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## **1.0 IMPACTS OF ALTERNATIVES UNDER CONSIDERATION**

### **1.1 SCALLOP RESOURCE**

#### **1.1.1 Fishery specifications**

##### **1.1.1.1 Overfishing Limit (OFL) and Acceptable Biological Catch (ABC)**

ACLs and AMs have been required under the MSA by fishing year 2010 if overfishing is occurring in a fishery, and 2011 for all other fisheries. The Council initiated Scallop Amendment 15 to comply with these new ACL requirements, and that action was implemented in 2011. In addition, an OFL and ABC are required, and the Council may not set catch limits above the ABC recommended by the SSC.

##### **1.1.1.1.1 No Action (Alternative 1)**

Under “No Action”, the overall OFL and ABC would be equivalent to default 2014 values adopted in Framework 24 (Table 5 in main document). These would remain in place until a subsequent action replaced them. The No Action ABC is higher than the updated estimate of ABC under consideration in this action (Alternative 2). Therefore, setting management measures based on an ABC that is above the updated value could increase the risk of overfishing, having potentially negative impacts on the scallop resource.

##### **1.1.1.1.2 Updated estimate of ABC for FY2014 and FY2015 (default) (Alternative 2)**

The SSC reviewed updated estimates of OFL and ABC based on revised PDT analyses using 2013 survey and fishery data available. The proposed values are in (Table 6 of the main document). Compared to the No Action ABC, these values are potentially more beneficial for the scallop resource because they are based on more updated information and reduce the risk of overfishing. This action is only setting ABC for 2014 and 2015, but the 2015 ABC will be reevaluated in a future framework action.

##### **1.1.1.2 Summary of biological projections for overall specification alternatives considered in this action**

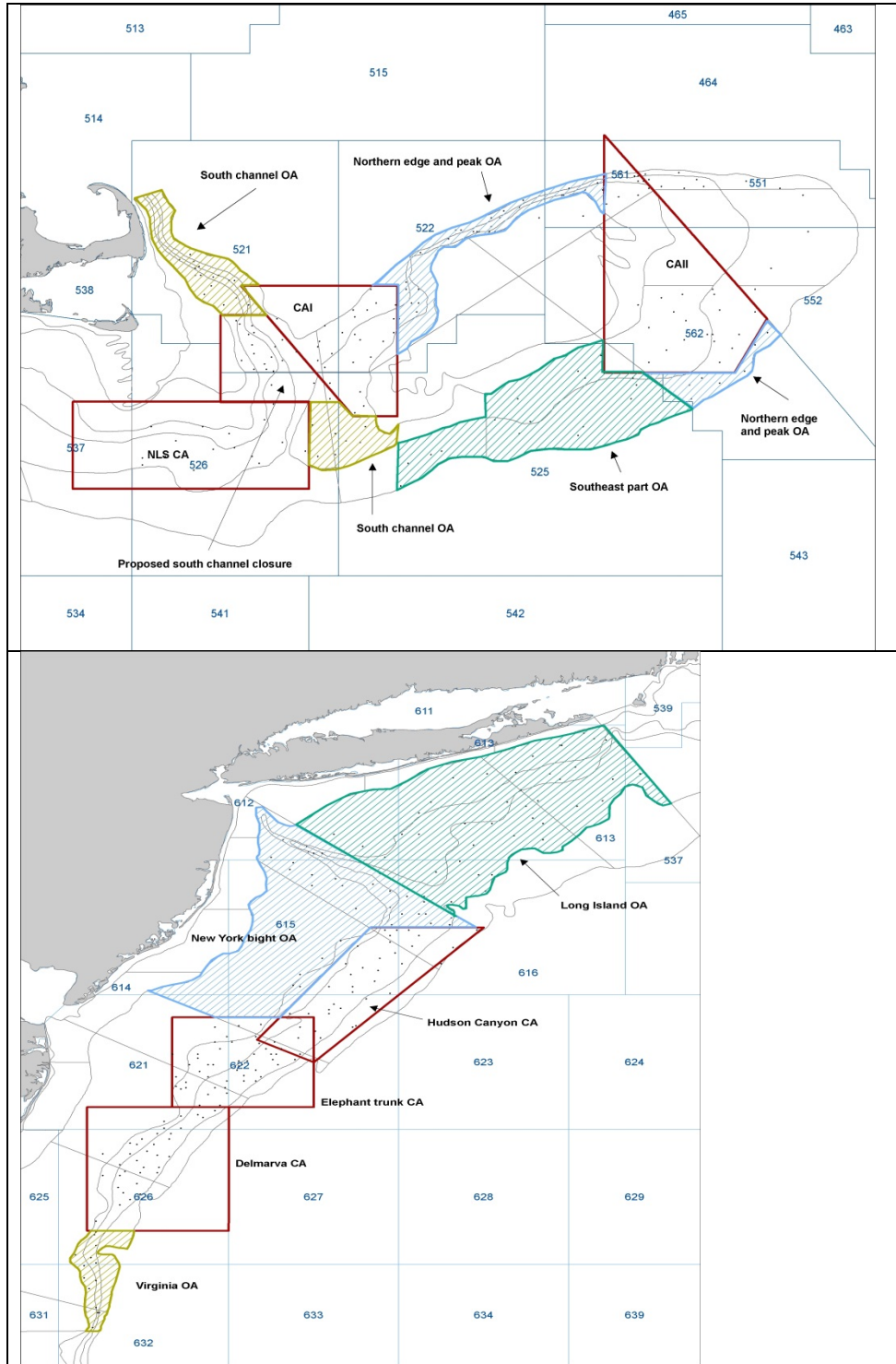
The biological impacts for the allocation alternatives considered in this action are based on results from an updated version of the SAMS (Scallop Area Management Simulator) model. This model has been used to project abundances and landings to aid management decisions since 1999. SAMS is a size-structured model that forecasts scallop populations in a number of areas. (Figure 1).

It is important to note that this model is based on fishing mortality by area and the inputs are not fishery-based in terms of DAS, etc. The simulation does not model individual vessels or trips; it models the fleet as a whole. The output of the model is then used to eventually compute individual DAS allocations after set-asides, general category landings, etc. are removed.

The SAMS model provides projected exploitable biomass estimates, scallop landings, average LPUE, DAS used and bottom area swept by area. All of these projections are described in the following tables and figures. Projections are run out 14 years to provide long-term impacts as required by law. After year two, the model uses the same assumptions for allocations in 2016

and beyond. Therefore, the only difference between the overall performances of alternatives is during the first 2 years.

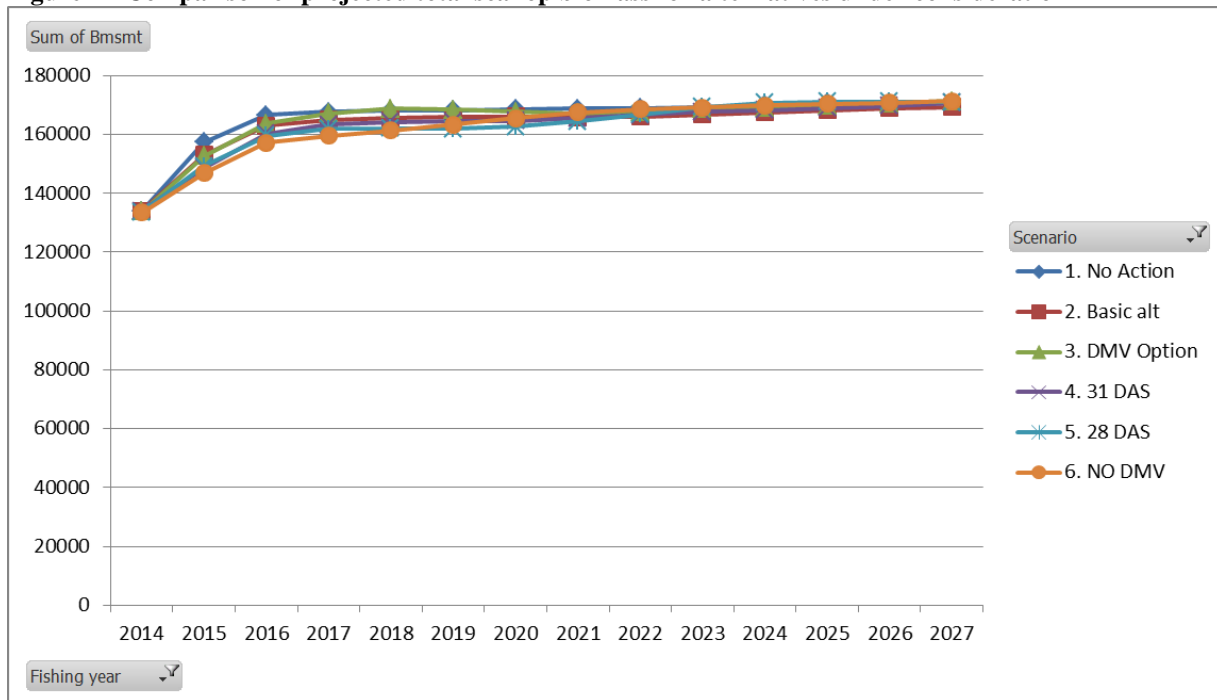
**Figure 1- SAMS model areas, with statistical areas and stratum boundaries on Georges Bank and the Mid-Atlantic**



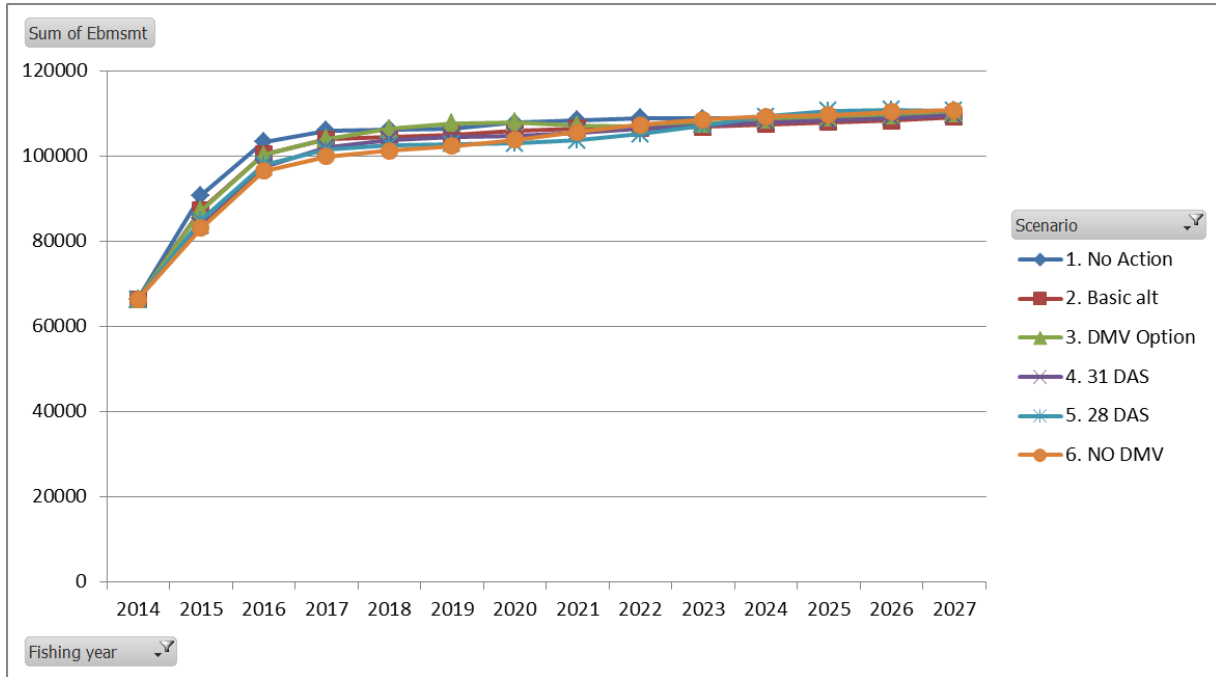
### 1.1.1.2.1 Projected biomass and exploitable biomass

- Total biomass is similar for all alternatives considered (Figure 2).
- Biomass is expected to increase modestly over the long term because of growth of smaller scallops in the Mid-Atlantic.
- Long-term projections are over 160,000 mt.
- Figure 3 shows exploitable biomass, and again all alternatives have similar projections, but in 2015 exploitable biomass is highest for No Action (over 90,000 mt), followed by Alternatives 2 and 3 (about 87,000 mt), then Alternative 5 (85,000mt), and finally Alternatives 4 and 6 (about 83,000 mt) ().
- Alternative 3 has slightly higher long term exploitable biomass than the other options due to lower fishing levels in 2014.

Figure 2 - Comparison of projected total scallop biomass for alternatives under consideration



**Figure 3 - Comparison of projected exploitable scallop biomass for alternatives under consideration**



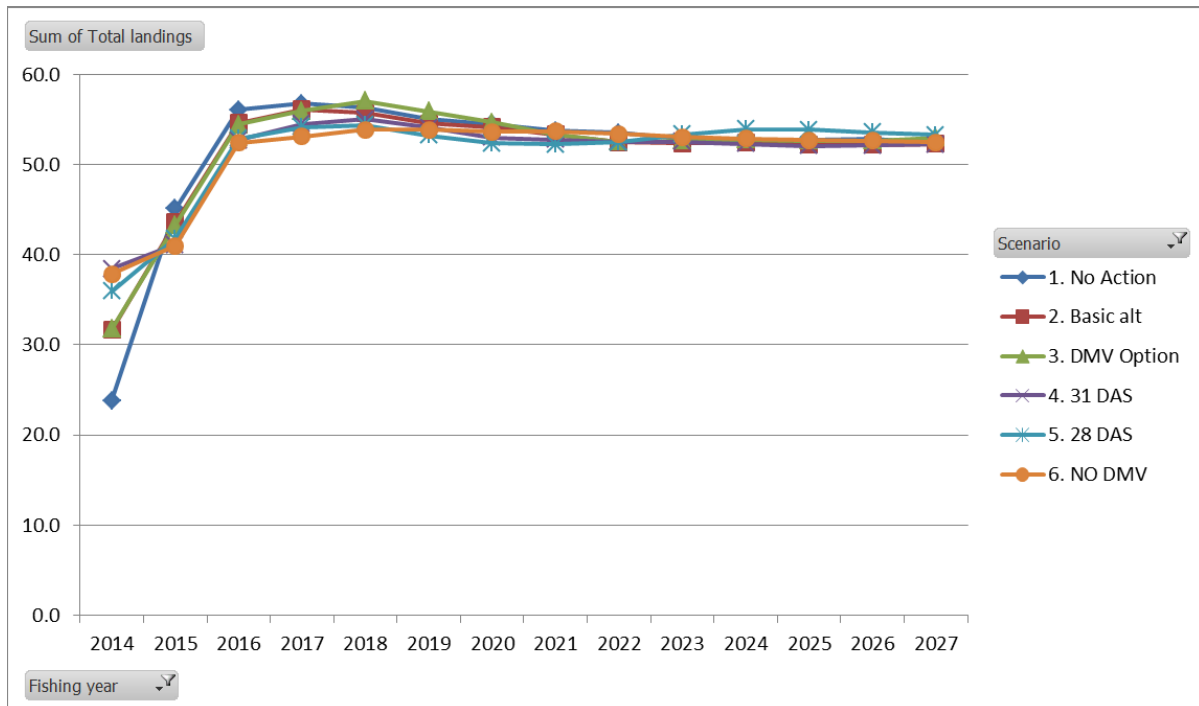
**Table 1 – Projected exploitable biomass by year for each alternative (mt)**

Sum of Ebmsmt Scenario						
Fishing year	1. No Action	2. Basic alt	3. DMV Opti	4. 31 DAS	5. 28 DAS	6. NO DMV
2014	66352	66353	66352	66352	66352	66352
2015	90753	87393	87201	83632	84927	83065
2016	103333	100435	100227	97378	98000	96479
2017	105991	103927	104100	101934	101525	99942
2018	106248	104522	106331	103817	102565	101247
2019	106480	105048	107703	104417	102893	102382
2020	107833	105918	107948	104784	102975	103755
2021	108477	106497	107271	105573	103700	105598
2022	108912	106502	106961	106468	105109	107311
2023	108764	106813	107535	107250	107205	108606
2024	108897	107494	108480	107894	109288	109249
2025	109569	107906	109066	108330	110589	109633
2026	110340	108310	109391	108945	110915	110350
2027	110674	109168	109902	109595	110623	110759
<b>Grand Total</b>	<b>1452623</b>	<b>1426286</b>	<b>1438468</b>	<b>1416369</b>	<b>1416666</b>	<b>1414728</b>

### 1.1.1.2.2 Projected scallop landings

- Landings are highest for Alternative 4 and 6 in 2014 due to higher open area DAS, but slightly lower than the other alternatives in the long term (Figure 4 and Table 2).
- Alternatives 2 and 3 have higher catch levels in 2014 compared to No Action, but lower catch than Alternative 5.
- In the long term Alternative 3 has slightly higher total catch, followed by Alternative 2 and Alternative 5, and finally Alternatives 4 and 6.
- Higher catches are projected in 2016 and 2017 based on openings of MA access areas that are projected to have relatively high levels of exploitable biomass.
- These projections assume the EFH and GF closed areas that are currently closed remain closed.

Figure 4 - Comparison of projected scallop landings for alternatives under consideration



**Table 2 – Projected scallop landings per year for each alternative (million pounds)**

Sum of Total landings	Scenario						
Fishing year	1. No Action	2. Basic alt	3. DMV Option	4. 31 DAS	5. 28 DAS	6. NO DMV	
2014	23.8	31.7	31.7	38.5	35.9	37.9	
2015	45.1	43.6	43.3	41.1	41.8	41.0	
2016	56.1	54.6	54.4	52.7	52.9	52.4	
2017	56.8	56.1	55.9	54.5	54.1	53.1	
2018	56.3	55.7	57.1	55.0	54.4	53.9	
2019	55.1	54.5	55.9	54.1	53.2	53.8	
2020	54.5	54.2	54.7	53.0	52.4	53.7	
2021	53.8	53.3	53.3	52.7	52.3	53.7	
2022	53.5	52.5	52.5	52.5	52.5	53.4	
2023	52.8	52.4	52.6	52.5	53.3	53.0	
2024	52.7	52.4	52.8	52.3	53.9	52.9	
2025	52.8	52.2	52.6	52.1	53.9	52.7	
2026	52.8	52.2	52.7	52.1	53.6	52.6	
2027	52.4	52.3	53.0	52.2	53.3	52.5	
<b>Grand Total</b>	<b>718.4</b>	<b>717.8</b>	<b>722.6</b>	<b>715.5</b>	<b>717.4</b>	<b>716.5</b>	

### 1.1.1.2.3 Total fishing mortality and open area fishing mortality

- All the alternatives under consideration have a total estimate of fishing mortality considerably lower than the target used to set fishery allocations for the fishery (F=0.28). The range under consideration is between 0.10 (No Action) and 0.21 (Alternative 3) (Table 3).
- The ACL structure set up in the Scallop FMP prescribes that the ACT for the fishery should not include allocations that are projected to have an overall F rate higher than 0.28, the rate that has a 25% chance of exceeding the ABC, which is 0.32.
- Because there is a relatively large amount of total biomass within EFH and GF closed areas, as well as MA access areas, the overall F rates are relatively low for the fishery even with higher DAS allocations. Specifically, increasing DAS from 23 DAS under Alternative 3 to 31 DAS under Alternative 4, only increases overall F by 0.04; the alternatives are exactly the same except Alternative 4 allocates 8 more DAS than Alternative 3.
- Therefore, the risk of overfishing is low for all of the alternatives under consideration since the projected F rates are well below 0.28. However, the model does underestimate F, when the projected F rate is later compared with the actual F rate the following year. In recent years total F has been underestimated by 20%.

