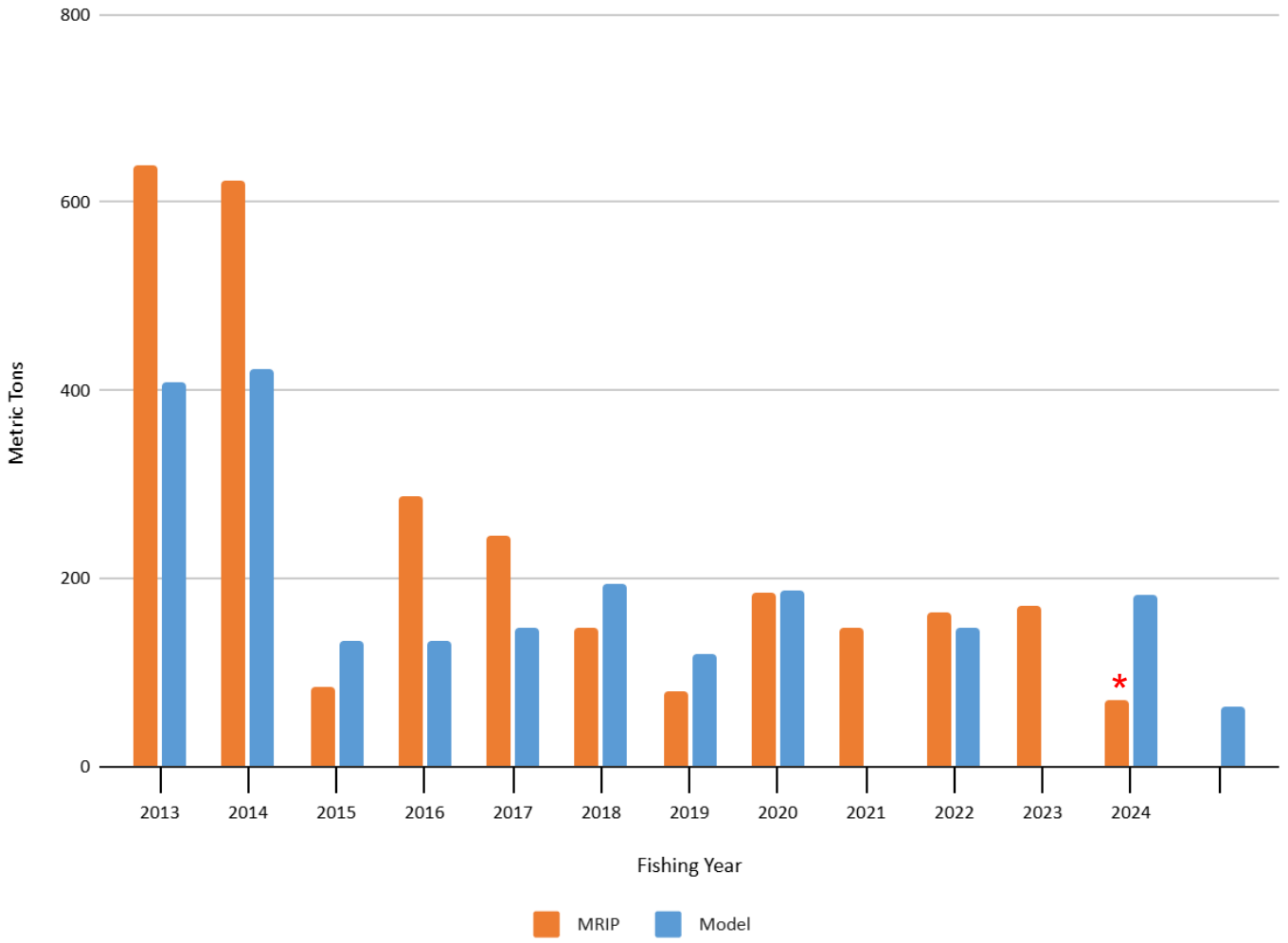
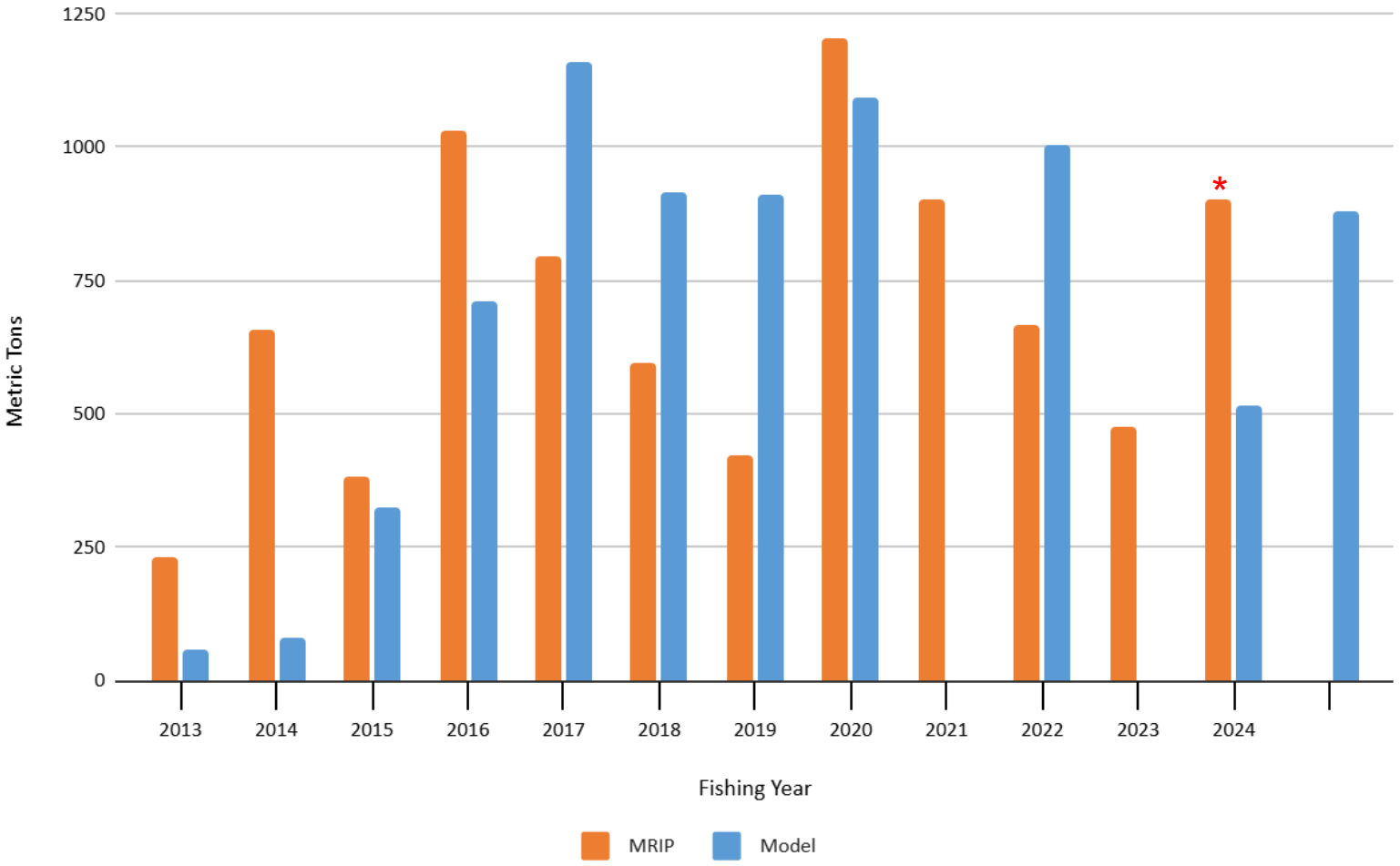
Model Predictions versus MRIP: GOM Cod



