

GOM Cod and Haddock Recreational Bioeconomic Model

- Joint Mid-Atlantic and New England Council SSC review conducted in 2012
- Used to develop management options for GOM cod and haddock each year since 2013
- Lee, Min-Yang, Scott Steinback, Kristy Wallmo. 2017. "Applying a Bioeconomic Model to Recreational Fisheries Management: Groundfish in the Northeast United States." *Marine Resource Economics* 32:2.

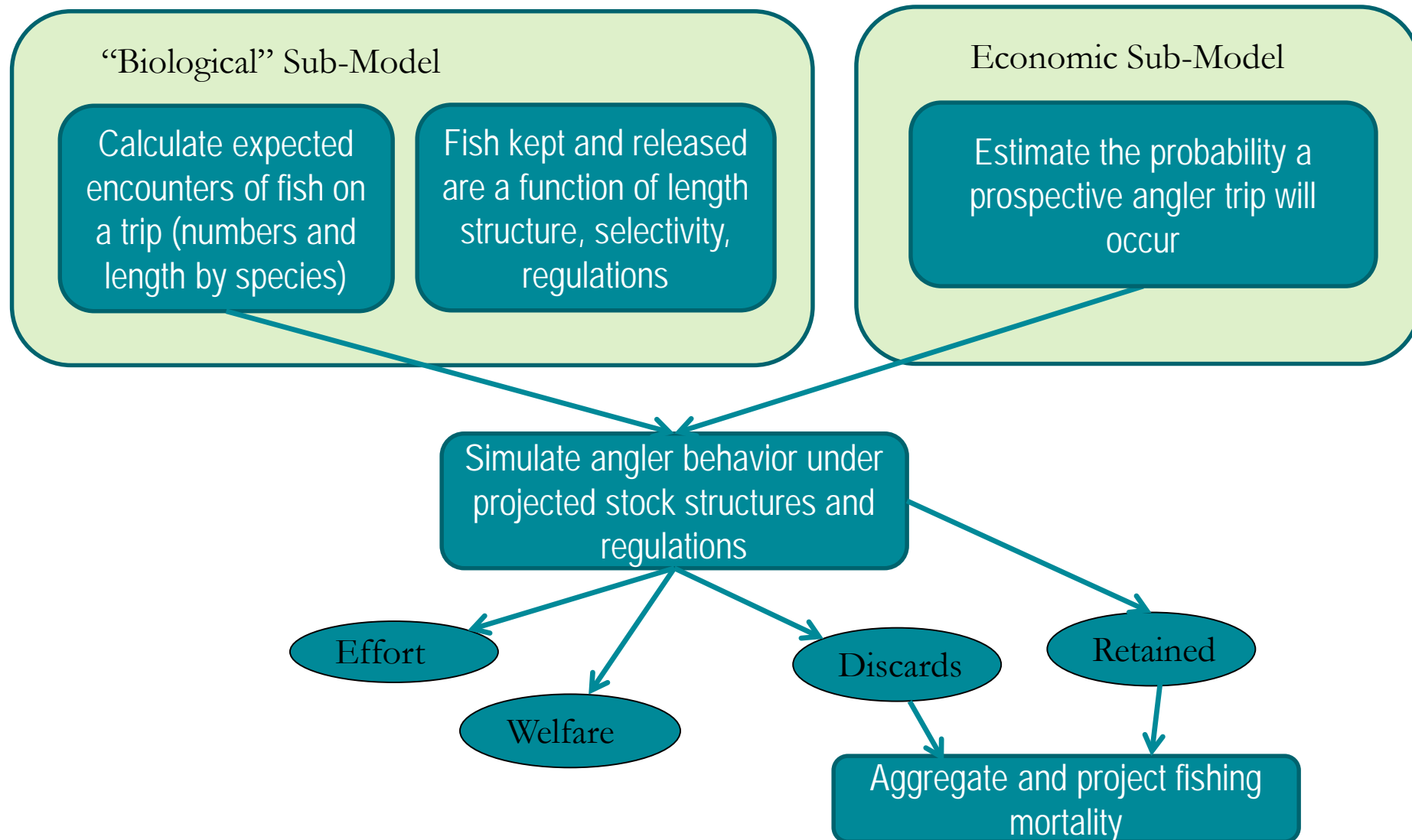
Annual Management Objectives

Predict how proposed management measures for GOM cod and haddock will affect:

- 1) Angler fishing effort
- 2) Angler welfare
- 3) Recreational fishing mortality

Management goal: “achieve but not exceed the sub-ACLs”

Bioeconomic Model Overview



How Accurate is the Model?

GOM Cod	ACL (mt)	Actual	Model
FY 2013	486	639	409 (36% lower)
FY 2014	486	623	422 (32% lower)
FY 2015	121	85	132 (55% higher)
FY 2016	157	286	132 (54% lower)
FY 2017	157	246	147 (40% lower)
FY 2018	220	147	193 (31% higher)
FY 2019	220	77*	~120 (56% higher)

*Preliminary

How Accurate is the Model?