**Table 3 – Projected overall F for the various scenarios under consideration**

Average of Over		Scenario					
subperiod	Fishing year	1. No Action	2. Basic alt	3. DMV Option	4. 31 DAS	5. 28 DAS	6. NO DMV
2014-2015	2014	0.10	0.18	0.17	0.21	0.19	0.18
	2015	0.23	0.23	0.22	0.22	0.22	0.23
<b>2014-2015 Total</b>		<b>0.17</b>	<b>0.21</b>	<b>0.20</b>	<b>0.22</b>	<b>0.21</b>	<b>0.21</b>
2016-2018	2016	0.28	0.28	0.28	0.28	0.28	0.28
	2017	0.28	0.28	0.28	0.28	0.28	0.28
	2018	0.28	0.28	0.28	0.28	0.28	0.28
<b>2016-2018 Total</b>		<b>0.28</b>	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>	<b>0.28</b>
2019-2027	2019	0.27	0.27	0.27	0.28	0.28	0.28
	2020	0.27	0.27	0.27	0.27	0.27	0.27
	2021	0.26	0.27	0.26	0.26	0.27	0.27
	2022	0.26	0.26	0.26	0.26	0.26	0.26
	2023	0.26	0.26	0.26	0.26	0.26	0.26
	2024	0.26	0.26	0.26	0.26	0.26	0.26
	2025	0.26	0.26	0.26	0.26	0.26	0.26
	2026	0.26	0.26	0.26	0.26	0.26	0.25
2027	0.25	0.26	0.26	0.25	0.26	0.25	
<b>2019-2027 Total</b>		<b>0.26</b>	<b>0.26</b>	<b>0.26</b>	<b>0.26</b>	<b>0.26</b>	<b>0.26</b>
<b>Grand Total</b>		<b>0.25</b>	<b>0.26</b>	<b>0.26</b>	<b>0.26</b>	<b>0.26</b>	<b>0.26</b>



- Projected open area F does vary between the alternatives.
- Open Area F has been capped at 0.38 in Alternatives 1, 2 and 3. One of the principles used in setting fishery specifications in this FMP since Amendment 15 is that open area F should not exceed 0.38. This constraint capps open area DAS at 23 DAS in FY2014 for all three alternatives.
- Alternatives 4-6 increase open area DAS to increase catch in FY2014 to be more similar to FY2013 levels. This increase has correspondingly higher open area F estimates; 0.48 for Alternative 5 (28 DAS), 0.52 for Alternative 3 (31 DAS), and 0.62 for Alternative 6 (37 DAS).
- Higher F rates in open areas can lead to growth overfishing in open areas; negative long-term impacts on the scallop resource.
- After FY2014 the model assumes that the 0.38 maximum will be in place again for open area DAS; therefore, in the long-term the open area F estimates are very similar. The only differences are in the first few years. The combined estimate of open area F is highest for Alternative 6, followed by Alt 4, then Alt5, then Alt 3, and Alt 2 and No Action have the same combined open area F estimate.

**Table 4 – Projected *open area F* estimates for the various scenarios under consideration**

Sum of OpF subperiod	Fishing ye	Scenario					
		1. No Action	2. Basic alt	3. DMV Op	4. 31 DAS	5. 28 DAS	6. NO DMV
2014-2015	2014	0.38	0.38	0.40	0.52	0.48	0.62
	2015	0.38	0.38	0.39	0.39	0.39	0.38
<b>2014-2015 Total</b>		<b>0.76</b>	<b>0.76</b>	<b>0.79</b>	<b>0.91</b>	<b>0.87</b>	<b>1.00</b>
2016-2018	2016	0.35	0.35	0.37	0.37	0.37	0.35
	2017	0.34	0.34	0.33	0.32	0.32	0.32
	2018	0.36	0.36	0.36	0.35	0.35	0.35
<b>2016-2018 Total</b>		<b>1.05</b>	<b>1.05</b>	<b>1.06</b>	<b>1.04</b>	<b>1.04</b>	<b>1.02</b>
2019-2027	2019	0.38	0.38	0.38	0.38	0.38	0.38
	2020	0.38	0.38	0.38	0.38	0.38	0.38
	2021	0.38	0.38	0.38	0.38	0.38	0.38
	2022	0.38	0.38	0.38	0.38	0.38	0.38
	2023	0.38	0.38	0.38	0.38	0.38	0.38
	2024	0.38	0.38	0.38	0.38	0.38	0.38
	2025	0.38	0.38	0.38	0.38	0.38	0.38
	2026	0.38	0.38	0.38	0.38	0.38	0.38
<b>2019-2027 Total</b>		<b>3.42</b>	<b>3.42</b>	<b>3.42</b>	<b>3.42</b>	<b>3.42</b>	<b>3.42</b>
<b>Grand Total</b>		<b>5.23</b>	<b>5.23</b>	<b>5.27</b>	<b>5.37</b>	<b>5.33</b>	<b>5.44</b>

#### 1.1.1.2.4 Estimate of landings per DAS and number of DAS

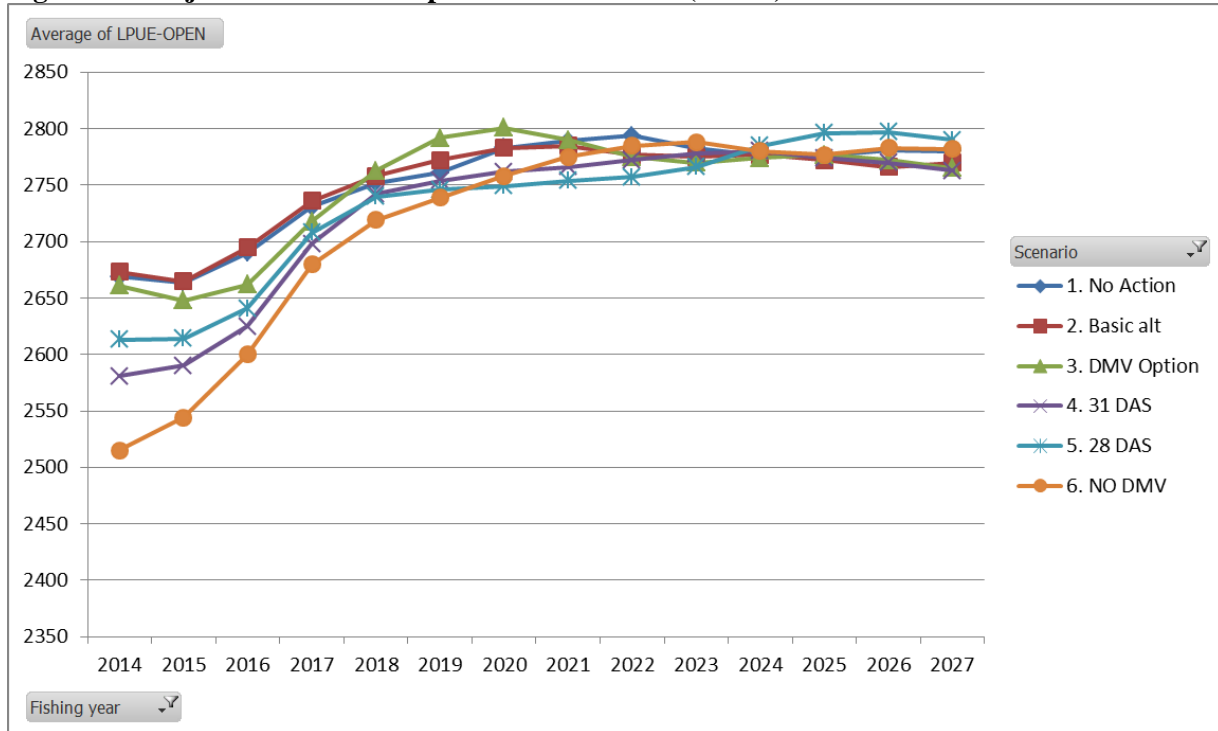
##### LPUE

- Alternatives with higher DAS allocations have lower estimates of average catch per DAS.
- The estimate with the highest open area DAS allocation (Alt6) is just over 2,500 pounds per DAS compared to Alternatives 2 and 3, estimated LPUE is about 2,670 per DAS, a 170 pound difference per DAS.
- These estimates are based on all LA vessels combined, including small dredge permits etc.
- This potential impact on LPUE takes several years to recover; by 2017 estimates for all areas are more similar around 2,750 pounds per DAS.
- Over time LPUE is estimated to increase for all areas as more total catch comes from access areas in future years.

##### DAS

- Figure 6 shows the estimate of FT DAS for each alternative.
- Note that these estimates are model outputs and not what FT vessels would be allocated. For Alternatives that provide a choice for Delmarva access (Alts 3, 4, and 5) these figures show what the model estimates DAS fishing would be per vessel if vessels had that choice.
- Based on the estimates of LPUE in Delmarva and open areas and other assumptions in the model about fishing behavior, the model projects that some level of effort (about 20%, 1 DAS out of 5DAS) would shift from Delmarva to open areas.
- More or fewer vessels may actually chose to fish open area DAS instead of Delmarva trips, but these analyses are primarily based on estimated catch rates and other factors like proximity to homeport.
- By increasing DAS in 2014 there are associated DAS reductions in 2015. Alt 6 increases DAS the most from the baseline alternatives, and that allocation is estimated to reduce FY2015 DAS by 3 DAS. The reduction for Alt 4 is 2 DAS, and one DAS for Alt 5.

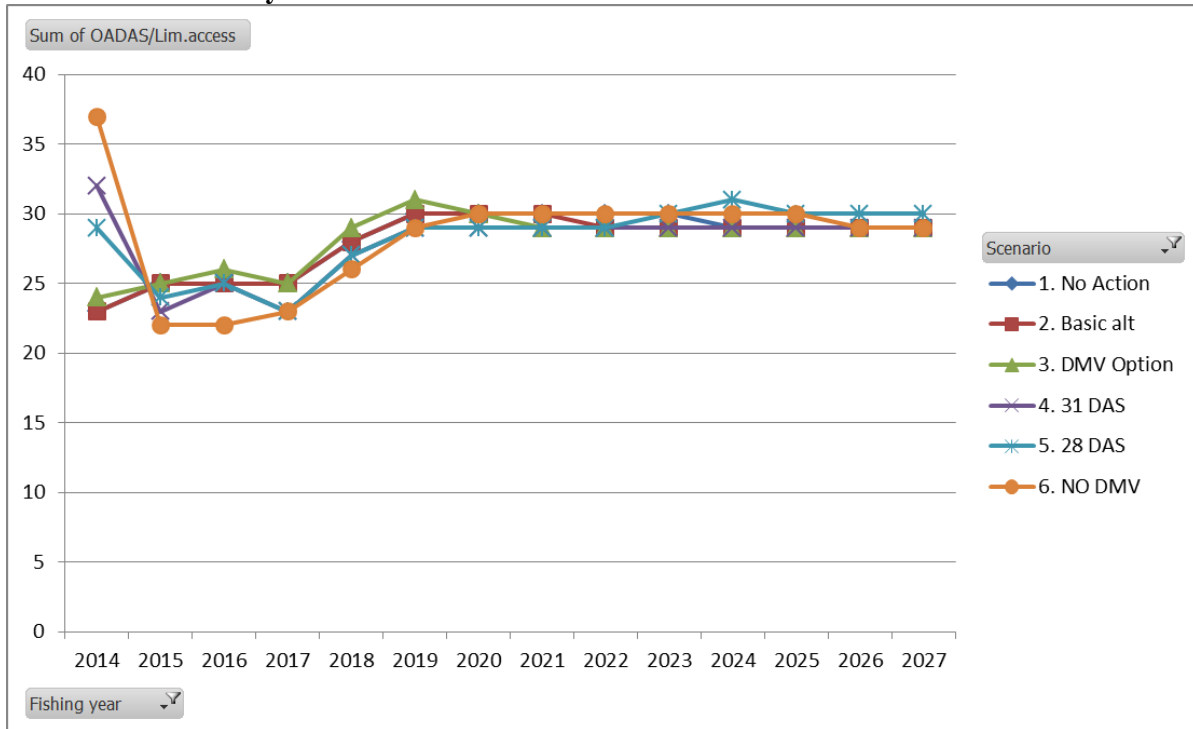
**Figure 5 – Projected estimate of open area catch rates (LPUE) for each scenario**



**Table 5 – Projected estimate of open area catch rates (LPUE) for each scenario**

Average of LPUE-OPEN		Scenario					
Fishing year		1. No Action	2. Basic alt	3. DMV Option	4. 31 DAS	5. 28 DAS	6. NO DMV
2014		2669	2673	2661	2581	2613	2515
2015		2664	2665	2648	2590	2614	2544
2016		2690	2695	2662	2625	2641	2600
2017		2731	2736	2718	2698	2708	2680
2018		2752	2758	2763	2742	2740	2719
2019		2761	2772	2792	2754	2746	2739
2020		2783	2783	2801	2762	2749	2758
2021		2789	2785	2790	2766	2754	2775
2022		2794	2777	2775	2772	2757	2785
2023		2783	2775	2770	2778	2766	2788
2024		2776	2777	2774	2780	2785	2780
2025		2776	2772	2777	2774	2796	2777
2026		2781	2766	2772	2770	2797	2783
2027		2780	2770	2765	2763	2790	2782
<b>Grand Total</b>		<b>2752</b>	<b>2750</b>	<b>2748</b>	<b>2725</b>	<b>2733</b>	<b>2716</b>

**Figure 6 – Projected number of open area DAS per FT vessel based on allocation decision in FY2014 only**



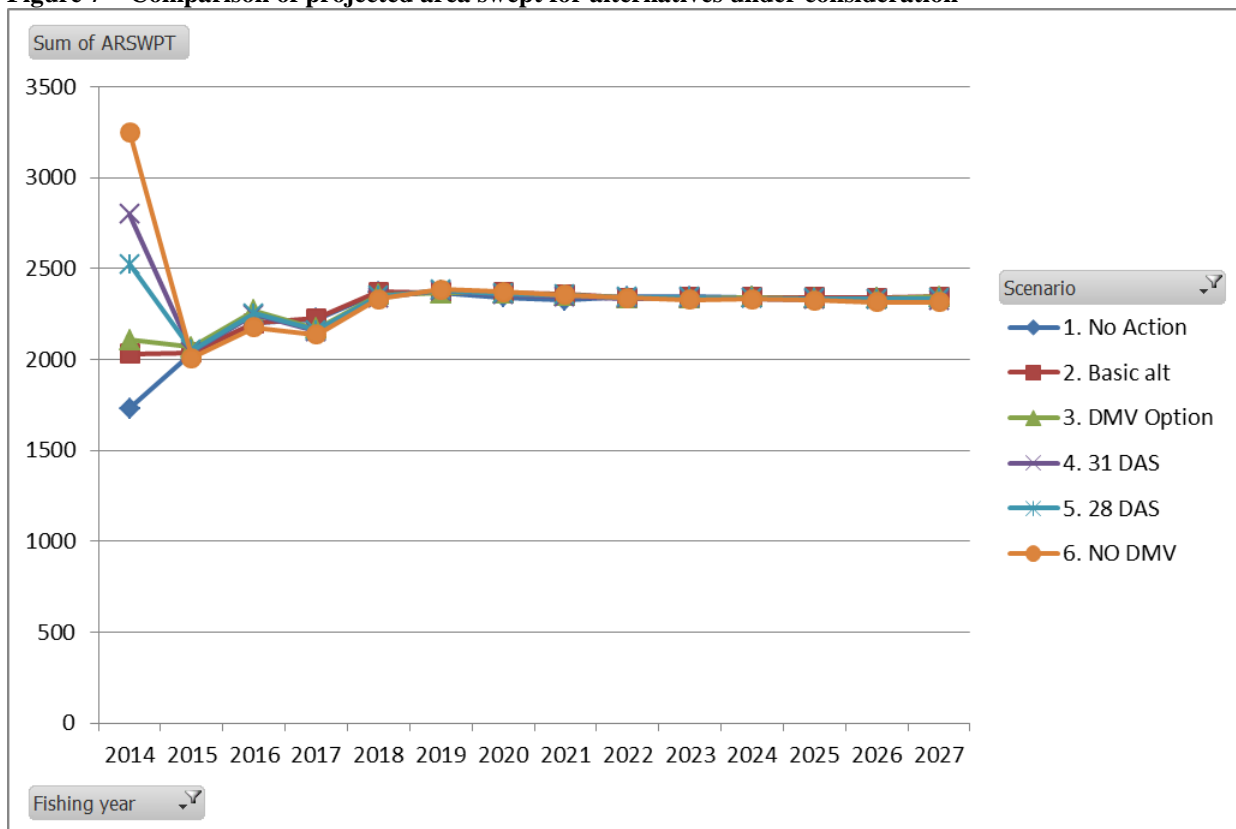
Sum of OADAS/Lim.acce	Scenario	1. No Action	2. Basic alt	3. DMV Option	4. 31 DAS	5. 28 DAS	6. NO DMV
Fishing year							
2014		23	23	24	32	29	37
2015		25	25	25	23	24	22
2016		25	25	26	25	25	22
2017		25	25	25	23	23	23
2018		28	28	29	27	27	26
2019		30	30	31	29	29	29
2020		30	30	30	29	29	30
2021		30	30	29	29	29	30
2022		30	29	29	29	29	30
2023		30	29	29	29	30	30
2024		29	29	29	29	31	30
2025		29	29	29	29	30	30
2026		29	29	29	29	30	29
2027		29	29	29	29	30	29
<b>Grand Total</b>		<b>392</b>	<b>390</b>	<b>393</b>	<b>391</b>	<b>395</b>	<b>397</b>

⚙ Denotes an estimate of open area DAS used per vessel for each scenario given the flexibility to use open area DAS or 12,000 pounds in Delmarva. This is not what vessels would be allocated. The model is projecting approximately one more DAS per vessel would be fished in open areas compared to Delmarva. The alternatives that allow this flexibility (Alts 3, 4, and 5) however do not allow a vessel to split access between Delmarva and open areas. A vessel would have to make a decision about what area to fish in.