* Preliminary based on imputed data

Model Predictions versus MRIP: GOM Haddock



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Model predictions for FY2026 under status quo

	Status quo actual	Status quo proposed
Mode	Private & For-hire	Private & For-hire
Additional angler trips	400	1,277
Cod limit	1	1
Cod size	23”	23”
Cod open season	Sep. 1st – Oct. 31st	May 1st – May 31st Sep. 1st – Oct. 31st
Projected cod total mortality (mt; median of 100 simulations)	58 mt	60 mt
Cod sub-ACL	118 mt	118 mt
% under cod ACL (out of 100 simulations)	99	99
Haddock limit	15	15
Haddock size	18”	17”
Haddock open season	May 1st – Feb. 28th April 1st – April 30th	May 1st – Feb. 28th April 1st – April 30th
Projected haddock total mortality (mt; median of 100 simulations)	503 mt	534 mt
Haddock sub-ACL	1,146 mt	1,146 mt
% under haddock ACL (out of 100 simulations)	100	100

Table 1. Western Gulf of Maine Catch and Effort Estimates[1]

	May 1 - Apr. 30 (all waves)			May 1 - Aug. 30 (wave 3 - 4)		
	FY 2024	FY 2025[2]		FY 2024	FY 2025	
cod/haddock angler trips[3]	231,963	143,265	(-38%)	129,477	77,212	(-40%)
cod harvest (#s)	13,280	12,973	(-2%)	460	135	(-71%)
cod discards (#s)	254,605	176,344	(-31%)	198,734	117,950	(-41%)
cod catch (#s)	267,885	189,318	(-29%)	199,194	118,085	(-41%)
avg. cod catch-per-trip	1.15	1.32	(+14%)	1.54	1.53	(-1%)
haddock harvest (#s)	555,272	270,881	(-51%)	465,303	167,230	(-64%)
haddock discards (#s)	829,155	507,251	(-39%)	537,571	200,938	(-63%)
haddock catch (#s)	1,384,427	778,132	(-44%)	1,002,874	368,168	(-63%)
avg. haddock catch-per-trip	5.97	5.43	(-9%)	7.75	4.77	(-38%)

[1] Source: MRIP data available as of 1/15/2025
[2] Waves 2, 5 and 6, of 2024 used as proxies for FY 2025
[3] Number of angler trips that caught and/or targeted cod or haddock

