

APPENDIX C
PRODUCTION THRESHOLDS

MEMORANDUM

SUBJECT: Establishing the Production Threshold for the Concentrated Aquatic Animal Production Proposed Effluent Limitations Guidelines

FROM: Janet Goodwin

TO: The Record

The proposed Effluent Limitations Guidelines (ELG) regulation for the Concentrated Aquatic Animal Production (CAAP) Point Source Category apply to CAAP facilities, but not all CAAP facilities. The proposed ELG regulation established a production threshold of 100,000 pounds produced annually. Any CAAP facility producing this amount or more annually would be subject to the ELG regulation. There is a population of CAAP facilities that will not be subject to this proposed ELG because they will fall below this production threshold. This memo describes the basis for establishing the proposed production threshold.

The establishment of the proposed threshold was largely driven by the results of EPA's economic impact analysis. As described in greater detail in the Economic and Environmental Impact Analysis Document, the measure used to estimate economic impacts was the ratio of incremental compliance costs to revenues from aquaculture sales. EPA estimated compliance costs for model facilities which were originally developed from data in the USDA 1998 Census of Aquaculture. From the Census of Aquaculture, EPA developed model facilities based on the six annual revenue ranges presented in the Census Report¹. We called the corresponding revenue size categories National 1 through National 6, respectively. The appendices present the ranges for the major species both in terms of annual revenues (taken directly from the Census of Aquaculture) and annual production in pounds (derived from price information combined with the revenue data).

As a result of the preliminary round of technology options and estimates of costs, EPA decided to only consider facilities that would be defined as CAAP facilities under the current regulations found at 40 CFR 122.24 and Appendix C of Part 122. Under this definition, any facility producing cold water species (salmon and trout) listed in the tables in the Appendix that produce less than 20,000 pounds annually would not be considered a CAAP facility. Thus for trout (see Table 2 in the Appendix), National Foodsize Model 1 and Stockers Models 1 & 2 are not considered to be CAAP facilities and were not considered for regulation. For salmon, shown in Table 6 in the Appendix, Foodsize Model 1 is below the 20,000 pound threshold and is not considered a CAAP facility. Facilities that produce warm water species (catfish, tilapia, hybrid striped bass and shrimp) in amounts less than 100,000 pounds annually are not considered to be a CAAP facility. (Based on separate analysis, EPA determined that pond systems are outside the scope of the proposed ELG; therefore, catfish and shrimp produced in pond systems were not further analyzed.) For tilapia, National Foodsize Models 1 through 3 are not CAAP facilities and were not considered for regulation (see Table 3 in the Appendix). Likewise, hybrid striped bass National Foodsize Models 1 through 3 are also below the production threshold for CAAP facilities.

¹The six revenue categories are: \$1,000 to \$24,999; \$25,000 to \$49,999; \$50,000 to \$99,999; \$100,000 to \$499,999; \$500,000 to \$999,999; and \$1 million or more.

EPA considered three technology options for the three different production systems in scope of the proposed rule, flow-through systems, recirculating systems and net pen systems. The options are described in detail in the Preamble to the proposed regulation and in the Technical Development Document. The following tables (Tables 1 through 4) present the results of the revenue tests for each of the three technology options considered for this proposal. The revenue tests are based EPA's initial (March 21, 2002) compliance cost estimates and 1998 prices. For non-commercial facilities – such as Federal and state hatcheries, academic and research, and tribal facilities – we imputed a revenue based on annual harvest and commercial prices.

**Table 1
Flow-through Systems, Trout, Food Size Fish**

Owner	Size	Percent of Facilities Showing Revenue Test Impacts (Option 1)			
		1%	3%	5%	10%
Trout Commercial	2	87%	87%	87%	69%
	3	66%	66%	34%	11%
	4	70%	37%	25%	0%
	5	55%	11%	0%	0%
	6	20%	0%	0%	0%
Trout Federal	6	100%	0%	0%	0%
Trout State	2	85%	85%	85%	55%
	4	25%	0%	0%	0%
	5	92%	51%	2%	0%
Trout Academic	2	100%	100%	100%	0%
	3	0%	0%	0%	0%
Trout Other	2	88%	88%	88%	75%
	5	100%	0%	0%	0%

Table 2
Flow-through Systems, Food Size Fish Other Than Trout

Owner	Size	Percent of Facilities Showing Revenue Test Impacts (Option 1)			
		1%	3%	5%	10%
Salmon Commercial	6	0%	0%	0%	0%
Salmon Federal	2	100%	100%	100%	100%
Salmon Other	6	0%	0%	0%	0%
Striped Bass	4	0%	0%	0%	0%
Tilapia	4	88%	50%	13%	0%
	5	100%	0%	0%	0%
	6	0%	0%	0%	0%

Table 3
Flow-through Systems, Stockers

Owner	Size	Percent of Facilities Showing Revenue Test Impacts (Option 1)			
		1%	3%	5%	10%
Trout	2	50%	0%	0%	0%
Commercial	3	51%	22%	7%	0%
	4	62%	7%	0%	0%
Trout	3	100%	75%	50%	0%
Federal	4	64%	10%	0%	0%
Trout State	2	94%	75%	69%	19%
	3	85%	32%	16%	0%
	4	31%	2%	0%	0%
Trout	3	100%	0%	0%	0%
Other	4	0%	0%	0%	0%
Trout Tribal	3	0%	0%	0%	0%