### 1.1.1.2.5 Projected bottom area swept

- Area swept is an indicator of the level of fishing associated with each alternative; higher area swept values represent higher potential impacts on the resource and associated impacts.
- Alternative 6 has the highest estimate of area swept in 2014 compared to the other alternatives due to higher open area DAS under this alternative (Figure 7).
- No Action has the lowest estimate of area swept since it does not include any access area effort.
- The estimate of total area swept is a bit higher for Alternative 2 and 3 compared to No Action, but these alternatives have lower area swept than all the other alternatives under consideration.
- The projections of area swept become very similar after the first year when the principles that are used to set fishery allocations are replied to all alternatives.
- Overall, all of the alternatives have lower area swept projections than recent years. The range under consideration is about 1,700 square nautical miles for No Action and up to 3,200 for Alternative 6. Framework 24 projected area swept to be about 4,000 square nautical miles for 2013 allocations and the years before that was about 5,000.
- Therefore, in terms of impacts on incidental scallop mortality, bycatch and habitat, the all alternatives have fewer impacts compared to recent years, but the range is quite broad; Alternative 6 being almost twice as high as No Action.

Figure 7 – Comparison of projected area swept for alternatives under consideration



#### **1.1.1.2.6 Projected shell/height frequencies per access area**

The Scallop PDT has completed projections of shell height frequencies per area for the next several years to show the composition of scallops in each area based on 2013 survey results. The blue line in the following figures is the size and frequency of scallops measured in the 2013 survey season, the red line is a projection of those scallops for May 2014, and finally the green line is a projection of those scallops for May 2015.

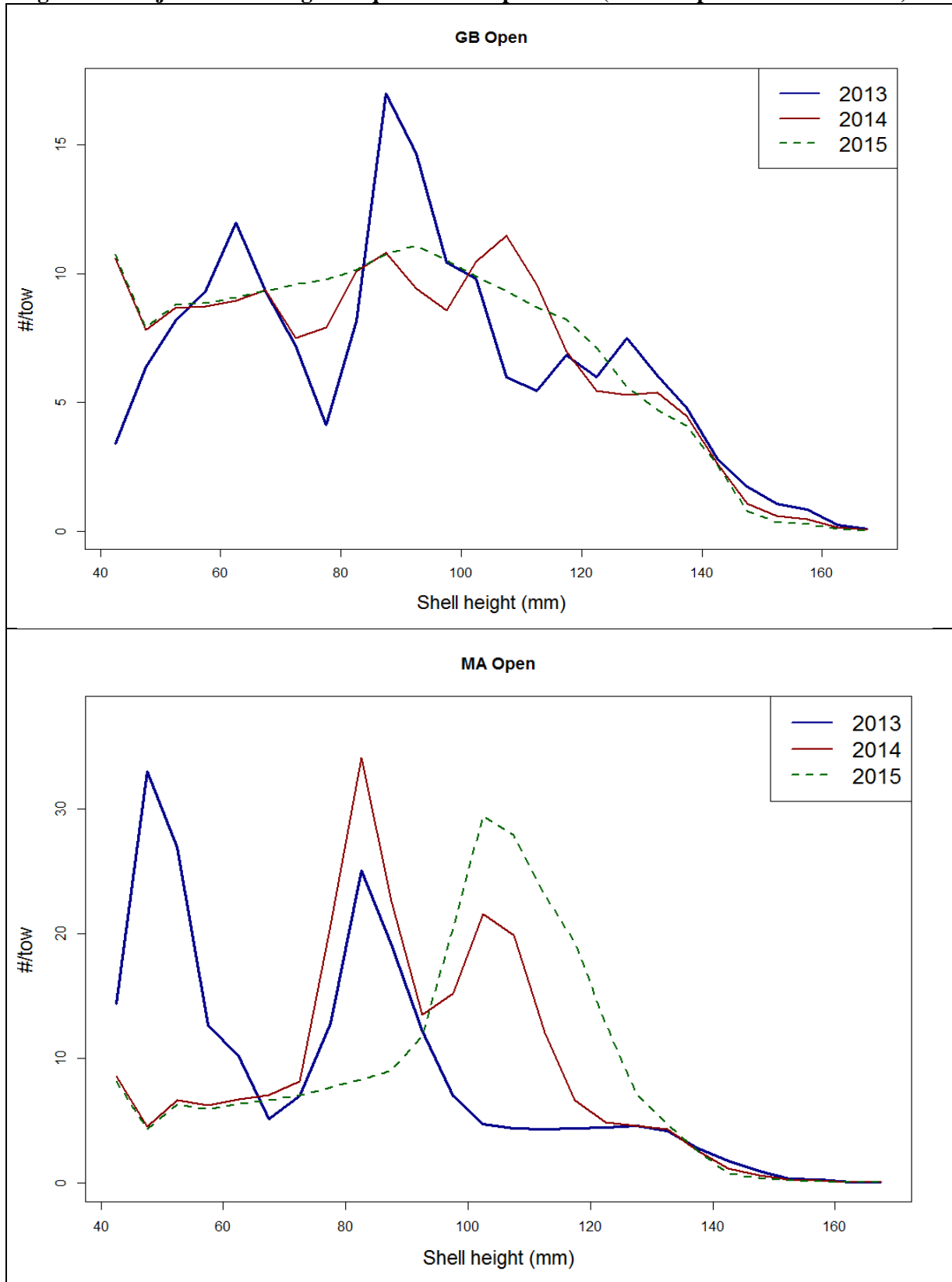
GB Open Areas – Evidence of several year classes present – wide range of sizes, but low frequency. Greatest number of scallops at 90mm in 2013 and some of those will be of harvestable size for FY2014, but a number of scallops will still be small for 4-inch gear.

MA Open Areas – More evidence of recruitment in the MA open areas, and higher frequency compared to GB, but many scallops will still be too small for the gear in FY2014 (over 100 mm).

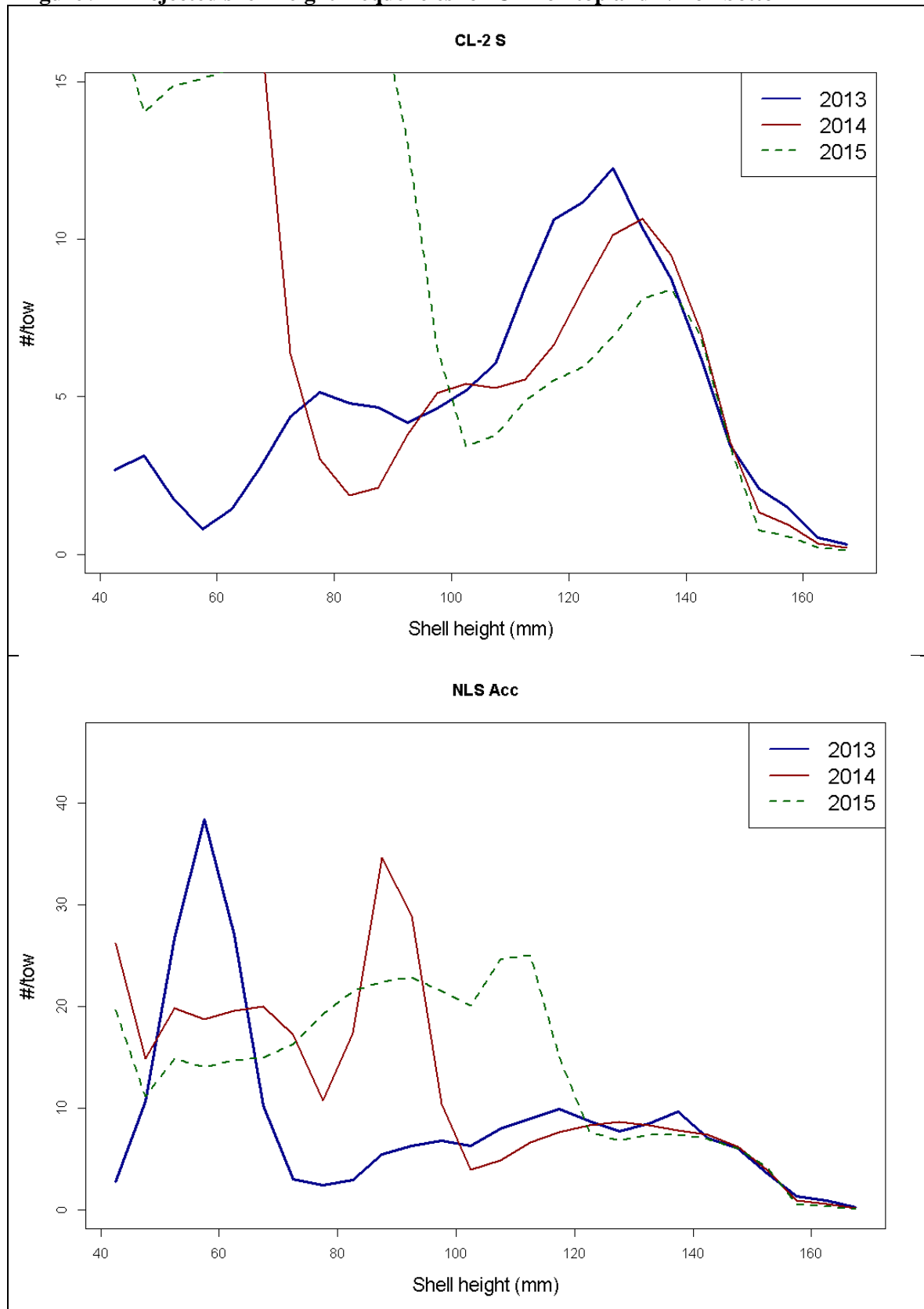
Closed Area 2 – Example of an area that has some larger scallops that should be fished; frequency is low but not much growth potential left. There is some recruitment that was observed (less than 40 mm) in 2013 survey. These scallops will not enter the fishery for some time.

NL – Low frequency of larger scallops – could support some access, not much. Evidence of strong year classes coming

**Figure 8 – Projected shell height frequencies for open areas (GB on top and MA on bottom)**



**Figure 9 – Projected shell height frequencies for CA2 on top and NL on bottom**





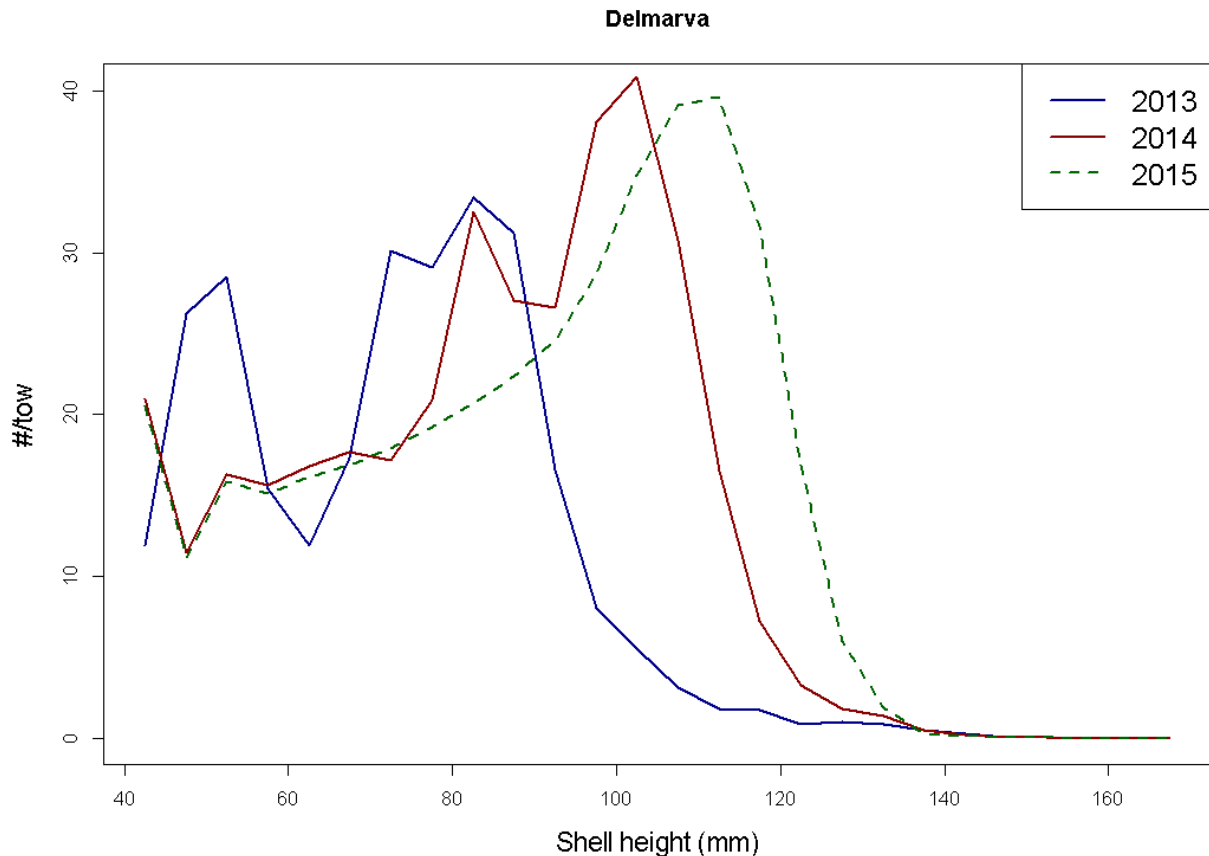
## Mid-Atlantic access areas

Delmarva – Evidence of two strong year classes. Scallops are projected to be right above 100mm in FY2014, but substantial proportion may still be smaller 90mm. In 2015 the majority of the scallops are projected to be harvestable with the 4-inch gear. There is evidence of another strong year class behind the first one, second peak at 50mm in 2013 survey.

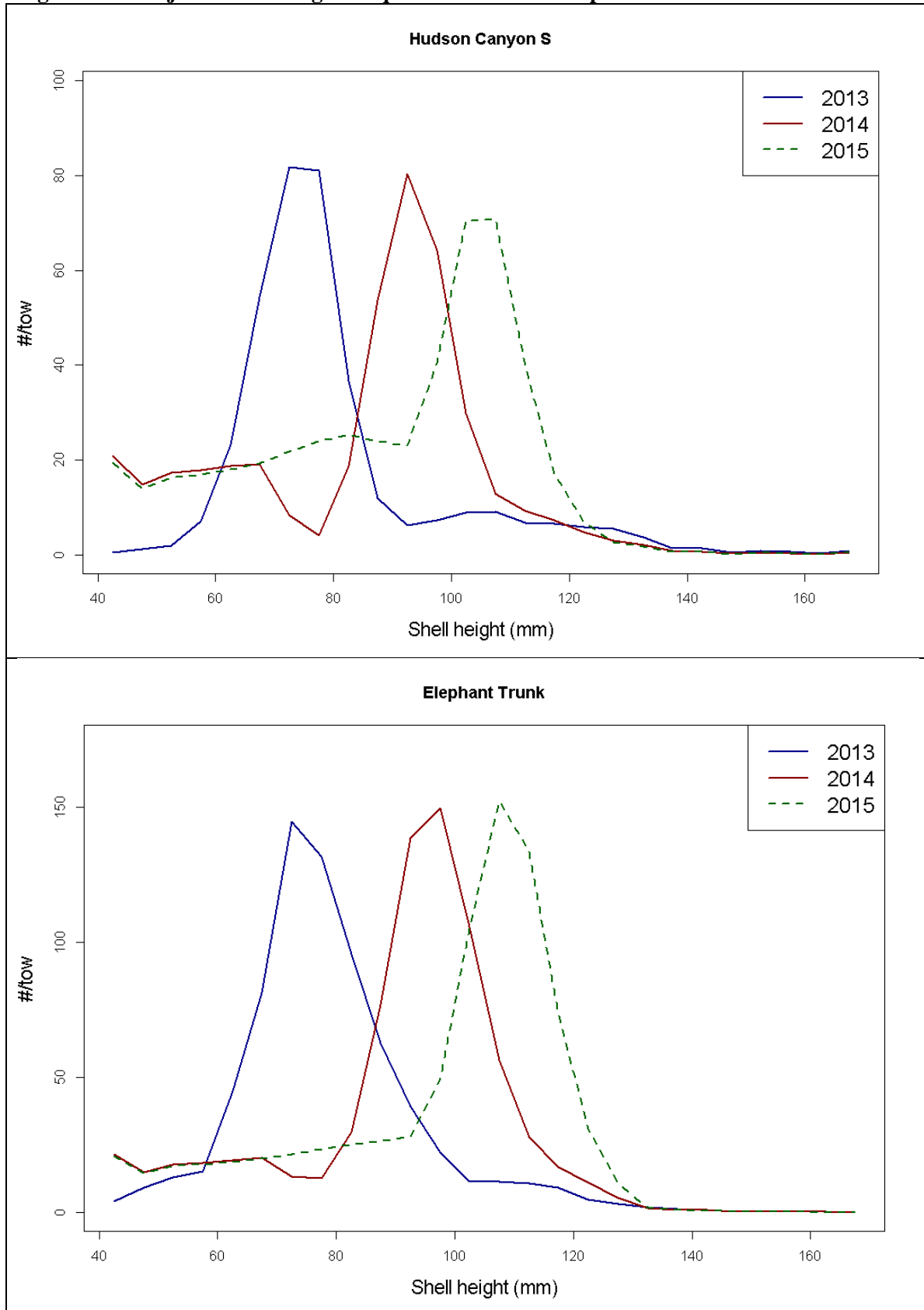
Hudson Canyon – Data support that the area should remain closed until 2015, majority of scallops not projected to be harvestable size in 2014.

Hudson Canyon – Data support that the area should remain closed until 2015, majority of scallops not projected to be harvestable size in 2014. Note that the frequency of scallops per tow much higher for this access area.

**Figure 10 - Projected shell height frequencies for Delmarva access area**



**Figure 11 – Projected shell height frequencies for HC on top and ETA on bottom**



### **1.1.1.3 Specifications for limited access vessels**

Specifications for the limited access fishery include DAS and access area trips as limited by the ACT for the limited access fishery and what areas are open to the fishery. This action considered a wide range of alternative ACTs based on a variety of possible allocation scenarios. A summary of the various allocation alternatives for the LA fishery are described in Table 8 in the main document.

#### **1.1.1.3.1 Alternative 1 (No Action – Default measures from Framework 24)**

Under No Action, the sub-ACL for the LA fishery would be 21,612 mt (47,647,385 lb) and sub-ACT of 15,428 mt (34,012,918 lb). The specifications would include default measures approved in Framework 24 for FY2014 which are 75% of the projected DAS for that year. For full-time vessels that is equivalent to 23 DAS (75% of 31 DAS), 9 DAS for part-time vessels, and 2 DAS for occasional vessels. There are no access area allocations under No Action. These measures would remain in place until replaced by another action.

The potential impacts of the No Action alternative are positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low. Total biomass projections are high under the No Action alternative.

#### **1.1.1.3.2 Alternative 2 (Basic run using OFD fishing mortality target principles – 23 DAS and 2 trips in either CA2, NL and Delmarva)**

This alternative includes:

- 23 DAS in open areas (when open area F is set at 0.38); and
- Two 12,000 pound access area trips per FT vessel. Each vessel would be allocated one trip in Delmarva and one trip in either NL or CA2, to be allocated by lottery.
- Total projected catch for Alternative 2 from all sources of catch (including set-asides and LAGC catch) is 14,364 mt, or 31.7 million pounds.