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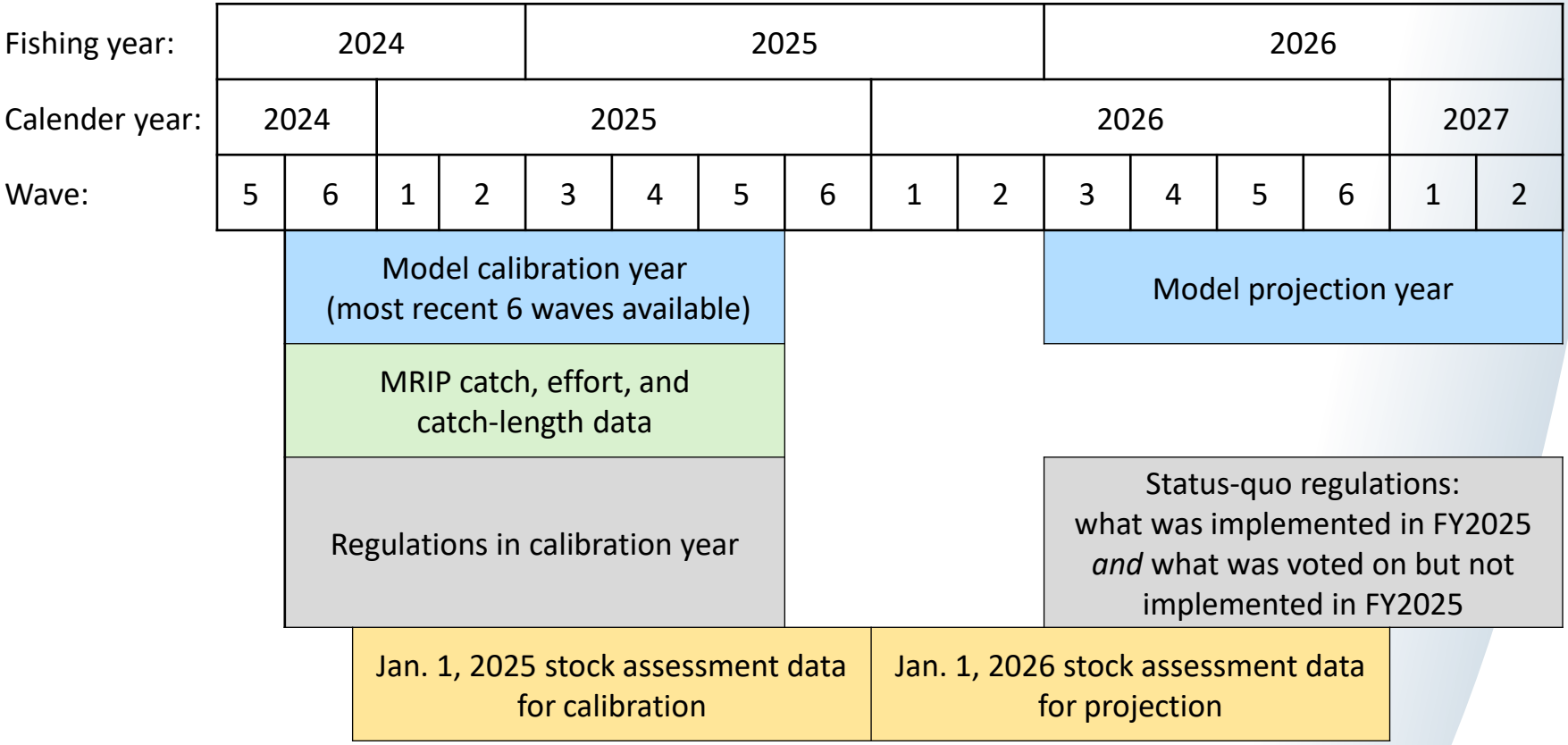
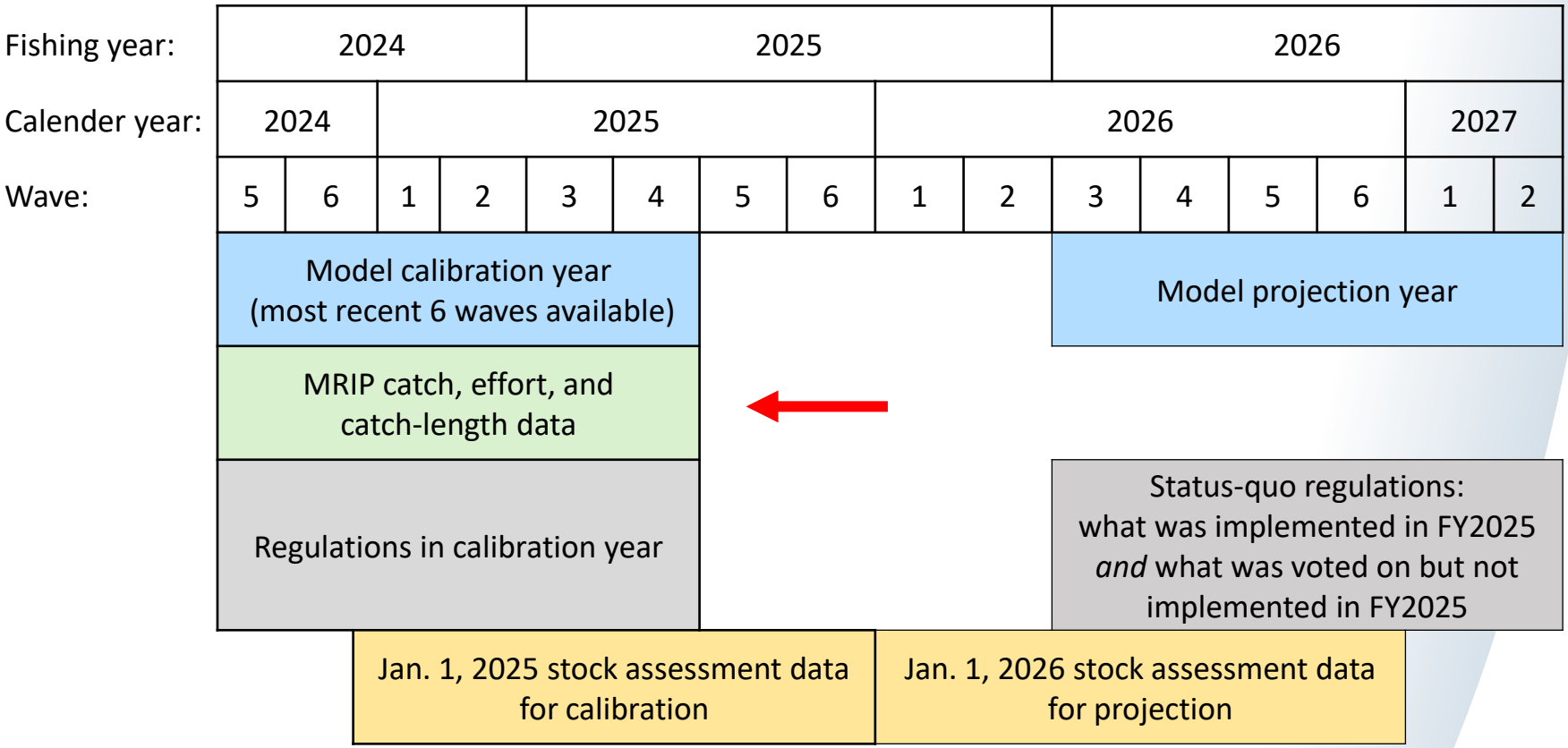
Caveats