GOM Had	ACL (mt)	Actual	Model
FY 2013	74	232	57 (407% lower)
FY 2014	87	659	80 (824% lower)
FY 2015	372	382	323 (13% lower)
FY 2016	928	1,031	709 (32% lower)
FY 2017	1,160	795	1,160 (46% higher)
FY 2018	3,358	595	916 (54% higher)
FY 2019	3,194	398*	~990 (149% higher)

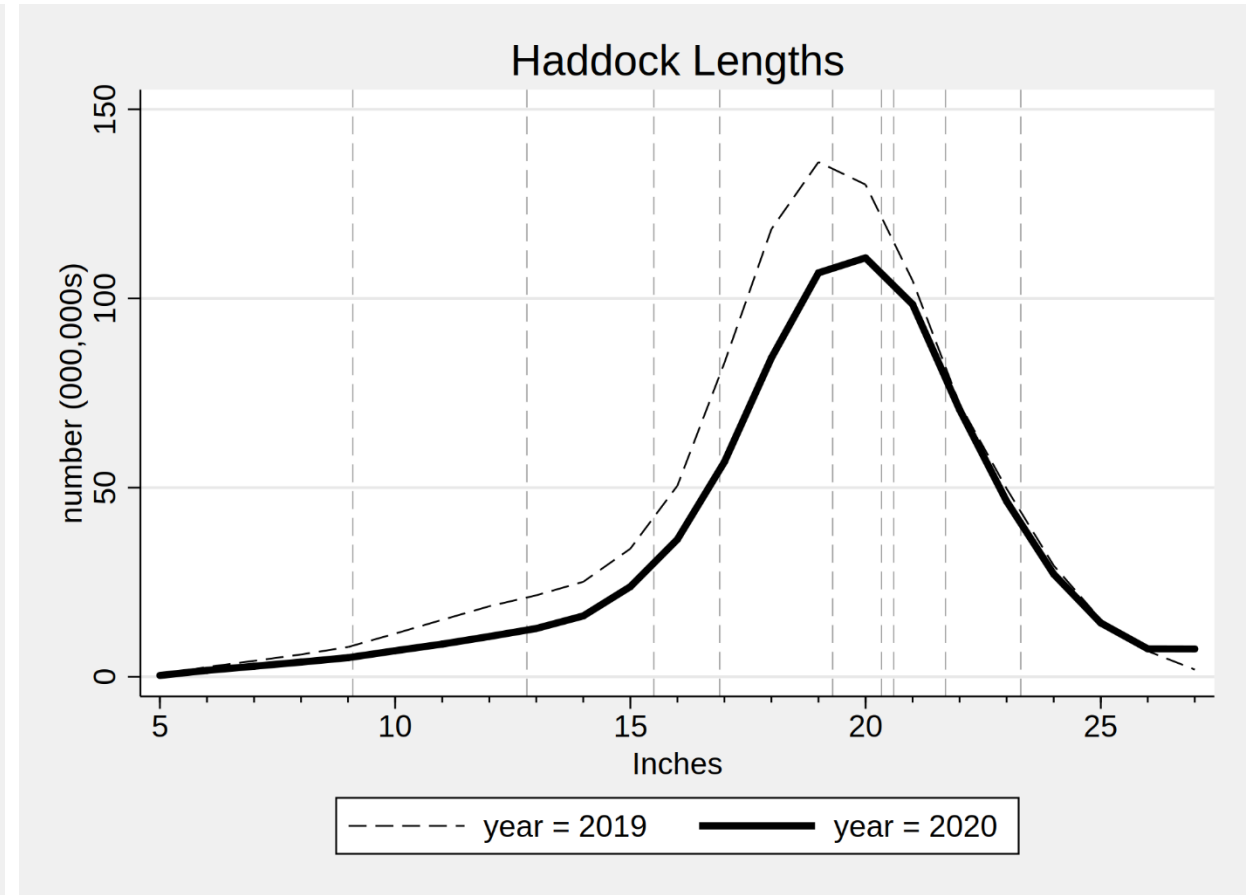
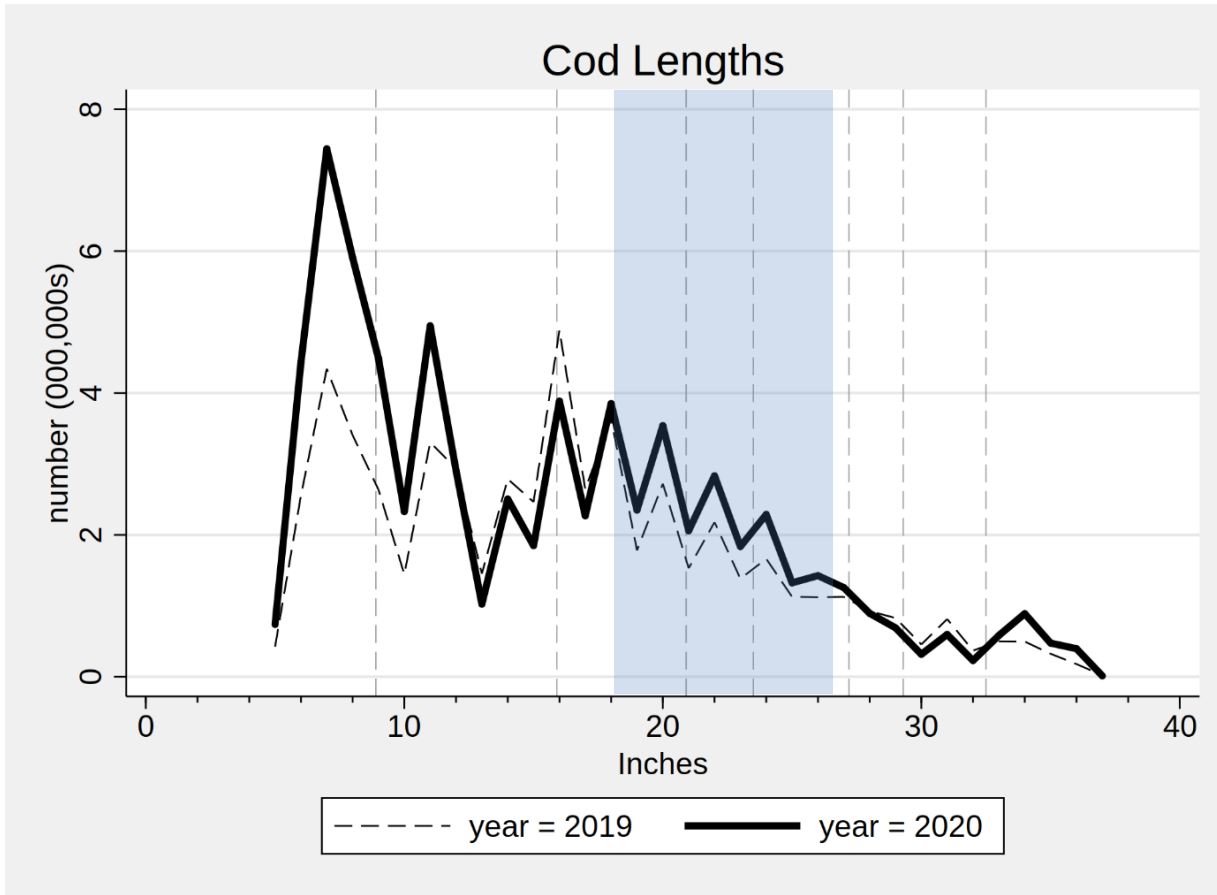
*Preliminary