The potential impacts of Alternative 2 are expected to be generally positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low. Total biomass projections are high under this alternative. The potential impacts on the scallop resource of this alternative are similar compared to no access area trips in No Action. Alternative 2 includes more access in several access areas, but this has a small impact on overall estimates of fishing mortality and biomass projections.

#### **1.1.1.3.3 Alternative 3 (Basic run using OFD fishing mortality target principles – 23 DAS and 2 trips in either CA2, NL and Delmarva, but flexibility to use open area DAS instead of Delmarva trip)**

This alternative is similar to Alternative 2, but flexibility has been added related to the Delmarva access area trip in an effort to provide additional conservation for that area. LA vessels will be given a choice to use one access area trip of 12,000 pounds in Delmarva, or five open area DAS.

Total projected catch for Alternative 3 from all sources of catch (including set-asides and LAGC catch) is 14,407 mt, or 31.8 million pounds.

The potential impacts of Alternative 3 are expected to be generally positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low. Total biomass projections are high under this alternative. The potential impacts on the scallop resource of this alternative are similar compared to No Action. Alternative 3 includes more access in several access areas compared to no access area trips under No Action, but this has a small impact on overall estimates of fishing mortality and biomass projections. Overall Alternative 2 and 3 have the same estimated impacts on the scallop resource.

**1.1.1.3.4 Alternative 4 (Basic run but increase target F in open areas to bring total catch to 2013 level – 31 DAS and 2 trips in either CA2, NL and Delmarva, but flexibility to use open area DAS instead of Delmarva trip)**

This alternative is similar to Alternative 3, but open area F has been increased to bring total catch to projected FY2013 levels. To attain 2013 catch levels (38 million pounds), open area DAS would need to increase to 31 DAS per FT vessel. Access area allocations for this alternative would remain the same as Alternative 3. If a FT vessel chose to use open area DAS instead of a Delmarva access area trip, their total DAS allocation for the year would be 36 DAS (31 DAS plus 5 DAS), and one access area trip in NL or CA2. Total projected catch for Alternative 4 from all sources of catch (including set-asides and LAGC catch) is 17,254 mt, or 38.0 million pounds.

The potential impacts of Alternative 4 are expected to be generally positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low. This alternative does have a higher estimate of open area fishing mortality due to higher DAS allocations ( $F=0.52$ ). This projected level is higher than  $F_{msy}$  (0.38) and could lead to growth overfishing in open areas, which could have negative long-term impacts on the scallop resource. However, this alternative is limited to one year, and if DAS are reduced in 2015 to levels below 0.38, the potential impacts on the scallop resource in open areas would be more temporary.

Compared to No Action, this alternative does have a higher estimate of overall fishing mortality, 0.21 compared to 0.10 for No Action. Both are well below the limit of 0.28 used as the target for setting fishery allocations in this fishery, but projected F levels have been underestimated by the model used by the Scallop PDT. Overall, this alternative has a higher impact on the scallop resource compared to No Action, and Alternatives 2, 3, and 5. However, the projected fishing mortality levels are well below overfishing thresholds, and LT biomass projections are not much different than No Action in the long-term.

**1.1.1.3.5 Alternative 5 (Basic run but increase target F in open areas so that open area DAS in 2015 are only reduced by one DAS to allow higher DAS in 2014 - 28 DAS and 2 trips in either CA2, NL and Delmarva, but flexibility to use open area DAS instead of Delmarva trip)**

This alternative is similar to Alternative 4, but open area F is limited so that projected 2015 DAS only reduce by one DAS. This alternative has a total projected catch of 16,263 mt, or 35.9 million pounds. Access area allocations for this alternative would remain the same as Alternative 3. If a FT vessel chose to use open area DAS instead of a Delmarva access area trip,

their total DAS allocation for the year would be 33 DAS (28 DAS plus 5 DAS), and one access area trip in NL or CA2.

The potential impacts of Alternative 5 are expected to be generally positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low. This alternative does have a higher estimate of open area fishing mortality due to higher DAS allocations ( $F=0.48$ ). This projected level is higher than  $F_{msy}$  (0.38) and could lead to growth overfishing in open areas, which could have negative long-term impacts on the scallop resource. However, this alternative is limited to one year, and if DAS are reduced in 2015 to levels below 0.38, the potential impacts on the scallop resource in open areas would be more temporary.

Compared to No Action, this alternative does have a higher estimate of overall fishing mortality, 0.19 compared to 0.10 for No Action. Both are well below the limit of 0.28 used as the target for setting fishery allocations in this fishery, but projected  $F$  levels have been underestimated by the model used by the Scallop PDT. Overall, this alternative has a higher impact on the scallop resource compared to No Action, and Alternatives 2 and 3. However, the projected fishing mortality levels are well below overfishing thresholds, and LT biomass projections are not much different than No Action in the long-term.

#### **1.1.1.3.6      Alternative 6 (Increase target $F$ in open areas to bring total catch to 2013 level AND keep Delmarva closed – 37 DAS and 1 trip in either CA2 or NL)**

This alternative is similar to Alternative 4 in terms of trying to maintain FY2013 catch levels for FY2014, but Delmarva remains closed in this alternative. This alternative has a total projected catch of 17,201, or 37.9 million pounds. Under this alternative, each vessel would receive one access area trip from NL or CA2; Delmarva would remain closed.

The potential impacts of Alternative 6 are expected to be generally positive on the scallop resource; estimates of fishing mortality are low under these specifications, thus the risk of overfishing is low. This alternative does have the highest estimate of open area fishing mortality due to higher DAS allocations ( $F=0.62$ ). This projected level is higher than  $F_{msy}$  (0.38) and could lead to growth overfishing in open areas, which could have negative long-term impacts on the scallop resource. However, this alternative is limited to one year, and if DAS are reduced in 2015 to levels below 0.38, the potential impacts on the scallop resource in open areas would be more temporary.

Compared to No Action, this alternative does have a higher estimate of overall fishing mortality, 0.18 compared to 0.10 for No Action. Both are well below the limit of 0.28 used as the target for setting fishery allocations in this fishery, but projected  $F$  levels have been underestimated by the model used by the Scallop PDT. Overall, this alternative has a higher impact on the scallop resource compared to No Action, and Alternatives 2 and 3. Alternative 6 has a lower overall estimate of  $F$  compared to Alternative 4 and 5 despite higher open area DAS because it keeps Delmarva closed. This area has a relatively large amount of biomass within the access area, so prohibiting access in 2014 reduces overall  $F$  substantially. Overall, the projected fishing mortality levels are well below overfishing thresholds, and LT biomass projections are not much

different than No Action in the long-term, but open area F estimates are relatively high for this alternative.

#### **1.1.1.3.7 Measures to protect recruitment within access areas potentially opening in 2014**

Based on 2013 survey results from several sources there is evidence of very large recruitment within and around NL, and to a lesser extent within CA2. Therefore, this action is considering a boundary within NL that would prohibit effort in the areas within NL with higher concentrations of small scallops. Option 1 (No Action) – no restriction on fishing location within GB access areas and Option 2 (trips restricted to northern part of NL only).

The impacts of Option 1 (No Action) are expected to be neutral to slightly negative on the scallop resource. The majority of the small scallops in the southern part of NL are small and will pass through scallop dredge gear. However, some will likely be crushed and impacted from fishing. Scallop fishgig effort will likely be concentrated farther to the north in areas that do not overlap the larger concentrations of small scallops in the southern part of the access area. However, there are some larger scallops in the south as well, and some fishing activity may occur within that area; however it is likely less than more historical fishing areas farther north.

The impacts of Option 2 are potentially slightly positive on the scallop resource compared to Option 1, No Action. If fishing is prohibited in this area, incidental scallop mortality on smaller scallops in this area will be lower compared to Option 1. However, the total allocation of NL effort is relatively low in 2014, and more fishing will likely occur in the northern part of the access area anyway.

#### **1.1.1.3.8 Additional measures to reduce mortality on smaller scallops in NL and/or Delmarva**

The action is considering a handful of measures to reduce mortality on smaller scallops in NL and Delmarva access areas. Alternative 1 (No Action) would not include any additional measures to reduce mortality on small scallops. Overall this measure has neutral impacts on the scallop resource and is consistent with area rotation principles. Smaller scallops are protected in access areas until the areas open when sufficient biomass is present.

Alternative 2 would prohibit RSA compensation fishing in NL and Alternative 3 would prohibit RSA compensation fishing in Delmarva. These alternatives may have slightly potential benefits on the scallop resource because these measures would limit overall fishing activity in areas with recent recruitment. RSA compensation fishing is a small proportion of overall fishing effort, equivalent to 1.25 million pounds overall. However, vessels are allowed to fish compensation pounds in any area open to the fishery. Therefore, if both these alternatives are selected vessels would need to fish RSA compensation fishing in CA2 or open areas in 2014. NL and Delmarva are both relatively close to shore, thus a likely candidate for RSA compensation fishing. Since vessels are allocated RSA compensation in pounds, the potential for highgrading is potentially higher. Therefore, since there are survey results that show the presence of small scallops in both NL and Delmarva, limiting effort in those areas would reduce potential impacts on smaller scallops in those areas from incidental mortality. Overall both these measures would have potentially positive results on the scallop resource compared to No Action.

Alternative 4 would constrain fishing in Delmarva between June and August, or three months after implementation of FW25 to concentrate fishing in a season with higher yields. This alternative could have potentially positive impacts on the scallop resource by constraining effort during the time of year when scallop meat weights are larger. Allowing access even earlier in the year would also help (i.e. May) but it is unlikely that FW25 will be implemented in May. Therefore, but constraining effort in June-August fewer scallops will be harvested to attain the same possession limits compared to fishing in months with lower yields. A large proportion of effort may have occurred during this season already, but having the limit would ensure that vessels do not increase effort during seasons with lower meat weights. Compared to No Action, this measure may have potential benefits on the resource within Delmarva, which is important for 2014 since biomass of smaller scallops is still relatively large in that area.

Finally, Alternative 5 would restrict crew limits in Delmarva to limits used in open area fishing to reduce potential highgrading on small scallops in Delmarva. Because scallops are still relatively small in Delmarva this measure would help reduce the potential for highgrading. Vessels could still take an additional crew member or two for access area trips in NL and or CA2, but not in Delmarva in 2014 as a way to reduce potential impacts on smaller scallops within Delmarva. Compared to No Action this measure could have beneficial impacts on the scallop resource in Delmarva by reducing the incentive for highgrading, which has negative impacts on the scallop resource from increased mortality.

#### **1.1.1.3.9 Measures to address unused Closed Area 1 access area trips**

This action is considering a handful of measures to address unused 2012 and 2013 CA1 access area allocation. Alternative 1 (No Action) would not allow rollover of unused trips. This alternative would have neutral impacts on the scallop resource. Since this measure would not allow previous access to be fished it would not include any additional impacts on the scallop resource. This measure would allow unused 2013 trips that were broken at the end of the year to be fished in the first 60 days of FY2014. The resource is not very productive in the access area within CA1; therefore if vessels decide to fish broken trips in that area impacts on the resource in CA1 will be relatively high. Catch rates are projected to be low in that area, but vessels may still decide to take these trips rather than lose the allocation completely. The level of effort will depend on whether it is economically feasible or not.

Alternative 2 would allow rollover of unused allocation in a future FY (Option1 for 2013 trips and Option 2 for 2012 trips). Both options have several sub-options specifying how long the extension would be (FY2015, FY2016, or when CA1 reopens as an access area under a future FW). This alternative overall would increase impacts on the resource compared to No Action. It is more likely that more unused allocation would be fished under this alternative compared to No Action, thus more impacts on the resource. Because more biomass is expected in this area in 2015/2016 compared to 2014, overall effort levels would likely be higher, especially if the boundary for CA1 is expanded and that area is available in late 2015 or 2016. In fact, if the CA1 access area is expanded, sufficient biomass is projected to be in that area to support this amount of effort. Therefore, that sub-option would have lower impacts on the overall scallop resource than the options that maintain effort within the existing access area.

Alternative 3 includes similar options to Alternative 2 in terms of when unused allocation would rollover (2015 or 2016), but allocation would be moved to open areas instead. Sub-options include allocation in either DAS, pounds, and a sub-option to spread the carryover out over two years. Overall, all these sub-options have negative impacts on the scallop resource compared to No Action because they include more access to the resource. Since these options include access to open areas, that will impact future access in open areas for the fishery overall, namely overall DAS would be lower for the fleet overall to allow this effort. Option 3 would minimize that impact to some extent by spreading access over two years instead, but it would still impact access in open areas for the fleet overall.

#### **1.1.1.4 Specifications for limited access general category vessels**

Specifications for the LAGC fishery include an overall IFQ allocation for vessels with LAGC IFQ permits, a hard TAC for vessels with a LAGC NGOM permit, and a target TAC for vessels with a LAGC incidental catch permit (40 pound permit).

##### **1.1.1.4.1 LAGC IFQ specifications**

Under No Action the FY2014 default measures the LAGC IFQ allocation is 1,258 mt for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit. This allocation is equivalent to 5.5% of the ACL projected for FY2014 from FW24. Alternative 2 updates the sub-ACL with updated survey and fishery information and the allocation under consideration is 1,099mt for all specification alternatives under consideration (Alternative 2-6). Alternative 2 has potentially positive impacts on the resource compared to No Action because it is based on updated survey and fishery information. Overall effort needs to be reduced in 2014 compared to default 2014 levels because updated survey results indicate that biomass is lower than projected.

##### **1.1.1.4.1.1 Allocation of fleetwide access area trip allocations for LAGC fishery**

This action is considering two options for allocating fleetwide trips to the LAGC IFQ fishery. Option 1 is to allocate 5.5% of the total 2014 access area TAC for every area open in a particular year. And Option 2 is to take the 5.5% from CA2 and prorate those trips proportionally among the remaining areas open in a particular year.

If trips are not taken in these areas, LAGC catch is assumed to be taken in open areas instead. In some cases, catch rates are higher in access areas so it may take longer for a LAGC vessel to fish for IFQ in open areas; however, in other cases catch rates can be higher in some open areas compared to access areas. Overall, LAGC catch in access areas is a small percentage of the overall catch and vessels tend to fish where catch rates are higher, so if they are higher in access areas most trips should be fished there, and if they are not more LAGC catch could come from open areas.

Option 2 would take the CA2 trips and prorate them to other access areas open that year. Option 2 would also have negligible impacts on the scallop resource overall because these trips are still accounted for in the projections. However, this could increase fishing in some areas above targeted levels under No Action (Option 1). For example, under Option 2, the 226 LAGC trips from CA2 under Option 1 would be shifted to NL and Delmarva under Specification Alternatives 2-5, and all 226 trips into NL for Specification Alternative 6 (Delmarva is closed). Overall there is potentially added fishing pressure for the remaining areas, (about 135,600 pounds – 226 trips



at 600 pounds each). But all LAGC trips may not be taken per access area and overall this is not a considerable amount of catch; thus Option 2 would have negligible impacts on the resource overall or in specific access areas compared to Option 1.

#### **1.1.1.4.2 Specifications for limited access general category NGOM vessels**

The Council approved a separate limited entry program for the NGOM with a hard-TAC. Framework 25 is considered a separate hard TAC for this area for 2014 and 2015(default). This action is considering No Action (70,000 pound TAC) and Alternative 2 (58,000 pounds).

The No Action NGOM alternative of 70,000 pounds marginally increases the risk of excess fishing and therefore could potentially have low negative impacts on the scallop resource. FW23 allowed vessels with a federal NGOM permit to declare on a trip basis if it is fishing in federal or state waters. If that vessel is fishing in state waters that catch no longer applies to the NGOM TAC. Therefore, there is now less need to inflate the NGOM federal TAC to account for catches on vessels with NGOM permits fishing in state waters. Vessels with LAGC IFQ vessels in that area will still have catch applied to the NGOM TAC, but that does not seem to be happening much at all. The NGOM TAC has been well below the 70,000 pound limit in recent years (just under 8,000 pounds in 2011 and ??? pounds in 2012). However, catch does seem to be increasing, it is currently estimated over 30,000 pounds in FY2013 to date.

Alternative 2 (58,000 pounds) is expected to reduce the chance of excess fishing in federal waters in the NGOM based on results of the recent scallop survey of that area (Table ???). Therefore, compared to the No Action (70,000 pound TAC) this option could have a low positive impact on the scallop resource by reducing the chance for excess fishing in NGOM. Overall, the No Action and the NGOM TAC alternatives are expected to have negligible impacts on the scallop resource overall since fishing levels are currently very low, much lower than both TAC alternatives.

#### **1.1.2 Accountability measures for the SNE/MA windowpane flounder sub-ACL allocated to the scallop fishery**

This action considered a range of AM alternatives including No Action, seasonal closed areas (Alternative 2), seasonal gear restricted areas (Alternative 3), and a proactive gear modification AM (Alternative 4). Based on the amount of overage, the seasonal closure and seasonal gear restricted area alternatives have various areas and seasons under consideration. Figure 6 in the main document summarizes the areas and seasons under consideration and Table 14 summarizes the estimated amount of WP reduction and percent of scallop effort potentially impacted by these AM areas.

## 1.1 ECONOMIC IMPACTS

### 1.1.1 Introduction

The following sections analyze the economic impacts of the management alternatives considered in Framework 25 and compare these with No Action alternative. The objective of the cost-benefit analysis is to evaluate the net economic benefits arising from changes in consumer and producer benefits that are expected to occur with implementation of a regulatory action. As the Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007) <sup>1</sup> state “the proper comparison is ‘*with the action*’ to ‘*without the action*’ rather than to ‘*before and after the action*,’ since certain changes may occur even without action and should not be attributed to the regulation.” Even without action, the scallop stock abundance in open and access areas will be different, requiring changes in open area DAS and trip allocations in order to maximize yield from the fishery over the long-term. As a result, landings, scallop prices, fishing costs, revenues and benefits from the fishery would change.

Furthermore, the Guidelines indicate that “the baseline is what is likely to occur in the absence of any of the proposed actions” and that “The No Action alternative should be the basis of comparison for other alternatives. However, the No Action alternative does not necessarily mean a continuation of the present situation, but instead is the most likely scenario for the future, in the absence of other alternative actions”<sup>2</sup>. Therefore, the consistency of the Framework 25 analyses with these guidelines require that the biological and economic impacts of the proposed measures compared to the “No Action” scenario as defined in Section 2.2.1 of the document.

As the Guidelines for Economic Analysis of Fishery Management Actions specify, “benefits and costs are measured from the perspective of the Nation, rather than from that of private firms or individuals. Benefits enjoyed by other nations are not included, although tax payments by foreign owners, and export revenues, are benefits to the Nation.”

The overall benefit and costs of the fishery management actions generally vary over time depending on the rate of growth of the stock and according to the nature of management measures implemented to maximize the yield from fishery. Although a general guideline for the period of analysis cannot be established for all fishery management actions due to the diversity of possible situations and measures to be dealt with, the Guidelines state that “the period of analysis could reflect the time it takes for the fishery to move from its initial equilibrium along the expansion path to the final equilibrium point (including the time needed for the present value of costs and benefits to approximate zero) due to the adoption of the proposed regulation, holding all other influence constant.” In addition, the Guidelines indicate that “a reasonable attempt should be made to conduct the analysis over a sufficient period of time to allow a consideration of all expected effects.”