- Delayed availability of 2025 wave 5 MRIP data
- May open season for cod

Intended data availability



Actual data availability – no 2025 wave 5



May cod opening

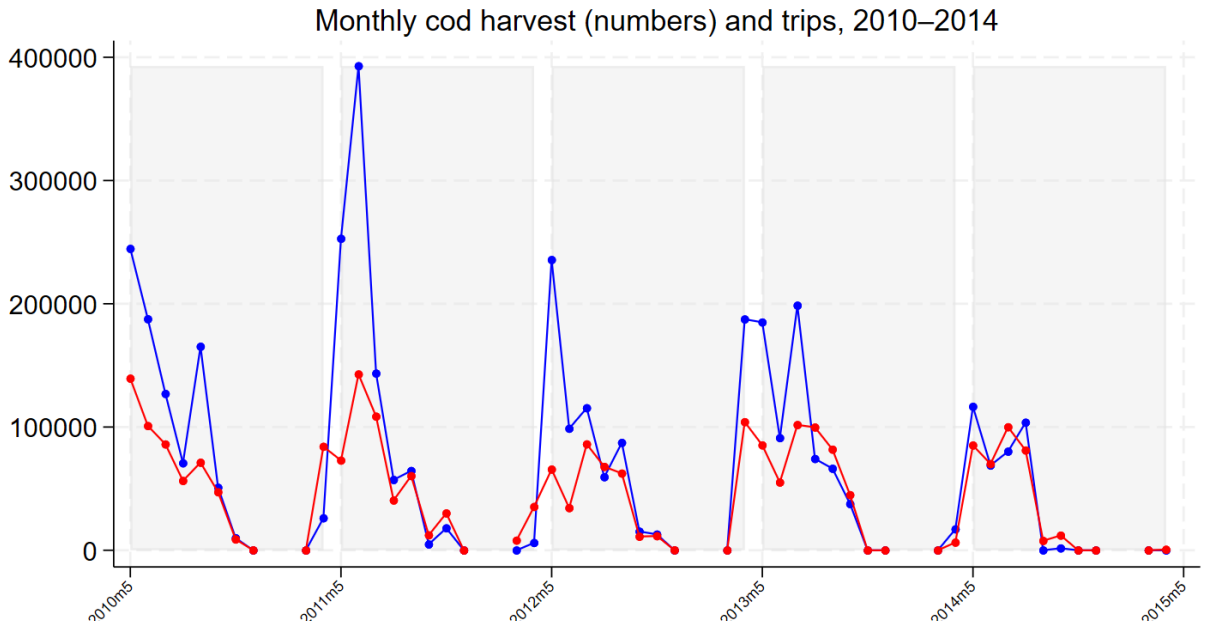
- FY2026 projections are anchored to past year's effort and catch
- Cod was not open in May in the past year
- As a result, model input data reflects:
  - low effort and catch in May
- Unadjusted model results likely understate the effect of opening cod in May