FY 2020 Bioeconomic Modeling Steps

- Incorporated available MRIP data (new estimates) and 2020 biological assessment projections
 - Projections developed from the 2019 Operational Assessments
- Calibrated the model to approximate FY 2019 effort and catch
- Evaluate how status quo and alternative measures affect mortality in FY 2020



Numbers-At-Length Assessment Projections



FY 2020 Mortality Projections

Option	Cod				Haddock				Angler Trips (Median)	% Under Cod ACL (out of 100 Simulations)	% Under Had ACL (out of 100 Simulations)
	Cod Limit	Cod Size	Cod Open Season	Cod Mortality (Median)	Had Limit	Had Size	Had Open Season	Had Mortality (Median)			
1 (Status Quo)	1	21"	Sep 15-Sep 30	185	15	17"	May-Feb 28, Apr 15-Apr 30	1,092	273,930	67	100
2 (Open Cod Apr 15-30)	1	21"	Sep 15-Sep 30 Apr 15-30	187	15	17"	May-Feb 28, Apr 15-Apr 30	1,094	273,998	65	100

FY 2020 rec sub-ACLs:

cod = 193 mt
haddock = 6,210 mt

Options considered, but rejected because % under cod sub-ACL < 50%:

- 3) Increase cod limit (from 1 to 2 fish)
- 4) Open cod Sep 1-Sep 30 (1 fish, 21")
- 5) Open cod Sep 1-Sep 30 (1 fish, slot limit of 21" - 24")
- 6) Open cod Sep 1 -Sept 30 (1 fish, slot limit of 22" - 25")
- 7) Close cod Sep 15-Sep 30, open cod May 1-May 15 (1 fish, 21")
- 8) Close cod Sep 15-Sep 30, open cod May 16-May 31 (1 fish, 21")
- 9) Close cod Sep 15-Sep 30, open cod Aug 16-Aug 31 (1 fish, 21")
- 10) Close cod Sep 15-Sep 30, open cod Sep 1-Sep 14 (1 fish, 21")
- 11) Open cod May 1-May 15 and Sept 15-Sep 30 (1 fish, slot limit of 22" - 25")