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<sup>1</sup> Guidelines for Economic Reviews of National Marine Fisheries Service Regulatory Actions, March 2007, [http://www.nmfs.noaa.gov/sfa/domes\\_fish/EconomicGuidelines.pdf](http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf)

<sup>2</sup> Ibid, p.12

Because fishery management actions in general result in short-term costs for the industry in terms of foregone revenue, “choosing a period of analysis that is too short may bias the analysis toward costs, where costs are incurred in the short-term and benefits are realized later.” Similarly, the Office of Management and Budget (OMB, 2003) indicated that the analyses should “present the annual time stream of benefits and costs expected to result from the rule,” and state that “the beginning point for your stream of estimates should be the year in which the final rule will begin to have effects” and “the ending point should be far enough in the future to encompass all the significant benefits and costs likely to result from the rule.”<sup>3</sup>

Furthermore, the economic impacts of the proposed regulations over the long-term should be evaluated by the discounted cumulative present value of the stream of benefits since benefits or costs that occur sooner are generally more valuable (or have a positive time preference). OMB Circular points out that the analytically preferred method of handling temporal differences between benefits and costs is to adjust all the benefits and costs to reflect their value in equivalent units of consumption and to discount them at the rate consumers and savers would normally use in discounting future consumption benefits (OMB, 2003). Discount rate is the interest rate used in calculating the present value of expected yearly benefits and costs. This Circular suggests that for regulatory analysis, the cost-benefit analyses should provide estimates of net benefits using both three percent and seven percent.

The benefits from the Framework 25 management action are expected to be realized over the long-term even though specifications in this action would mainly be implemented for one (2013) fishing year. This section examines both the short-term and the long-term economic impacts of the proposed regulations. The present value of long-term benefit and costs are estimated using both a 3% and a 7% discount rate. The higher discount rate provides a more conservative estimate and a lower bound for the economic benefits of alternatives compared with the benefits predicted using a lower discount rate.

## **1.1.2 Acceptable Biological Catch (Section 2.1.1)**

### **1.1.2.1 No Action ABC**

Reauthorization of the MSA requires the SSC to set an acceptable biological catch (ABC), or maximum catch level that can be removed from the resource taking into account all sources of biological uncertainty. The Council is prohibited from setting catch limits above that level. This new requirement is expected to have long-term economic benefits on the fishery by helping to ensure that catch limits and fishing mortality targets are set at or below ABC. This should help prevent overfishing and optimize yield on a continuous basis. Under “No Action” for FY 2014, the overall ABC for each year would be identical to that of the default FY 2014 ABC for the fishery of 52.3 million pounds (23,697 MT), after accounting for discards. These would remain in place until a subsequent action replaced them. From a cost benefit point of view, No Action ABC is not expected to have any economic impacts compared to the No Action baseline. Compared to the preferred alternative, No Action would have positive economic impacts in the short-run because ABC for the fishery would exceed the ABC levels for the preferred alternative

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<sup>3</sup> OMB Circular A-4 (September 17, 2003), [http://www.whitehouse.gov/omb/circulars\\_a004\\_a-4/](http://www.whitehouse.gov/omb/circulars_a004_a-4/)

(20,782 MT) in 2014, allowing higher allocations, landings and revenues for the scallop fleet. However, the updated ABC values based on the best available science through 2013 are lower than the ABC values under No Action. Therefore, if the specifications were based on the No Action ABC values, fishing effort would be higher than it should resulting in overfishing of the scallop resource. This will have negative impacts on the scallop yield, revenues and total economic benefits from the scallop resource in the long-term.

#### **1.1.2.2 ABC for 2014 and default for 2015**

The updated values for ABC are provided in Table 6 of Section 2.1.1.2. The ABC available to the fishery (after removing the discards) will be lower than the No Action levels, 20,782 MT, in 2014. The default 2015 ABC level, 23,982 MT, will be slightly higher, however, than the No Action ABC of 23,697 (net of discards). Therefore, this measure is expected to have negative impacts on the landings and revenues, producer and consumer surpluses and net economic benefits to the nation in the short-term but positive economic benefits over the long-term.

#### **1.1.3 Economic impacts of the Framework 25 specification alternatives**

Framework 25 includes five allocation alternatives (ALT2, ALT3, ALT4 and ALT5) in addition to the “No Action” scenario (ALT1). These alternatives allocate a different number of open area DAS and access area trips in 2014 as summarized Table 6 below. The biological model projected landings, LPUE and size composition of landings for each of these alternatives for 2014-2027. These projections were then used as inputs in the economic model to estimate prices, revenues, costs, producer and consumer surpluses and total economic benefits from the scallop fishery. These analyses also include the economic impacts both on the limited access and general category fisheries given that respectively 94.5% and 5.5% of the TAC is allocated to these fisheries. The impacts of alternatives on individual vessels are expected to be proportional to the aggregate impacts on revenues, fishing costs and net revenues (producer surplus).

The consistency of the Framework 25 analyses with the Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007)<sup>4</sup> require that the biological and economic impacts of alternatives compared to the “No Action” (i.e., without the action) alternative as defined in Section 2.1.2.1 of the document. The definition of “No Action” follows a regulatory approach and refers to continuation of the allocations that are specified in the present regulations so long as they are compatible with the other measures included in those regulations. Therefore, the “No Action” alternative does not reflect, a “state” or baseline that correspond to the same amount of fishing effort in 2013, but rather it refers to “what is likely to occur in the absence of any of the proposed actions”. If No Action was taken in 2014, specifications would include default measures approved in Framework 24 for FY2014. Accordingly open area DAS allocations will equal to 23 days-at-sea per full-time vessels, or 75% of the allocations in 2012 (31 days) and there will be no access area allocations.

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<sup>4</sup> Guidelines for Economic Reviews of National Marine Fisheries Service Regulatory Actions, March 2007, [http://www.nmfs.noaa.gov/sfa/domes\\_fish/EconomicGuidelines.pdf](http://www.nmfs.noaa.gov/sfa/domes_fish/EconomicGuidelines.pdf)

In the following sections, the costs and benefits of the Framework 25 alternatives are compared to the values for the “No Action” alternative. Specifically, these sections analyze the aggregate impacts of alternatives on landings, effort, revenues, fishing costs, consumer and producer surpluses and net economic benefits both on the limited access and general category fisheries (given that respectively 94.5% and 5.5% of the TAC is allocated to these fisheries) relative to the No Action levels. The impacts of alternatives on individual vessels are expected to be proportional to the aggregate impacts on revenues, fishing costs and net revenues (producer surplus).

The previous Frameworks also included a status quo scenario (*SQ*) to reflect the changes in landings and economic benefits as a result of changes in allocations from their current values. The alternative 4 in this action reflects a scenario that maintains landings at the projected FY2013 levels by allocating 31 open area days and 2 access area trips. Therefore, for the purposes of Framework 25 analyses, the projected economic benefits for other alternatives will be compared to the benefits for alternative 4 (31 open area days and 2 access area trips with flexibility to use them in open areas) instead to an hypothetical *SQ* scenario that keeps the allocations at the same levels as in 2013 (33 open area days and 2 access area trips).

Section 1.1.3.1 to 1.1.3.6 provide a summary of the economic impacts of each alternative separately, in terms of landings, revenues and total economic benefits (producer surplus plus consumer surplus) followed by in Section 1.1.3.7, a discussion of the comparative impacts of the specification alternatives. Section 1.1.3.8 to Section 1.1.3.12 provide a detailed discussion of economic impacts for landings, prices, effort, employment, trip costs, consumer and producer surpluses and total economic benefits.

**Table 6. Economic Impacts for 2014: Estimated landings (million lb.) and revenues (Million \$) (in inflation adjusted 2013 values) (2012 revenues=\$557.4 million, estimated revenues for 2013=\$460 million)**

Values	1. No Action	2. Basic Run	3. DMV option	4. 31 DAS	5. 28 DAS	6. No DMV
<b>FT LA DAS</b>	23 DAS	23 DAS (OA F=0.38)	23 DAS (OA F=0.40)	31 DAS (OA F=0.52)	28 DAS (OA F=0.48)	37 DAS (OA F=0.62)
<b>Vessel Choice</b>			1) DEL trip or 2) 5 DAS (total of 28 DAS)	1) DEL trip or 2) 5 DAS (total of 36 DAS)	1) DEL trip or 2) 5 DAS (total of 33 DAS)	DMV Closed
<b># of Access Area Trips</b>	0	2	2 or 1	2 or 1	2 or 1	1
<b>Total landings</b>	23.8	31.7	31.7	38.5	35.9	37.9
Difference from No Action level		7.9	7.9	14.7	12.1	14.1
<b>Total revenue</b>	280.5	363.6	364.3	427.8	404.6	422.8
Difference from No Action level		83.1	83.8	147.3	124.1	142.3
<b>Producer Surplus</b>	261.9	339.2	339.8	397.2	376.3	392.0
Difference from No Action level		77.3	77.9	135.3	114.4	130.1
<b>Total Economic Benefits</b>	278.1	363.3	364.1	429.9	405.7	424.0
Difference from No Action level		85.2	86.0	151.8	127.6	145.9

**Table 7. Long-term Impacts: Cumulative present value of revenues, producer surplus and total economic benefits net of No Action values (in 2013 inflation adjusted values and at 3% discount rate)**

Values	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
<b>Total landings</b>	718.4	717.8	722.6	715.5	717.4
<b>Total landings net of No Action landings</b>		-0.6	4.2	-2.9	-1.0
	<b>At 3% discount rate</b>				
<b>Revenue</b>	22.7	52.4	18.5	20.6	16.9
<b>Producer Surplus</b>	21.0	47.9	15.1	17.9	12.7
<b>Total Benefits</b>	17.2	50.5	6.5	10.7	5.2
	<b>At 7% discount rate</b>				
<b>Revenue</b>	32.7	54.7	36.0	28.3	29.3
<b>Producer Surplus</b>	30.3	50.2	31.6	25.2	24.4
<b>Total Benefits</b>	28.5	53.2	26.3	19.5	19.1

### 1.1.3.1 No Action: Summary of economic impacts

As a result of fewer open area DAS (23 days instead of 33 days in 2013) and no allocations to access areas, the landings (23.8M lb.), revenues (\$280.5M), and total economic benefits (\$278.1) for No Action would be significantly lower compared to the other alternatives in 2014 including ALT4 (status quo landings), which maintains the landings at approximately 2013 levels (Table 1). Over the long-term

from 2014 to 2027, the present value of revenues, producer surplus and total economic benefits under No Action will still be lower compared to all alternatives. This is because the large negative impacts in 2014 outweighs the positive impacts on landings and economic benefits after 2014 (Table 7).

#### **1.1.3.2 ALT2: Summary of economic impacts**

This alternative results in higher landings (31.7M lb.), revenues (\$363.6), and total economic benefits (\$363.3) in 2014 compared to No Action because it allows 2 access area limits while keeping the open area days at 23 DAS. However, the landings, revenues and total economic benefits for this alternative will be lower in 2014 compared to ALT3 to ALT6 (Table 1). Over the long-term from 2014 to 2027, the present value of revenues, producer surplus and total economic benefits under this alternative will be higher than No Action, ALT4 to ALT6, but lower than ALT3 levels using a 3% discount rate to estimate future benefits. If a 7% discount rate was to estimate present values over the long-term, the revenues and total economic benefits of this alternative would be second largest after ALT3 values (Table 7).

#### **1.1.3.3 ALT3: Summary of economic impacts**

The economic impacts of this alternative would be similar to that of ALT2 in the short-term, with higher landings (31.7M lb.), revenues (\$364.3), and total economic benefits (\$364.1) in 2014 compared to No Action due allocation of 2 or 1 access area limits with a flexibility to fish in the open areas instead of a trip to DMV. However, the landings, revenues and total economic benefits for this alternative will be lower in 2014 compared to ALT3 to ALT6 (Table 1). Over the long-term from 2014 to 2027, the present value of revenues, producer surplus and total economic benefits for ALT3 would exceed the values for all the alternatives including the No Action level whether a 3% or a 7% discount rate is used to estimate future benefits. (Table 7).

#### **1.1.3.4 ALT4: Summary of economic impacts**

This alternative reflects status quo conditions by maintaining the landings at the projected FY2013 levels and allocates 31 open area days and 2 or 1 access area trips with a flexibility use one trip in the open areas. It results in highest landings (38.5M), revenues (\$427.8 million) and total economic benefits (\$429.9 million) in 2014 among all the alternatives considered in this Framework (Table 1). However, ALT 4 will have a smaller increase in revenues (\$18.5 million), producer surplus (\$15.1 million) and total economic benefits (\$6.5 million) over the long-term compared to No Action and other alternatives except for ALT6 (Table 7) when a 3% discount rate was used to estimate present values. If future benefits were discounted at 7%, ALT4 will have slightly higher benefits and would rank 2<sup>nd</sup> in terms of revenues and rank 3<sup>rd</sup> in terms of total economic benefits in the long-term (Table 7).

#### **1.1.3.5 ALT5: Summary of economic impacts**

This alternative would allocate 28 open area DAS and would result in higher landings 35.9M in 2014 compared to No Action, ALT2 and ALT3 levels (Table 1). The revenues (\$404.6 million) and total economic benefits (\$405.7 million) are expected to exceed No Action levels respectively by \$124.1 million and by \$127.6 million in 2014. Revenues and total economic

benefits for ALT5 would be lower than the levels for ALT4 and ALT6 in 2014. However, in the long-term this alternative will result in slightly higher increase in the present value of revenues (by \$20.6) and total economic economic benefits (\$10.7 million) compared to both ALT 4 and ALT 6 using a 3% discount rate to estimate future benefits, but lower than ALT3 levels. However, if the value of the future revenues were discounted using a 7% discount rate, ALT5 would have lower revenues and total economic benefits compared to ALT2 to ALT4, and slightly higher benefits than ALT6 (Table 7).

### **1.1.3.6 ALT6: Summary of economic impacts**

This alternative would allocate 37 open area DAS and would have similar (but slightly lower) landings (37.9 M lb.) compared to ALT4, which exceeds the levels for No Action and ALT2, ALT3 and ALT5 (Table 1). The revenues (\$422.8 million) and total economic benefits (\$424 million) are expected to exceed No Action levels respectively by \$142.3 million and by \$145.9 million in 2014. In the long-term, however, this alternative would result in smallest increase in the present value of revenues (by \$16.9 million) and total economic economic benefits (\$5.2 million) compared to ALT2 to ALT5 from the No Action level using a 3% discount rate to estimate future benefits. However, if the value of the future revenues were discounted using a 7% discount rate, ALT6 would have lower total economic benefits compared to ALT2, ALT3, ALT4 and ALT5 and lower revenues compared to ALT2, ALT3, ALT4, but it would have slightly revenues than ALT5 over the long term from 2014 to 2026 (Table 7).

### **1.1.3.7 Comparison of economic impacts of specification alternatives**

This section provides a discussion of the comparative impacts of the Framework 25 alternatives (Table 6 to Table 7). Although the Tables include the results for all these six alternatives, the discussion also highlight a comparison of the alternatives with No Action as well as with Alternative 4 because the later reflects the status quo conditions, as indicated above, resulting in an amount of landings in 2014 similar to levels in 2013.

These results are summarized for 2014 fishing year and over the long-term (2014-2027) as follows:

- Alternatives other than No Action (ALT1) would allocate 1 or 2 access area trips and some would provide a choice to vessels to use one DMV trip in the open areas (ALT 3 to ALT 5) and ALT 4 to ALT 6) would allocate higher open area DAS. Consequently, the landings and revenues for those alternatives (ALT 2 to ALT 6) are projected to exceed the landings for No Action levels in 2014 fishing year (Table 1).
- The alternatives with higher open area DAS (ALT 4 to ALT 6) result in higher landings in 2014, ranging from 35.9M lb. for ALT 5 (28 DAS) to 38.5M lb. for ALT 4 (31 DAS) compared to alternatives that allocate 23 DAS (ALT 2 and ALT 3), which result in landings of 31.7M lb. in 2014. The difference in the projected landings from the No Action levels ranges from 7.9 million lb. (ALT 2 and 3) to about 14.7 million lb. (ALT 4) for 2014 fishing year (Table 1).



- However, starting with 2015 and over the long-term, the landings for all alternatives except for ALT 3 are expected to be lower than the No Action levels (Table 2). The alternatives that allocate higher open area DAS (ALT 4 to ALT 6) in the short-term result in lower landings in the long-term compared to No Action as well as compared to ALT 2 and ALT 3 that limit open area mortality to  $F=0.40$  (ALT 3) or below (No Action and ALT 2). Overall, ALT 3 (DMV option) is estimated to result in highest landings in the long-term exceeding the landings under the No Action and status quo (ALT4).
- Even though the sum of landings over the long-term (2014-2027) is lower than landings for No Action alternative (except for ALT3), the long-term present value of revenues, producer surplus (revenue net of trip costs) and total economic benefits (consumer plus producer surplus) will exceed the No Action values for all alternatives. This is mainly because the increase in revenues compared to No Action levels is quite large in 2014 (ranging from \$83.1 million ALT2 to \$147.3 million for ALT4), outweighing the negative impacts on revenues in the rest of the period ( Table 1 and Table 2). As a result, the increase in present value of total economic benefits will range from \$5.2 million (ALT 6) to \$50.5 million (ALT 3) in the long-term using a discount rate of 3% (Table 3).
- There is a trade-off, however, in revenues, producer surplus and total economic benefits in the short-term versus in the long-term for each alternative. ALT 3 (DMV) is expected to result in smallest increase in revenues, producer surplus and net economic benefits in the short-term (2014), but largest increase over the long-term compared to No Action levels. The present value of the cumulative revenues will exceed the No Action revenues by \$52.4 million, the present value of the cumulative producer surplus by \$47.9 million and total economic benefits by \$50.5 million under ALT 3 over the long-term using a 3% discount rate. Although the economic impacts of ALT2 is similar to that for ALT3 in 2014, over the long-term, the economic benefits from ALT2 will fall short of the levels for ALT3 as the later option provides greater flexibility to vessels to take an additional 5 open area DAS instead of a DMV trip (Table 7).
- Conversely, ALT 4 will have the highest increase in revenues, producer surplus and total economic benefits in 2014, but will have a smaller increase in revenues (\$18.5 million), producer surplus (\$15.1 million) and total economic benefits (\$6.5 million) over the long-term compared to No Action and other alternatives except for ALT6 (Table 7) when a 3% discount rate was used to estimate present values. The present value of the economic benefits estimated for ALT 6 is similar to the levels for ALT 4, however, economic benefits for this alternative is slightly lower than for ALT4 both in 2014 and in the long-term (Table 6 and Table 7). ALT5 is expected to result in about \$124.1 million increase in revenues and \$127.6 million increase in total economic benefits compared to No Action in 2014, but lower than the levels for ALT4 and ALT6. However, in the long-term this alternative will result in slightly higher increase in revenues (by \$20.6) and total economic economic benefits (\$10.7

million) compared to both ALT 4 and ALT 6 using a 3% discount rate to estimate present values (Table 7).