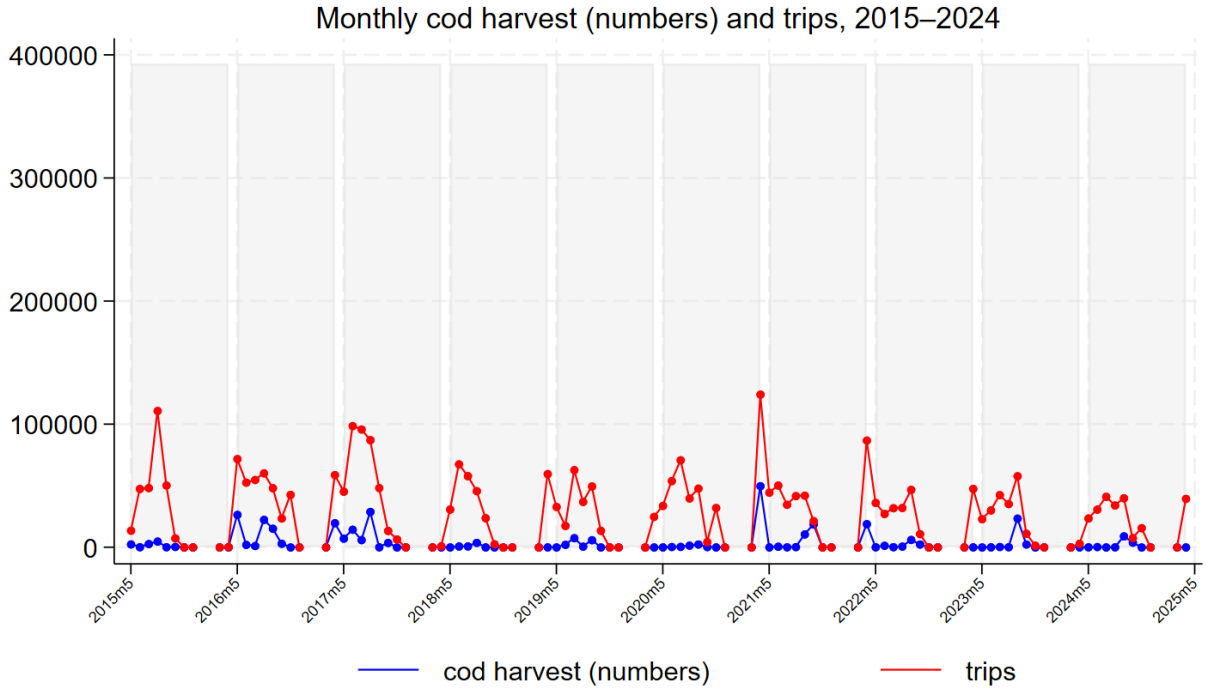
May cod opening - diagnostic analysis

- How much additional mortality would we expect if cod is open in May?
  - Used historical MRIP data (FY2010–FY2024) to estimate average increase in cod mortality associated with increasing bag limits
  - Order-of-magnitude check on impacts not fully captured by the RDM
  - Results suggest +1 bag limit in May is associated with:

    ~ 16,900 cod harvested

    ~ 42 mt of total cod mortality


Monthly cod harvest (numbers) and trips, 2010–2014
400000
300000
200000
100000
0
2010m5
2011m5
2012m5
2013m5
2014m5
2015m5


Monthly cod harvest (numbers) and trips, 2015–2024
400000
300000
200000
100000
0
2015m5
2016m5
2017m5
2018m5
2019m5
2020m5
2021m5
2022m5
2023m5
2024m5
2025m5
cod harvest (numbers)
trips

May cod opening - diagnostic analysis

- Frequencies of cod bag limit by month (15 years):

	Cod bag limit			
month	0 fish	1 fish	9 fish	10 fish
January	15	0	0	0
February	15	0	0	0
March	15	0	0	0
April	8	3	2	2
May	11	0	3	2
June	11	0	3	2
July	11	0	3	2
August	10	1	3	2
September	4	7	2	2
October	8	3	2	2
November	15	0	0	0
December	15	0	0	0