- Although the present value of the revenues, producer and total economic benefits (absolute values) will be slightly lower for all alternatives if a 7% discount rate was applied, the increase in those values compared to No Action levels will be larger. However, when the value of the future revenues were discounted using a 7% discount rate, ALT4 would result in the second highest revenues of the long-term after ALT3, and third largest total benefits after ALT3 and ALT2 (Table 7). This is because, a 7% discount rate places less weight to decline in future revenue compared to a 3%. As a result, increase in the short-term revenue outweighs the decline in future revenue to a greater degree, changing the rank of alternatives in terms of their impacts on the revenues and total economic benefits (Table 7).
- The results for the producer surplus and total economic benefits are similar to that of revenues when present values at estimated using a 7% discount rate. However, there is a small difference in the ranking of ALT 2 and ALT 4, such that ALT2 results in slightly larger economic benefits compared to ALT4 (Table 7). ALT3 ranks first in terms of positive impacts on the present value of total economic benefits (including both the producer and consumer benefits). Present value of economic benefits are similar for ALT 5 and ALT6 in the long-term (2014-2027).
- It should be pointed out that the actual values of revenues for all alternatives could potentially exceed those shown in Table 1 to Table 7. They are based on conservative estimates for prices (Table 10 below) assuming no change in import prices, disposable income and exports to separate out the impacts of landings with those alternatives on prices. However, the reverse is possible too, if for example, the Japanese scallops recover offering competition to domestic scallops and if import prices and exports decline. For these reasons, estimated numbers for revenues and economic benefits should be mainly used for comparing one alternative with another rather than for predicting the actual values on future years.

The following sections describes the detailed results of the proposed options on landings, effort, prices, revenues, producer and consumer surpluses and total economic benefits annually (for 2014 and beyond) and also for distinct periods including short-term (2014-2015) and long-term (2014 to 2027) for all alternatives.

#### **1.1.3.8 Impacts on Landings, Price and Revenue**

No Action (ALT1) and the alternatives two and three (ALT2 and ALT3) would result in smaller landings in the short-term (2014-2015) compared to ALT1, ALT2 and ALT3 (Table 5). Because No Action would allocate zero access area trips and keep the open area DAS allocation at 23 DAS per LA vessel, the landings with No Action would be about 23.8 million lb. in 2014, while under the alternatives ALT4, ALT 5 and ALT6, it would exceed 35 million lb.. For the overall long-term period from 2014 to 2027, however, landings for alternative 3 are estimated to exceed the levels for the No Action by about 4.2

million lb., whereas the landings for the rest of the alternatives will be lower than No Action landings by 0.6 million lb. (ALT 2) to 2.9 million lb. for ALT4.

**Table 8. Estimated Landings (Million lb.) (Est.lb. in 2013=40 mill.lb.)**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
<b>2014-2015</b>	2014	23.8	31.7	31.7	38.5	35.9	37.9
	2015	45.1	43.6	43.3	41.1	41.8	41.0
<b>2014-2015 Total</b>		<b>68.9</b>	<b>75.3</b>	<b>75.1</b>	<b>79.5</b>	<b>77.8</b>	<b>78.9</b>
<b>2016-2018</b>	2016	56.1	54.6	54.4	52.7	52.9	52.4
	2017	56.8	56.1	55.9	54.5	54.1	53.1
	2018	56.3	55.7	57.1	55.0	54.4	53.9
<b>2016-2018 Total</b>		<b>169.1</b>	<b>166.4</b>	<b>167.4</b>	<b>162.3</b>	<b>161.4</b>	<b>159.4</b>
<b>2019-2027</b>	2019	55.1	54.5	55.9	54.1	53.2	53.8
	2020	54.5	54.2	54.7	53.0	52.4	53.7
	2021	53.8	53.3	53.3	52.7	52.3	53.7
	2022	53.5	52.5	52.5	52.5	52.5	53.4
	2023	52.8	52.4	52.6	52.5	53.3	53.0
	2024	52.7	52.4	52.8	52.3	53.9	52.9
	2025	52.8	52.2	52.6	52.1	53.9	52.7
	2026	52.8	52.2	52.7	52.1	53.6	52.6
	2027	52.4	52.3	53.0	52.2	53.3	52.5
<b>2019-2027 Total</b>		<b>480.4</b>	<b>476.0</b>	<b>480.1</b>	<b>473.7</b>	<b>478.3</b>	<b>478.3</b>
<b>Grand Total</b>		<b>718.4</b>	<b>717.8</b>	<b>722.6</b>	<b>715.5</b>	<b>717.4</b>	<b>716.5</b>

**Table 9. Estimated landings net of No Action levels**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
<b>2014-2015</b>	2014		7.9	7.9	14.7	12.1	14.1
	2015		-1.5	-1.8	-4.0	-3.3	-4.1
<b>2014-2015 Total</b>			<b>6.4</b>	<b>6.2</b>	<b>10.7</b>	<b>8.9</b>	<b>10.0</b>
<b>2016-2018</b>	2016		-1.4	-1.6	-3.3	-3.2	-3.7
	2017		-0.7	-0.8	-2.3	-2.6	-3.7
	2018		-0.6	0.8	-1.2	-1.9	-2.4
<b>2016-2018 Total</b>			<b>-2.6</b>	<b>-1.6</b>	<b>-6.8</b>	<b>-7.7</b>	<b>-9.7</b>
<b>2019-2027</b>	2019		-0.5	0.8	-1.0	-1.8	-1.3
	2020		-0.4	0.2	-1.5	-2.2	-0.9
	2021		-0.4	-0.5	-1.0	-1.5	-0.1
	2022		-1.1	-1.0	-1.0	-1.0	-0.1
	2023		-0.5	-0.2	-0.3	0.5	0.2
	2024		-0.3	0.1	-0.4	1.2	0.1
	2025		-0.5	-0.1	-0.7	1.1	0.0
	2026		-0.6	-0.1	-0.6	0.8	-0.2
	2027		-0.1	0.6	-0.2	0.9	0.1
<b>2019-2027 Total</b>			<b>-4.4</b>	<b>-0.3</b>	<b>-6.8</b>	<b>-2.1</b>	<b>-2.1</b>
<b>Grand Total</b>			<b>-0.6</b>	<b>4.2</b>	<b>-2.9</b>	<b>-1.0</b>	<b>-1.8</b>

Prices are estimated using the ex-vessel price model that takes into account the impacts of changes in meat count, domestic landings, exports, import prices, income of consumers, and composition of landings by market category (i.e., size of scallops) including a price premium on under count 10 scallops. The price estimates shown in Table 7 correspond to the price model outputs assuming that the import prices will be constant at their 2012 levels (given that 2013 trade data is not complete yet), scallop exports will constitute about 50% of the domestic landings, and the disposable income will be constant at the current levels in 2013, so that only the effects of the reduction in and changes in the size composition of landings could be identified. As such, these are conservative estimates for prices and actual prices could be higher (lower) than the values estimated in Table 7 if the import prices, exports and disposable income increase (decrease) in the future years.

Although the absolute values for revenues, producer and consumer surpluses, and total economic benefits would change with the value of estimated prices, the percentage differences of these values for alternatives 2 to 6 relative to the no action alternative would not change in any significant way. Higher prices than estimated in Table 7 will increase the short-term positive impact of all the alternatives on revenues compared to no action, while lower prices reduce this impact. The long-term benefits will be greater with higher prices and smaller with lower prices, however.

**Table 10. Estimated ex-vessel prices (in 2013 inflation adjusted prices, Avg. Price in 2012=\$9.78, Estimated price in 2013=\$11.38)**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
<b>2014-2015</b>	2014	11.78	11.48	11.48	11.12	11.25	11.16
	2015	10.54	10.61	10.62	10.73	10.69	10.71
<b>2014-2015 Total</b>		<b>11.16</b>	<b>11.04</b>	<b>11.05</b>	<b>10.93</b>	<b>10.97</b>	<b>10.94</b>
<b>2016-2018</b>	2016	9.99	10.04	10.05	10.13	10.12	10.12
	2017	9.95	9.95	9.97	10.02	10.04	10.08
	2018	10.00	10.00	9.94	10.02	10.05	10.08
<b>2016-2018 Total</b>		<b>9.98</b>	<b>10.00</b>	<b>9.99</b>	<b>10.06</b>	<b>10.07</b>	<b>10.09</b>
<b>2019-2027</b>	2019	10.08	10.08	10.01	10.09	10.13	10.10
	2020	10.11	10.13	10.09	10.17	10.21	10.14
	2021	10.17	10.19	10.19	10.21	10.24	10.15
	2022	10.19	10.25	10.26	10.24	10.25	10.18
	2023	10.24	10.27	10.26	10.25	10.22	10.22
	2024	10.26	10.27	10.26	10.27	10.20	10.24
	2025	10.27	10.28	10.26	10.28	10.20	10.26
	2026	10.26	10.29	10.27	10.29	10.22	10.27
<b>2019-2027 Total</b>		<b>10.21</b>	<b>10.23</b>	<b>10.21</b>	<b>10.23</b>	<b>10.21</b>	<b>10.21</b>
<b>Grand Total</b>		<b>10.29</b>	<b>10.29</b>	<b>10.28</b>	<b>10.29</b>	<b>10.29</b>	<b>10.29</b>

The economic impacts of the alternatives considered in this Framework are compared with the no action alternative to be consistent with the definition provided in Section 2.2.1 and with Guidelines for the Economic Analysis of the Fishery Management Action (NMFS, 2007). The

value of the estimated revenue alternatives ALT2 to ALT6 would be higher in the short-term (2014) compared to no action. The main reason for this is that the regulations would allow no access area trip allocations in 2014, compared to 1 to 2 trips for other alternatives.

The impacts of the Framework 25 alternatives on the annual revenues and the present value of the cumulative revenues for each period are shown in Table 8 (undiscounted values) and in Table 14 (at 3% discount rate) to Table 17 (at 7% discount rate). ALT 3 (DMV) is expected to result in smallest increase in revenues in the short-term (2014-2015), but largest increase over the long-term compared to No Action levels. The present value of the cumulative revenues will exceed No Action revenues by \$52.4 million (\$54.7 million) under ALT 3 over the long-term if a 3% discount rate (7% discount rate) is used. Although the economic impacts of ALT2 is similar to that for ALT3 in the short-term, over the long-term, the economic benefits from ALT2 will fall short of the levels for ALT3 as the later option provides greater flexibility to vessels to take an additional 5 open area DAS instead of a DMV trip.

Conversely, ALT 4 will have the highest increase in revenues (by \$114 million) in the short-term (2014-2015) but will have a smaller increase in revenues (\$18.5 million) over the long-term (2014 to 2027) compared to No Action and other alternatives except for of ALT6 (an increase of \$16.9 million net of No Action) if the present value of revenues are estimated using a 3% discount rate (Table 15). However, if the value of the future revenues were discounted using a 7% discount rate, ALT4 would result in the second highest revenues of the long-term after ALT3 (Table 17). The revenues under ALT4 are estimated to decline in 2016-2027 in a greater degree compared to other alternatives. A 7% discount rate places less weight to decline in future revenue compared to a 3%. As a result, increase in the short-term revenue outweighs the decline in future revenue to a greater degree, changing the rank of alternatives in terms of their impacts on the revenues and total economic benefits.

ALT5 is expected to result in about \$98 million increase in revenues compared to No Action in the short-term (2014-2015), lower than the levels for ALT4 and ALT6. However, in the long-term this alternative will result in slightly higher (lower) increase in revenues (by \$20.6) compared to both ALT 4 and ALT 6 if a 3% discount rate (7% discount rate) was used.

In the previous Framework actions, in addition to the no action alternative, the results of the alternatives were also compared with the SQ alternative to show the results when DAS and access area trip allocations were set at exactly the same values as in the previous years (i.e., 33 full-time DAS and 2 trips in 2013). The alternative 4 in this action reflects, however, a scenario that maintains landings at the projected FY2013 levels by allocating 31 open area days and 2 access area trips. The comparison of revenues for ALT4 with other alternatives indicates this alternative would generate the largest revenues in 2014, but 4<sup>th</sup> (2<sup>nd</sup>) largest revenues in the long-term form 2014 to 2027 using a 3% (7%) discount rate with ALT3 outperforming the rest of the alternatives in terms of long-term revenues regardless of the discount rate applied.

**Table 11. Scallop Revenue Projections (in 2013 inflation adjusted values prices, not discounted)**  
**Estimated revenue in 2013 fishing year= \$460 million**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	2014	280.5	363.6	364.3	427.8	404.6	422.8
	2015	475.0	462.7	460.2	440.7	446.9	439.0
<b>2014-2015 Total</b>		<b>755.5</b>	<b>826.3</b>	<b>824.6</b>	<b>868.5</b>	<b>851.5</b>	<b>861.8</b>
2016-2018	2016	559.8	548.4	547.2	534.0	535.0	530.3
	2017	564.6	558.6	557.6	546.3	543.5	535.5
	2018	562.5	557.1	567.2	551.6	546.7	543.1
<b>2016-2018 Total</b>		<b>1686.9</b>	<b>1664.1</b>	<b>1672.0</b>	<b>1631.9</b>	<b>1625.1</b>	<b>1608.8</b>
2019-2027	2019	555.0	549.8	559.3	545.8	539.1	543.9
	2020	551.4	548.5	551.9	539.3	534.4	543.9
	2021	546.7	543.4	543.2	538.7	535.3	545.1
	2022	545.7	537.9	538.9	538.1	538.0	543.6
	2023	541.2	538.1	540.3	538.5	545.0	542.0
	2024	541.1	538.5	541.4	536.8	549.6	541.4
	2025	541.7	536.9	540.3	535.6	549.5	540.9
	2026	541.7	537.0	540.6	536.4	547.6	540.3
2027	538.6	537.8	543.6	537.4	545.9	539.7	
<b>2019-2027 Total</b>		<b>4903.1</b>	<b>4867.9</b>	<b>4899.4</b>	<b>4846.6</b>	<b>4884.3</b>	<b>4880.9</b>
<b>Grand Total</b>		<b>7345.5</b>	<b>7358.3</b>	<b>7396.0</b>	<b>7347.0</b>	<b>7360.9</b>	<b>7351.6</b>

**Table 12. Present value of total scallop revenue (using 3% discount rate, in 2013 prices)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	741.7	812.9	811.2	855.7	838.5	849.1
2016-2018	1544.1	1523.1	1530.0	1493.4	1487.4	1472.4
2019-2027	3771.3	3743.9	3768.3	3726.5	3751.9	3752.6
<b>Grand Total</b>	<b>6057.1</b>	<b>6079.8</b>	<b>6109.5</b>	<b>6075.6</b>	<b>6077.7</b>	<b>6074.0</b>

**Table 13. Present value of total scallop revenue net of No Action revenue (using 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		71.2	69.5	114.0	96.8	107.4
2016-2018		-21.1	-14.1	-50.8	-56.8	-71.7
2019-2027		-27.4	-3.0	-44.8	-19.4	-18.7
<b>Grand Total</b>		<b>22.7</b>	<b>52.4</b>	<b>18.5</b>	<b>20.6</b>	<b>16.9</b>

**Table 14. Present value of total scallop revenue (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	724.5	796.1	794.5	839.7	822.3	833.1
2016-2018	1379.0	1360.0	1365.8	1333.2	1328.0	1314.6
2019-2027	2712.0	2692.1	2709.8	2678.6	2693.5	2697.0
<b>Grand Total</b>	<b>4815.4</b>	<b>4848.1</b>	<b>4870.1</b>	<b>4851.4</b>	<b>4843.7</b>	<b>4844.7</b>

**Table 15. Present value of total scallop revenue net of No Action revenue (using 7% discount rate)**

<b>Period</b>	<b>1. No Action</b>	<b>2. Basic Run</b>	<b>3. DMV option</b>	<b>4. 31DAS</b>	<b>5. 28 DAS</b>	<b>6. No DMV</b>
2014-2015		71.6	70.0	115.3	97.8	108.7
2016-2018		-19.0	-13.1	-45.8	-51.0	-64.4
2019-2027		-19.9	-2.2	-33.4	-18.6	-15.0
<b>Grand Total</b>		<b>32.7</b>	<b>54.7</b>	<b>36.0</b>	<b>28.3</b>	<b>29.3</b>

### **1.1.3.9 Impacts of Framework 25 specification alternatives on DAS, fishing costs and open area days and employment**

Table 1 shows open area DAS per full-time vessel for each alternative and fishing year and Table 9 show total fleet DAS from all areas. Total effort measured in terms of DAS used as a sum total of all areas will be higher in the short-term for all the alternatives compared to No Action because ALT2 to ALT 6 allocates one or more trips to access areas whereas No Action alternative would allocate no access area trips. Total DAS would be greater for ALT4, ALT 5 and ALT6 because these alternatives would allocate more open area DAS compared to No Action and to ALT2 and ALT3. However, starting in 2015, total effort measured in terms of DAS used will be lower under those alternatives compared to No Action because lower fishing mortality in 2014 under the No Action alternatives makes it possible to allocate more access area trips and open area DAS in the future years).

As compared to No Action, the overall DAS used will increase by 31.5% (ALT2) to 65.8% (ALT6) in 2014 (Table 10). This could lead to an increase in employment if more crew was employed to maintain DAS spent per crew at the present levels. On the other hand, it is uncertain to what extent the increase in crew-days will result in an increase in the number of crew given that this increase is mostly limited to 2014.

Total trip costs for the fleet vary with the total DAS-used for each alternative. Table 11 shows that those alternatives that allocate more DAS result in higher trip costs both in the short-term and long-term as higher costs in 2014 outweighs relatively lower r costs in the rest of the period compared to No Action. Present value of the fleet costs are summarized and compared with No Action Table 12 using a discount rate of 3% and in Table 13 using a discount rate of 7%. In 2014-2015, the present value of the total trips costs (including food, fuel, ice, water, ice and supplies) will be higher by \$5 million for ALT2 and by \$10 million for ALT4 using a discount rate of 3% compared to No Action (Table 11 and Table 13). For the long-term period from 2014 to 2027, the increase in the cumulative present value of the trip costs rages from about \$2 million for ALT 2 to close to \$5 million for ALT6 depending on the discount rate used.