May cod opening - diagnostic analysis

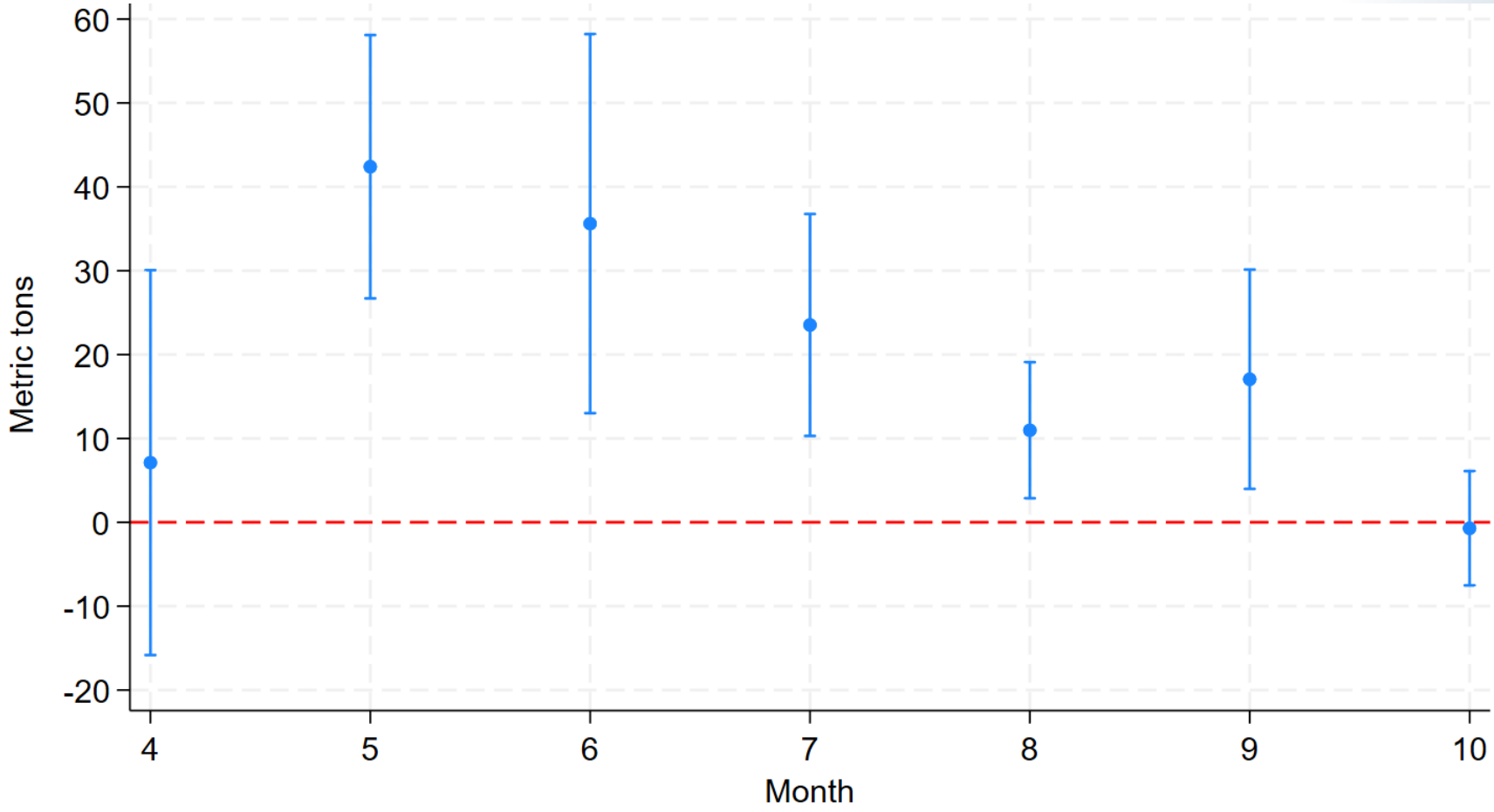
- Estimate using OLS the average total mortality associated with opening cod by month:

$$y_{my} = \beta_1 Trips_{my} + \beta_2 cod\_stock\_numbers_y + \alpha_m + \theta_m cod\_bag_{my} + \varepsilon_{my}$$