**Table 16. Total DAS (sum of open and access areas)**

<b>Period</b>	<b>Fishing year</b>	<b>1. No Action</b>	<b>2. Basic Run</b>	<b>3. DMV option</b>	<b>4. 31DAS</b>	<b>5. 28 DAS</b>	<b>6. No DMV</b>
<b>2014-2015</b>	2014	8918	11727	11775	14672	13560	14785
	2015	16371	15957	15899	15258	15443	15250
<b>2014-2015 Total</b>		<b>25289</b>	<b>27684</b>	<b>27674</b>	<b>29930</b>	<b>29003</b>	<b>30035</b>
<b>2016-2018</b>	2016	19781	19410	19462	18961	18957	18784
	2017	19930	19764	19743	19281	19126	18833
	2018	19874	19701	20151	19511	19277	19203
<b>2016-2018 Total</b>		<b>59585</b>	<b>58875</b>	<b>59356</b>	<b>57753</b>	<b>57360</b>	<b>56820</b>
<b>2019-2027</b>	2019	19326	19120	19506	19031	18737	19037
	2020	19060	18964	19065	18647	18452	18938
	2021	18786	18667	18625	18556	18429	18887
	2022	18696	18397	18427	18468	18503	18729
	2023	18498	18393	18487	18443	18761	18577
	2024	18496	18403	18520	18336	18878	18523
	2025	18502	18343	18459	18277	18820	18468
	2026	18479	18342	18476	18311	18706	18405
2027	18334	18361	18621	18350	18623	18362	
<b>2019-2027 Total</b>		<b>168177</b>	<b>166990</b>	<b>168186</b>	<b>166419</b>	<b>167909</b>	<b>167926</b>
<b>Grand Total</b>		<b>253051</b>	<b>253549</b>	<b>255216</b>	<b>254102</b>	<b>254272</b>	<b>254781</b>



**Table 17. Percentage increase in total DAS compared to No Action DAS (Sum of open and access areas)**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	2014		31.5%	32.0%	64.5%	52.1%	65.8%
	2015		-2.5%	-2.9%	-6.8%	-5.7%	-6.8%
<b>2014-2015 Total</b>			<b>9.5%</b>	<b>9.4%</b>	<b>18.4%</b>	<b>14.7%</b>	<b>18.8%</b>
2016-2018	2016		-1.9%	-1.6%	-4.1%	-4.2%	-5.0%
	2017		-0.8%	-0.9%	-3.3%	-4.0%	-5.5%
	2018		-0.9%	1.4%	-1.8%	-3.0%	-3.4%
<b>2016-2018 Total</b>			<b>-1.2%</b>	<b>-0.4%</b>	<b>-3.1%</b>	<b>-3.7%</b>	<b>-4.6%</b>
2019-2027	2019		-1.1%	0.9%	-1.5%	-3.0%	-1.5%
	2020		-0.5%	0.0%	-2.2%	-3.2%	-0.6%
	2021		-0.6%	-0.9%	-1.2%	-1.9%	0.5%
	2022		-1.6%	-1.4%	-1.2%	-1.0%	0.2%
	2023		-0.6%	-0.1%	-0.3%	1.4%	0.4%
	2024		-0.5%	0.1%	-0.9%	2.1%	0.1%
	2025		-0.9%	-0.2%	-1.2%	1.7%	-0.2%
	2026		-0.7%	0.0%	-0.9%	1.2%	-0.4%
<b>2019-2027 Total</b>			<b>-0.7%</b>	<b>0.0%</b>	<b>-1.0%</b>	<b>-0.2%</b>	<b>-0.1%</b>
<b>Grand Total</b>			<b>0.2%</b>	<b>0.9%</b>	<b>0.4%</b>	<b>0.5%</b>	<b>0.7%</b>

**Table 18. Total trip costs (In 2013 inflation adjusted values prices, not discounted)**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	2014	18.6	24.5	24.6	30.6	28.3	30.8
	2015	34.1	33.3	33.1	31.8	32.2	31.8
<b>2014-2015 Total</b>		<b>52.7</b>	<b>57.7</b>	<b>57.7</b>	<b>62.4</b>	<b>60.5</b>	<b>62.6</b>
2016-2018	2016	41.2	40.5	40.6	39.5	39.5	39.2
	2017	41.6	41.2	41.2	40.2	39.9	39.3
	2018	41.4	41.1	42.0	40.7	40.2	40.0
<b>2016-2018 Total</b>		<b>124.2</b>	<b>122.8</b>	<b>123.8</b>	<b>120.4</b>	<b>119.6</b>	<b>118.5</b>
2019-2027	2019	40.3	39.9	40.7	39.7	39.1	39.7
	2020	39.7	39.5	39.7	38.9	38.5	39.5
	2021	39.2	38.9	38.8	38.7	38.4	39.4
	2022	39.0	38.4	38.4	38.5	38.6	39.0
	2023	38.6	38.3	38.5	38.5	39.1	38.7
	2024	38.6	38.4	38.6	38.2	39.4	38.6
	2025	38.6	38.2	38.5	38.1	39.2	38.5
	2026	38.5	38.2	38.5	38.2	39.0	38.4
<b>2019-2027 Total</b>		<b>350.6</b>	<b>348.2</b>	<b>350.7</b>	<b>347.0</b>	<b>350.1</b>	<b>350.1</b>
<b>Grand Total</b>		<b>527.6</b>	<b>528.6</b>	<b>532.1</b>	<b>529.8</b>	<b>530.1</b>	<b>531.2</b>

**Table 19. Total trip costs (In 2013 inflation adjusted values prices, at 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		5.0	5.0	9.7	7.8	10.0
2016-2018		-1.4	-0.5	-3.5	-4.3	-5.3
2019-2027		-1.9	0.0	-2.9	-0.8	-0.5
<b>Grand Total</b>		<b>1.7</b>	<b>4.5</b>	<b>3.3</b>	<b>2.7</b>	<b>4.2</b>

**Table 20. Total trip costs (In 2013 inflation adjusted values prices, at 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		5.0	5.0	9.8	7.9	10.0
2016-2018		-1.2	-0.5	-3.2	-3.8	-4.7
2019-2027		-1.4	0.0	-2.2	-0.9	-0.4
<b>Grand Total</b>		<b>2.4</b>	<b>4.5</b>	<b>4.5</b>	<b>3.1</b>	<b>4.9</b>

### 1.1.3.10 Present Value of Producer Surplus

Producer surplus (benefits) for a particular fishery shows the net benefits to harvesters, including vessel owners and crew, and is measured by the difference between total revenue and operating costs. Annual values for the producer surplus are shown in Table 21 and indicate that ALT4 and ALT6 results in largest producer surplus in 2014 but smallest in 2015 fishing year.

The increase in present value of total producer surplus will range from \$64.5 million for ALT 3 to \$104.3 million for ALT4 in the short-term (2014-2015) and will range from \$12.7 million (ALT 6) to \$47.9 million (ALT 3) in the long-term using a discount rate of 3% (2014-2027, Table 19).

ALT 3 (DMV) is expected to result in smallest increase in producer surplus in the short-term (2014-2015), but largest increase over the long-term compared to No Action levels. In comparison, ALT 4 will have the highest increase in producer (by \$104.3 million) in the short-term (2014-2015) but will have a smaller increase in producer benefits (\$15.1 million) over the long-term (2014 to 2027) compared to No Action and other alternatives except for ALT6, which results in smallest long-term producer benefits when a 3% discount rate is applied to estimate the present values (Table 19). ALT5 is expected to result in about \$89 million increase in producer surplus compared to No Action in the short-term (2014-2015), lower than the levels for ALT4 and ALT6. However, in the long-term this alternative will result in slightly higher increase in producer surplus (by \$17.9 million) compared to ALT 4 and ALT 6.

**Table 21. Annual values for producer surplus (Million \$, in 2013 inflation adjusted values, not discounted)**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	2014	261.9	339.2	339.8	397.2	376.3	392.0
	2015	440.9	429.4	427.1	408.9	414.7	407.2
<b>2014-2015 Total</b>		<b>702.8</b>	<b>768.6</b>	<b>766.9</b>	<b>806.1</b>	<b>791.0</b>	<b>799.2</b>
2016-2018	2016	518.5	507.9	506.7	494.5	495.5	491.1
	2017	523.1	517.4	516.5	506.1	503.6	496.2
	2018	521.1	516.1	525.1	510.9	506.5	503.0
<b>2016-2018 Total</b>		<b>1562.7</b>	<b>1541.3</b>	<b>1548.3</b>	<b>1511.5</b>	<b>1505.6</b>	<b>1490.4</b>
2019-2027	2019	514.7	509.9	518.6	506.1	500.1	504.2
	2020	511.7	508.9	512.1	500.4	495.9	504.4
	2021	507.5	504.5	504.3	500.0	496.8	505.7
	2022	506.8	499.6	500.4	499.6	499.4	504.6
	2023	502.6	499.7	501.8	500.0	505.9	503.2
	2024	502.5	500.2	502.8	498.6	510.2	502.8
	2025	503.1	498.7	501.8	497.5	510.3	502.4
	2026	503.2	498.7	502.1	498.2	508.6	501.9
	2027	500.4	499.5	504.8	499.1	507.0	501.4
<b>2019-2027 Total</b>		<b>4552.5</b>	<b>4519.7</b>	<b>4548.7</b>	<b>4499.6</b>	<b>4534.2</b>	<b>4530.8</b>
<b>Grand Total</b>		<b>6817.9</b>	<b>6829.7</b>	<b>6863.9</b>	<b>6817.2</b>	<b>6830.8</b>	<b>6820.4</b>

However, the ranking of the alternatives in terms of the impacts on producer surplus changes if the value of the future values were discounted using a 7% discount rate. In this case, ALT4 would result in the second highest revenues of the long-term after ALT3 (Table 21). The producer surplus under ALT4 is estimated to decline in 2016-2027 compared to No Action in a greater degree compared to other alternatives. A 7% discount rate places less weight to decline in future values compared to a 3%. As a result, increase in the short-term producer surplus outweighs the decline in future benefits relatively more, changing the rank of alternatives in terms of their impacts on the revenues, producer surplus and total economic benefits.

**Table 22. Present value of producer surplus (using 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	690.0	756.1	754.5	794.2	779.0	787.4
2016-2018	1430.4	1410.7	1416.8	1383.2	1377.9	1364.0
2019-2027	3501.5	3476.0	3498.5	3459.6	3482.9	3483.2
<b>Grand Total</b>	<b>5621.8</b>	<b>5642.8</b>	<b>5669.7</b>	<b>5637.0</b>	<b>5639.7</b>	<b>5634.5</b>

**Table 23. Present value of producer surplus net of No Action values (using 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		66.1	64.5	104.3	89.0	97.4
2016-2018		-19.7	-13.6	-47.2	-52.5	-66.4
2019-2027		-25.4	-3.0	-41.9	-18.6	-18.3
<b>Grand Total</b>		<b>21.0</b>	<b>47.9</b>	<b>15.1</b>	<b>17.9</b>	<b>12.7</b>

**Table 24. Present value of producer surplus (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	674.0	740.5	739.0	779.4	763.9	772.6
2016-2018	1277.4	1259.6	1264.7	1234.8	1230.2	1217.8
2019-2027	2517.8	2499.3	2515.7	2486.6	2500.2	2503.2
<b>Grand Total</b>	<b>4469.2</b>	<b>4499.5</b>	<b>4519.4</b>	<b>4500.8</b>	<b>4494.4</b>	<b>4493.6</b>

**Table 25. Present value of producer surplus net of No Action values (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		66.6	65.0	105.4	89.9	98.6
2016-2018		-17.8	-12.7	-42.6	-47.2	-59.6
2019-2027		-18.5	-2.2	-31.3	-17.6	-14.6
<b>Grand Total</b>		<b>30.3</b>	<b>50.2</b>	<b>31.6</b>	<b>25.2</b>	<b>24.4</b>

### 1.1.3.11 Present Value of Consumer Surplus

Consumer surplus for a particular fishery is the net benefit that consumers gain from consuming fish based on the price they would be willing to pay for them. Consumer surplus will increase when fish prices decline and/or the amount of fish harvested goes up. Present value of the consumer surplus are shown in Table 22 (using a 3% discount rate) and Table 24 (using a 7% discount rate), and the cumulative present values net of No Action levels are summarized in Table 23 and Table 25. In the short-term (2014-2015), all alternatives have a positive impact on the consumer surplus compared to No Action levels, with ALT4 and ALT6 having the largest impacts. However, over the long-term from 2014 to 2027, the present value of the consumer surplus is estimated to decline compared to the No Action levels for ALT2, ALT4 to ALT6, except for under ALT3 with a small increase in consumer surplus (Table 23 and Table 25). This is mainly because No Action would result in slightly higher landings over the long-term compared to all alternatives except for ALT3 (Table 5).

**Table 26. Present value of consumer surplus (using 3 % discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	58.9	64.6	64.3	69.5	67.3	69.0
2016-2018	174.0	170.0	171.3	163.3	162.1	159.1
2019-2027	397.4	391.7	397.3	388.7	393.6	394.7
<b>Grand Total</b>	<b>630.2</b>	<b>626.4</b>	<b>632.9</b>	<b>621.5</b>	<b>623.0</b>	<b>622.7</b>

**Table 27. Present value of consumer surplus net of No Action values (using 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		5.8	5.5	10.7	8.5	10.1
2016-2018		-4.0	-2.7	-10.6	-11.9	-14.9
2019-2027		-5.7	-0.1	-8.7	-3.8	-2.7
<b>Grand Total</b>		<b>-3.8</b>	<b>2.6</b>	<b>-8.7</b>	<b>-7.2</b>	<b>-7.5</b>

**Table 28. Present value of consumer surplus (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	57.3	63.1	62.8	68.1	65.9	67.6
2016-2018	155.4	151.8	152.8	145.8	144.7	142.0
2019-2027	286.3	282.2	286.3	279.8	282.6	284.1
<b>Grand Total</b>	<b>499.0</b>	<b>497.1</b>	<b>502.0</b>	<b>493.7</b>	<b>493.2</b>	<b>493.7</b>

**Table 29. Present value of consumer surplus net of No Action values (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		5.9	5.6	10.9	8.7	10.3
2016-2018		-3.6	-2.6	-9.6	-10.7	-13.4
2019-2027		-4.1	0.0	-6.5	-3.7	-2.2
<b>Grand Total</b>		<b>-1.8</b>	<b>3.0</b>	<b>-5.2</b>	<b>-5.7</b>	<b>-5.3</b>

### 1.1.3.12 Present Value of Total Economic Benefits

Economic benefits include the benefits both to the consumers and to the fishing industry, and equal the sum of benefits to the consumers and producers. Annual values for the economic benefits are shown in Table 26. The cumulative present value of the total benefits are summarized in Table 26 (3% discount rate) and Table 28 (7% discount rate), and the economic benefits net of No Actions levels are shown in Table 27 (3% discount rate) and Table 29 (7% discount rate).

The short-term (2014-2015) economic benefits for all alternatives are expected to exceed the levels for No Action ranging from \$70 (\$70.6) million for ALT3 to 114.9 (\$116.3) million for ALT4 using a discount rate of 3% (7%).

There are trade-offs between the short-term and the long-term benefits, however, with ALT3 resulting in highest net economic benefits over the long-term from 2014 to 2027 by \$50.5 (\$53.6) million using a 3% (7%) discount rate to estimate present values. This is followed by ALT2 (\$17.2 million) and ALT3 (\$10.7 million), with ALT4 and ALT6 resulting in lowest net benefits in 2014-2027 using a 3% discount rate and compared to No Action levels (Table 27). The results are similar if the net economic benefits were estimated using a 7% discount rate, except this time ALT4 would result in third largest benefits after ALT3 and ALT2 (Table 29).

**Table 30. Annual values of total economic benefits (undiscounted, in 2013 inflation adjusted values)**

Period	Fishing year	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
<b>2014-2015</b>	2014	278.1	363.3	364.1	429.9	405.7	424.0
	2015	484.9	471.1	468.4	446.9	453.8	445.3
<b>2014-2015 Total</b>		<b>762.9</b>	<b>834.5</b>	<b>832.4</b>	<b>876.8</b>	<b>859.5</b>	<b>869.3</b>
<b>2016-2018</b>	2016	581.4	568.3	566.6	551.5	552.8	547.9
	2017	587.3	580.6	579.3	566.6	563.5	554.4
	2018	584.0	578.2	589.6	572.0	566.4	562.0
<b>2016-2018 Total</b>		<b>1752.7</b>	<b>1727.1</b>	<b>1735.5</b>	<b>1690.0</b>	<b>1682.7</b>	<b>1664.2</b>
<b>2019-2027</b>	2019	575.3	569.8	581.0	565.4	558.0	562.9
	2020	571.2	567.9	572.2	557.5	551.9	562.5
	2021	565.7	561.9	561.7	556.4	552.3	563.8
	2022	564.4	555.3	556.2	555.4	555.0	562.1
	2023	558.9	555.1	557.6	555.8	562.8	560.0
	2024	558.5	555.6	558.9	554.0	568.2	559.1
	2025	559.0	553.9	557.7	552.4	568.3	558.3
	2026	559.3	553.8	557.9	553.3	566.1	557.8
	2027	555.9	554.9	561.1	554.2	563.9	557.0
<b>2019-2027 Total</b>		<b>5068.3</b>	<b>5028.3</b>	<b>5064.3</b>	<b>5004.5</b>	<b>5046.5</b>	<b>5043.6</b>
<b>Grand Total</b>		<b>7584.0</b>	<b>7589.9</b>	<b>7632.3</b>	<b>7571.3</b>	<b>7588.7</b>	<b>7577.1</b>

**Table 31. Present value of total economic benefits (using 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	748.8	820.7	818.8	863.8	846.3	856.3
2016-2018	1604.4	1580.8	1588.1	1546.5	1540.0	1523.1
2019-2027	3898.8	3867.7	3895.7	3848.3	3876.4	3877.9
<b>Grand Total</b>	<b>6252.0</b>	<b>6269.2</b>	<b>6302.6</b>	<b>6258.5</b>	<b>6262.7</b>	<b>6257.3</b>

**Table 32. Net economic benefits (net of No Action values , using 3% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		71.9	70.0	114.9	97.5	107.5
2016-2018		-23.6	-16.3	-57.9	-64.4	-81.3
2019-2027		-31.1	-3.1	-50.6	-22.4	-20.9
<b>Grand Total</b>		<b>17.2</b>	<b>50.5</b>	<b>6.5</b>	<b>10.7</b>	<b>5.2</b>

**Table 33. Present value of total economic benefits (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015	731.2	803.6	801.8	847.5	829.8	840.2
2016-2018	1432.8	1411.4	1417.6	1380.5	1374.9	1359.8
2019-2027	2804.2	2781.6	2802.0	2766.4	2782.8	2787.3
<b>Grand Total</b>	<b>4968.2</b>	<b>4996.6</b>	<b>5021.4</b>	<b>4994.5</b>	<b>4987.6</b>	<b>4987.3</b>

**Table 34. Present value of total economic benefits net of No Action values (using 7% discount rate)**

Period	1. No Action	2. Basic Run	3. DMV option	4. 31DAS	5. 28 DAS	6. No DMV
2014-2015		72.4	70.6	116.3	98.6	108.9
2016-2018		-21.3	-15.2	-52.2	-57.8	-73.0
2019-2027		-22.6	-2.2	-37.7	-21.3	-16.8
<b>Grand Total</b>		<b>28.5</b>	<b>53.2</b>	<b>26.3</b>	<b>19.5</b>	<b>19.1</b>

## 1.2 SOCIAL IMPACTS

The consideration of the social impacts of the changes made in this framework is required pursuant to the National Environmental Policy Act (NEPA) of 1969 and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) of 1976. NEPA requires that before any agency of the federal government may take “actions significantly affecting the quality of the human environment,” that agency must prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS) that includes the integrated use of the social sciences (NEPA Section 102(2)(C)). Social science analysis is required by multiple sections of the MSA. Section 303(b)(6) on limited entry requires examination of "(A) present participation in the fishery, (B) historical fishing practices in, and dependence on, the fishery, (C) the economics of the fishery, (D) the capability of fishing vessels used in the fishery to engage in other fisheries, (E) the cultural and social framework relevant to the fishery and any affected fishing communities, and (F) any other relevant considerations." Section 303A provides guidelines for implementing social and economic components of Limited Access Privilege Programs (LAPPs). Section 303(a)(9) on preparation of Fishery Impact Statements notes they "shall assess, specify, and describe the likely effects, if any, of the conservation and management measures on--(A)

participants in the fisheries and fishing communities affected by the plan or amendment; and (B) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants."

Finally, National Standard 8 stipulates that "conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities" (16 U.S.C. § 1851 *et seq.*). A fishing community is then defined as being "substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community" (16 U.S.C. § 1802 (17)).

The need to measure, understand and mitigate the social impacts of fisheries policy is an essential part of the management process. Managers have an obligation to consider how policy changes affect the human context of the fishery, including the direct and indirect impacts on the safety, wellbeing, quality of life, fishery dependence, culture and social structure of communities. These impacts can be felt at the individual, family and community level which can make measuring and considering them difficult as the impact variables are typically differentially distributed. There is general consensus however, as to the types of impact to be considered; the section of the human environment where the impacts may be felt; likely social impacts; and the steps to enhance positive impacts while mitigating negative ones (ICPGSIA, 2003).

Broadly defined, social impacts that need to be considered are the "social and cultural consequences to human populations of any public or private actions that alter the ways in which people live, work, play, relate to one another, organize to meet their needs, and generally cope as members of society" (Burdge and Vanclay 1995). Identifying possible social impact variables is a topic of much debate but the development of standard definitions for a set of the most common and consequential social impacts are underway. The current National Marine Fisheries Service "Guidelines for Social Impact Assessment," provides some assistance in defining relevant social factors/variables. It is suggested that the following five social factors/variables should be considered when comparing the preferred management alternative to the alternatives not selected:

1. The *Size and Demographic Characteristics* of the fishery-related work force residing in the area; these determine demographic, income, and employment effects in relation to the work force as a whole, by community and region.
2. The *Attitudes, Beliefs and Values* of fishermen, fishery-related workers, other stakeholders and their communities; these are central to understanding behavior of fishermen on the fishing grounds and in their communities.
3. The effects of proposed actions on *Social Structure and Organization*; that is, changes in the fishery's ability to provide necessary social support and services to families and communities.
4. The *Non-Economic Social Aspects* of the proposed action or policy; these include lifestyle issues, health and safety issues, and the non-consumptive and recreational uses of living marine resources and their habitats.



5. The *Historical Dependence on and Participation* in the fishery by fishermen and communities, reflected in the structure of fishing practices, income distribution and rights. (NMFS, 2007)

Longitudinal data describing these social factors region-wide and in comparable terms is limited; though the new cost and crew surveys currently being implemented by the NEFSC will begin to alleviate this. For this framework the “guidelines” document provides a range of variables to consider when predicting potential social impacts. It should also be noted that the academic literature on the subject has provided multiple lists of potential social variables, but it also cautions that such lists should not be considered “exhaustive” or “a checklist” (ICGPSIA, 1994; Vanclay, 2002; Burdge, 2004). Ultimately judgment must be used in choosing which variables are salient in any particular case.

Yet another source of information regarding potential social factors specific to fishing communities in the Northeast can be gleaned from a series of ten “social impact informational meetings” sponsored by the NEFMC during the preparation of Amendment 13 to the (NE) Multispecies FMP. Based on comments provided by local stakeholders during these meetings five social impact factors were developed to describe the level of impact felt by fishing communities and families because of management changes: 1) regulatory discarding; 2) safety; 3) disruption in daily living; 4) changes in occupational opportunities and community infrastructure; and 5) formation of attitudes. These factors, while initially developed for the multispecies fishery, overlap with those variables suggested by NMFS guidelines and have the added benefit of reflecting specific concerns of fishermen in the Northeast.

In the preparation of this document, qualitative and quantitative methods have been used to assess the relative impact of the proposed management measures. Ports most closely involved with the scallop fishery, and likely to be affected by the proposed measures, were identified in the previous scallop SAFE reports. While some management measures tend to produce certain types of social impacts it is not always possible to predict precise effects when there are multiple overlaying management measures such as in this proposed action. Also changes to the human environment often occur in small, incremental amounts and the character of a particular impact can be hidden by the gradual nature with which it occurs. Such impacts will be noted where they are possible to discern or where the potential for cumulative impacts seems likely. Therefore the discussion of social impacts for alternatives will indicate the likely directional impacts of specific measures e.g., positive, negative, or neutral.

## **1.2.1 Fishery specifications**

### **1.2.1.1 Overfishing Limit (OFL) and Acceptable Biological Catch (ABC)**

ACLs and AMs have been required under the MSA by fishing year 2010 if overfishing is occurring in a fishery, and 2011 for all other fisheries. The Council initiated Scallop Amendment 15 to comply with these new ACL requirements, and that action was implemented in 2011. In addition, an OFL and ABC are required, and the Council may not set catch limits above the ABC recommended by the SSC.

#### **1.2.1.1.1 No Action (Alternative 1)**

Under “No Action”, the overall OFL and ABC would be equivalent to default 2014 values adopted in Framework 24 (Table 5 in main document). These would remain in place until a subsequent action replaced them.

The current default ABC for is 23,697 mt, after accounting for discards, which is higher than the ABCs recommended by the SSC for this action. If Alternative 1 (no action) is adopted there will likely be no near-term social impacts felt by the individuals and communities involved in the scallop fishery. However, in the long-term, if the default ABCs set by Alternative 1 are achieved, they could affect the sustainability of the catch because they exceed the SSC recommended catch levels. Long-term sustained catches that exceed the recommended ABC could translate into negative social impacts threatening the *Historical Dependence on and Participation* in the fishery. It is also possible that the adoption of the default ABC for FY2014 – FY2015 could have a small but negative impact on the formation of *Attitudes and Beliefs* regarding government and management because these ABCs would not be based on the best available science.

#### **1.2.1.1.2 Updated estimate of ABC for FY2014 and FY2015 (default) (Alternative 2)**

The SSC reviewed updated estimates of OFL and ABC based on revised PDT analyses. The proposed values are in (Table 6 of the main document). If Alternative 2 of this measure is adopted the ABC for FY2014, and the default ABC for 2015 would be set based on updated information. Compared to Alternative 1, the No Action alternative, the ABCs set by Alternative 2 are smaller and would reduce catches of scallops for the years specified. If Alternative 2 is adopted a near-term, negative impact (compared to no action) should be expected on the *Size and Demographic Characteristics* of the fishery-related work force as reduced catch and revenue would affect income, and employment opportunities. It is expected that near-term reductions in catch will have long-term benefits for the scallop resource. Therefore, the long-term effects of adopting Alternative 2 would likely have a positive impact on both the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery. It is also possible that the adoption of new ABCs for FY2014 and 2015 based on the best available science, could have a small but positive impact on the formation of *Attitudes and Beliefs* regarding management and government.

#### **1.2.1.2 Specifications for limited access vessels**

Specifications for the limited access fishery include DAS and access area trips as limited by the ACT for the limited access fishery and what areas are open to the fishery. This action considered a wide range of alternative ACTs based on a variety of possible allocation scenarios. A summary of the various allocation alternatives for the LA fishery are described in Table 8 in the main document. The potential social impacts from Alternatives 1-6 of this section are described together below.

With no access area allocations under No Action, the potential impacts of the No Action alternative are negative social impacts affecting the *Historical Dependence on and Participation* in the fishery. The reduced sense of security in an individual’s future planning of fishery operations would also have a negative effect on the *Lifestyle/Noneconomic social aspects* of the fishery.

Alternatives 2-6 all provide a higher long-term present value of cumulative revenues (see Economic Impacts), thus they would likely (to differing degrees) have a more positive impact on related social impacts on the overall *Size and Demographic Characteristics* in the fishery, compared with the No Action alternative. Alternatives 2-3 contain the same number of allocated open access days, but Alternatives 4-6 contain higher open access days in exchange for a closed area trip, providing more operational flexibility (compared with the No Action alternative) and positive impacts on the *Life-style/Non-economic social aspects* of the fishery, especially for those fishermen less mobile or closer to preferred fishing grounds. Alternative 6 provides the largest short-term revenues (see Economic Impacts), and thus in the short term may have positive social impacts on *Historical Dependence on and Participation* in more vulnerable entities in the fishery, but smaller total economic benefits than Alternatives 3-5, which therefore have a greater probability of positively affecting *Size and Demographic Characteristics* in the long-term.

#### **1.2.1.3 Measures to protect recruitment within access areas potentially opening in 2014**

Based on 2013 survey results from several sources there is evidence of very large recruitment within and around NL, and to a lesser extent within CA2. Therefore, this action is considering a boundary within NL that would prohibit effort in the areas within NL with higher concentrations of small scallops. Option 1 (No Action) – no restriction on fishing location within GB access areas and Option 2 (trips restricted to northern part of NL only).

If Option 1 (no action) is adopted there will likely be no near-term social impacts felt by the individuals and communities involved in the scallop fishery. Option 2 would be more constraining in the short term than the No Action option because it would limit operational flexibility and impact the *Life-style/Non-economic social aspects* of the fishery. However, in the long-term, if small scallops noted in high concentrations are caught before they are able to grow, the no action alternative could have a number of negative social impacts. Thus the impacts of Option 2, compared to No Action, could have a positive impact on the formation of *Attitudes and Beliefs* regarding government and management because this option would be more aligned with the rotational management strategies that have guided the scallop fishery for a number of years. Option 2, compared with No Action, could also in the long term have a positive impact on *Size and Demographic Characteristics* in the fishery with the expected long-term growth in the scallop biomass in NL if fishing on the concentrated small scallops is avoided.

#### **1.2.1.4 Additional measures to reduce mortality on smaller scallops in NL and/or Delmarva**

The action is considering a handful of measures to reduce mortality on smaller scallops in NL and Delmarva access areas. Alternative 1 (No Action) would not include any additional measures to reduce mortality on small scallops. Alternative 2 would prohibit RSA compensation fishing in NL and Alternative 3 would prohibit RSA compensation fishing in Delmarva. Alternative 4 would limit fishing in Delmarva between June and August, or three months after implementation of FW25 to concentrate fishing in a season with higher yields. Finally, Alternative 5 would restrict crew limits in Delmarva to limits used in open area fishing to reduce potential highgrading on small scallops in Delmarva.

Alternatives 2 and 3 would be more constraining than the No Action Alternative 1 because they would limit operational flexibility and impact the *Life-style/Non-economic social aspects* of the fishery. However, if near-term reductions in catch have long-term benefits for the scallop resource, then the long-term effects of adopting Alternative 2 and 3 would likely have a positive impact on both the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery. Alternative 4 would be more constraining on *Life-style/Non-economic social aspects* of the fishery, but the higher expected yields may have a short term positive impact on *Size and Demographic Characteristics*. Alternative 5 could have a negative impact on *Size and Demographic Characteristics* for those no longer fishing on vessels with fewer sites, but with a potentially offsetting positive impact on income for those fishermen remaining on RSA trips in Delmarva. Moreover, it could have a small but positive effect on the *Attitudes and Beliefs* regarding fairness and equity issues, if highgrading is discouraged.

#### **1.2.1.5 Measures to address unused Closed Area 1 access area trips**

This action is considering a handful of measures to address unused 2012 and 2013 CA1 access area allocation. Alternative 1 (No Action) would not allow rollover of unused trips. Alternative 2 would allow rollover of unused allocation in a future FY (Option 1 for 2013 trips and Option 2 for 2012 trips). Both options have several sub-options specifying how long the extension would be (FY2015, FY2016, or when CA1 reopens as an access area under a future FW). Alternative 3 includes similar options in terms of when unused allocation would rollover, but allocation would be moved to open areas instead. Sub-options include allocation in either DAS, pounds, and a sub-option to spread the carryover out over two years.

No action would prevent a vessel from fully utilizing its allocation if it had, for example, a broken trip, which would have a negative impact on the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery for those vessels. However, deteriorating resource conditions in Closed Area 1 mean that if many vessels availed themselves of Alternative 2, there could be long-term negative impacts on the resource and thus also on the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery as a whole in the future. Alternative 3 would also have positive short-term impacts on the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery for those vessels with potential rollover allocations. Option 1 and 2 differ in whether the allocation would be fished in just FY2014 or spread between FY2014 and FY2015; the latter would reduce vessel flexibility and affect but potentially the *Life-style/Non-economic social aspects* of the fishery compared to the former, but the latter, by spreading the catch, positively affect the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery for other participants. Both options have sub-options to assign unused allocations in either pounds or DAS; given the latter would be calculated conservatively, it might have a relatively more negative effect on the *Historical Dependence on and Participation* in the fishery, especially for those vessels who have lower capacities of catch per DAS.

#### **1.2.1.6 Specifications for limited access general category IFQ vessels**

Specifications for the LAGC fishery include an overall IFQ allocation for vessels with LAGC IFQ permits, a hard TAC for vessels with a LAGC NGOM permit, and a target TAC for vessels with a LAGC incidental catch permit (40 pound permit).

#### **1.2.1.6.1 LAGC IFQ specifications**

Under No Action the FY2014 default measures the LAGC IFQ allocation is 1,258 mt for vessels with a LAGC IFQ permit as well as LA vessels with a LAGC IFQ permit. This allocation is equivalent to 5.5% of the ACL projected for FY2014 from FW24. Alternative 2 updates the sub-ACL with updated survey and fishery information and the allocation under consideration is 1,099mt for all specification alternatives under consideration (Alternative 2-6).

Compared to Alternative 1, the No Action alternative, the smaller total allocation set by Alternative 2 would reduce catches of scallops for the years specified. If Alternative 2 is adopted a near-term, negative impact should be expected on the *Size and Demographic Characteristics* of the fishery-related work force as reduced catch and revenue would affect income, and employment opportunities. But it is expected that near-term reductions in catch will have long-term benefits for the scallop resource. Therefore, the long-term effects of adopting Alternative 2 would likely have a positive impact on both the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery.

#### **1.2.1.6.2 Allocation of fleetwide access area trip allocations for LAGC fishery**

This action is considering two options for allocating fleetwide trips to the LAGC IFQ fishery. Option 1 is to allocate 5.5% of the total 2014 access area TAC for every area open in a particular year. And Option 2 is to take the 5.5% from CA2 and prorate those trips proportionally among the remaining areas open in a particular year.

Option 1 allocates the LAGC share of TAC from all access areas, Option 2 is sensitive to the fact that many smaller vessels in the LAGC fishery are less able to fish in CA2. Thus option 2 would have relatively more positive impacts on both the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery in the short-term, at the expense of somewhat higher effort in the other access areas (though still subject to trip limits).

#### **1.2.1.6.3 Specifications for limited access general category NGOM vessels**

The Council approved a separate limited entry program for the NGOM with a hard-TAC. Framework 25 is considered a separate hard TAC for this area for 2014 and 2015(default). This action is considering No Action (70,000 pound TAC) and Alternative 2 (58,000 pounds).

If Alternative 2 of this measure is adopted the LAGC NGOM TAC would be updated for FY2014 based on the results from a 2012 scallop resource survey in the area. Compared to Alternative 1, the No Action alternative, the TAC set by Alternative 2 decreases from 70K lbs to 58K lbs. If Alternative 2 is adopted a near-term, negative impact should be expected on the *Size and Demographic Characteristics* of the fishery-related work force as reduced catch and revenue would affect income, and employment opportunities. But it is expected that near-term reductions in catch will have long-term benefits for the scallop resource if it allows the stock to better recover. Therefore, the long-term effects of adopting Alternative 2 could have a positive impact on both the *Size and Demographic Characteristics* of and the *Historical Dependence on and Participation* in the fishery.

### 1.2.2 Accountability measures for the SNE/MA windowpane flounder sub-ACL allocated to the scallop fishery

This action considered a range of AM alternatives including No Action, seasonal closed areas (Alternative 2), seasonal gear restricted areas (Alternative 3), and a proactive gear modification AM (Alternative 4). Based on the amount of overage, the seasonal closure and seasonal gear restricted area alternatives have various areas and seasons under consideration. Figure 6 in the main document summarizes the areas and seasons under consideration and Table 14 summarizes the estimated amount of WP reduction and percent of scallop effort potentially impacted by these AM areas.

Alternative 1 (No Action), though it poses no short-term impacts on the scallop fishery, has the potential to cause negative social impacts on other fisheries if an overage of windowpane flounder caught by the scallop fishery were to significantly exceed the overall ACL. Alternatives 2-4 provide a way to address this issue and bring the fishery into compliance with Council management strategy on sub-ACLs, which could have a small but positive impact on the formation of *Attitudes and Beliefs* regarding management and government overall.

Alternative 2 would close areas seasonally based where there are high bycatch rates of SNE/MA windowpane flounder, whereas Alternative 3 would seasonally restrict such area with gear modifications. Since Alternative 2 would close particular areas to fishing, it could have a higher negative impact (compared to No Action) on the *Historical Dependence on and Participation* in the fishery, and on the *Size and Demographic Characteristics* of the fishery-related work force as reduced catch and revenue would affect income, and employment opportunities. Such impacts would be localized on the groups of fishermen who tend to use the closed areas relatively more, especially if they are not able to move to other fishing areas. However, Alternative 3 would entail additional costs for gear modification, so would also have a negative impact on those social impact factors to the extent the costs affected participation or revenue. Additionally, while Alternative 3 primarily concerns modifications to dredge gear, it contains two additional options targeting trawl vessels. Option 1 would declare trawl vessels not affected by accountability measures, whereas option 2 would prohibit the use of the gear when seasonal gear restricted areas are in effect for dredge users. While option 1 would have no negative impacts on trawl vessels, it may have a negative impact the *Attitudes and Beliefs* of scallopers who use dredge gear, regarding management and fairness and equity issues. Option 2 would negatively affect trawl vessels in the same way that dredge vessels are affected by Alternative 2, namely affecting the groups of fishermen who tend to use the closed areas relatively more, especially if they are not able to move to other fishing areas. Such impacts may be small and localized given that trawl gear is no longer used extensively in the scallop fishery.

Alternative 4 would, rather than close or restrict areas, modify the current but outdated gear regulations for all areas and for all scallop vessels in favor of a shorter apron that may reduce flatfish bycatch. This alternative would also entail additional costs for gear modification, so would also have a negative impact on those social impact factors of *Historical Dependence on and Participation* in the fishery, and on the *Size and Demographic Characteristics* of the fishery-related work force. However, it would not have a differential impact on portions of the fleet who work in bycatch high areas, and may have a positive impact on the formation of *Attitudes and Beliefs* regarding management in that it recognizes innovative gear modifications.

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