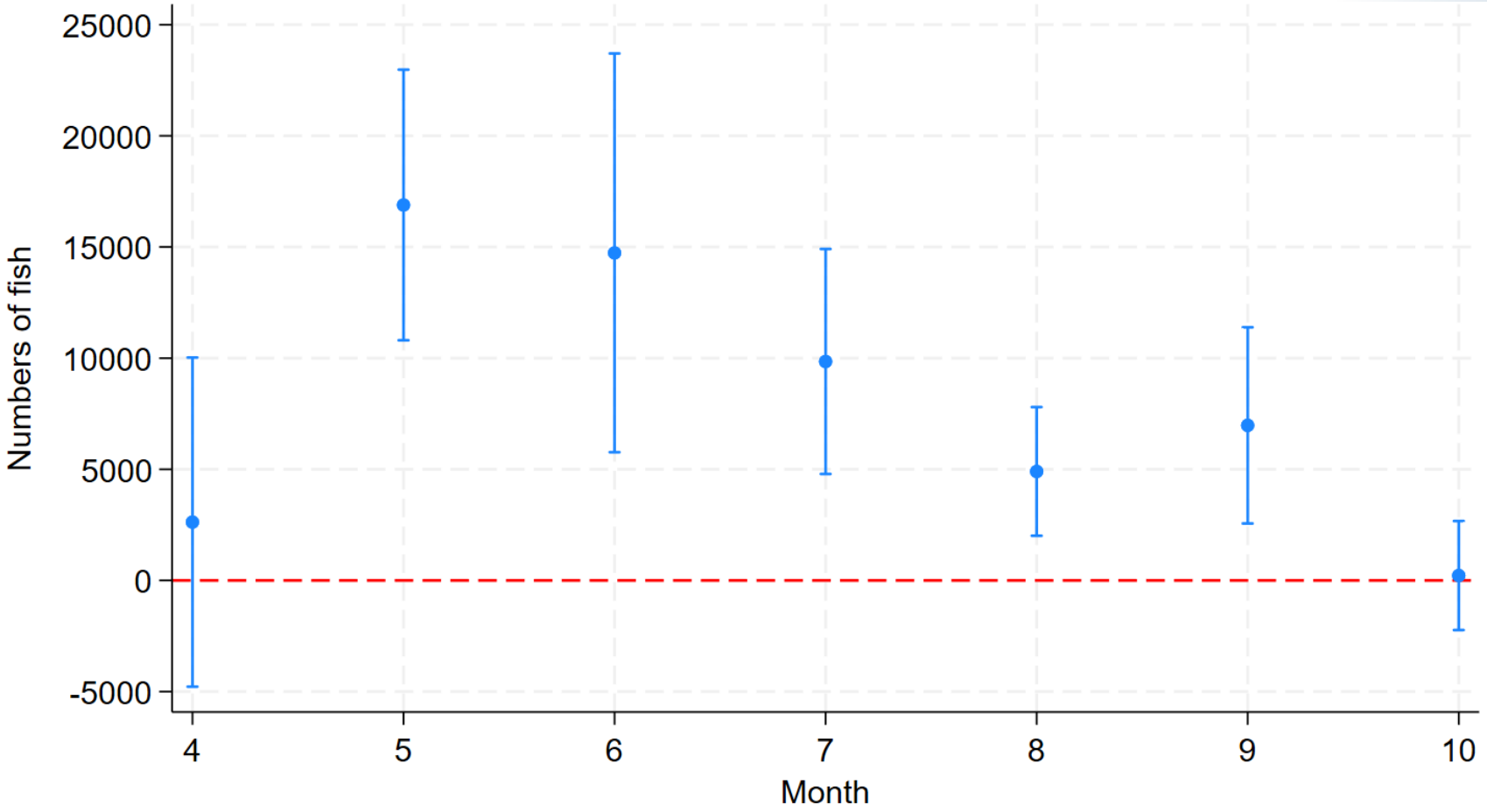
- y_{my} = cod rec. mortality in month *m* of year *y*
- $m \in$ {Apr,…,Oct}
- $y \in$ {FY2010,…, FY2024}
- α_m month fixed effects
- θ_m **month-specific bag limit effects**

- Compute average marginal effects by month (next slide)
  - change in total monthly mortality from one-unit increase in bag limit

Marginal effect of one-unit increase in bag limit on: **total cod mortality (mt)**



Marginal effect of one-unit increase in bag limit on: **cod harvest (numbers)**



Summary of results

- Historical data show one-unit increase in bag limit in May associated with:
  - ~ 16,900 cod harvested
  - ~ 42 mt of total cod mortality

- Unclear whether this substitutes or complements mortality in later periods of the year

- RDM tool does not pick this up because it uses data from the most recent year (when cod was closed in May)
  - Performs best when future open seasons resemble last year's open season