**Table 4
Recirculating Systems and Net Pens**

Owner	Size	Percent of Facilities Showing Revenue Test Impacts (Option 1)			
		1%	3%	5%	10%
Recirculating	4	0%	0%	0%	0%
Striped Bass	6	0%	0%	0%	0%
Recirculating	4	75%	0%	0%	0%
Tilapia	5	0%	0%	0%	0%
	6	0%	0%	0%	0%
Net Pens	5	0%	0%	0%	0%
Salmon	6	17%	0%	0%	0%

Based on the results of the revenue tests shown above it was determined that flow-through systems below National Model 4 would incur significant financial impacts under even the least stringent option (Option 1) considered. EPA did not identify any facilities below the National 4 production level for recirculating systems and net pens. Model Facility 4 represented a range of annual production values that varied according to the individual species being considered.

**Table 5
Production Ranges for Model Facility 4 by Species**

Species	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production
Trout Foodsize	94,339.62	192,147.17	471,697.17
Trout Stockers	43,668.12	88,941.48	218,340.17
Tilapia Foodsize	58,823.53	120,876.47	294,117.96
Hybrid Striped Bass Foodsize	40,983.61	84,217.21	204,917.62
Salmon Foodsize	50,000.00	102,745.00	249,999.50

As shown by Table 5, the lower bound of the annual production for each of the Model 4 facilities ranges from 41,000 pounds for hybrid striped bass to 94,000 pounds for foodsize trout. Since flow-through systems producing foodsize trout showed the greatest impacts based on the revenue test, and given that these facilities represent the largest class of CAAP facilities in terms of the number regulated, EPA chose this basis to establish the production threshold for the ELG requirements. EPA is proposing to round the production threshold up to 100,000 pounds produced rather than the actual value calculated when revenues were converted to pounds based on the reported price per pound.

EPA believes this 100,000 pound production threshold represents a reasonable threshold above which all facilities in scope can comply with the proposed regulatory requirements. Facilities that produce less than 100,000 pounds annually of cold water species are not covered by the proposed ELG regulations based on the economic impacts that would result from the costs to comply, while facilities that produce less than 100,000 pounds annually of warm water species do not meet the definition of a CAAP facility and are thus not covered either.

EPA also proposes to establish tiered requirements for the flow-through subcategory, based on the estimated economic impacts associated with more stringent requirements (Option 2) for the National 4 size flow-through facilities. The results of the revenue tests shows that flow-through facilities in Model Size 4 would experience significant economic impacts if they were required to comply with Option 2 requirements while Model Size 5 and 6 would not experience impacts (see Tables 6 through 8 below). Therefore, EPA proposes to establish a threshold within the flow-through subcategory and establish less stringent requirements for flow-through facilities in Model Size 4. As shown above in Table 5, the Model 4 foodsize trout facility size ranges from 94,336 pounds to 471,700 pounds in annual production. EPA rounded these values to range from 100,000 to 475,000 pounds, and used this production range to represent medium sized flow-through facilities. Facilities that produce aquatic animals in flow-through systems and have an annual production greater than 475,000 pounds annually would have to comply with more stringent requirements based on Option 3 as described in the preamble, Economic and Environmental Impact Analysis and Technical Development Document.

Table 6
Flow-through Systems, Trout, Food Size Fish

Owner	Size	Percent Showing Revenue Test Impacts (Option 2)			
		1%	3%	5%	10%
Trout Commercial	4	100%	70%	70%	3%
	5	55%	11%	0%	0%
	6	20%	0%	0%	0%
Trout Federal	6	100%	50%	0%	0%
Trout State	4	100%	25%	25%	0%
	5	92%	51%	2%	0%
Trout Other	5	100%	0%	0%	0%

Table 7
Flow-through Systems, Food Size Fish Other Than Trout

Owner	Size	Percent Showing Revenue Test Impacts (Option 2)			
		1%	3%	5%	10%
Salmon Commercial	6	100%	0%	0%	0%
	6	100%	0%	0%	0%
Salmon Other	6	100%	0%	0%	0%
Striped Bass	4	100%	0%	0%	0%
Tilapia	4	100%	88%	50%	0%
	5	100%	0%	0%	0%
	6	0%	0%	0%	0%

Table 8
Flow-through Systems, Stockers

Owner	Size	Percent Showing Revenue Test Impacts (Option 2)			
		1%	3%	5%	10%
Trout Commercial	4	100%	49%	7%	0%
Trout Federal	4	100%	54%	10%	0%
Trout State	4	100%	27%	2%	0%
Trout Other	4	100%	0%	0%	0%

**Table Appendix 1
Catfish**

National Foodsize	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production (pounds)
1	1,000.00	1,351.35	6,893.00	9,314.86	24,999.00	33,782.43
2	25,000.00	33,783.78	34,968.00	47,254.05	49,999.00	67,566.22
3	50,000.00	67,567.57	71,676.00	96,859.46	99,999.00	135,133.78
4	100,000.00	135,135.14	222,538.00	300,727.03	499,999.00	675,674.32
5	500,000.00	675,675.68	695,276.00	939,562.16	999,999.00	1,351,350.00
6	1,000,000.00	1,351,351.35	2,606,890.00	3,522,824.32		
Broodsize						
National Broodsize	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production (pounds)
1	1,000.00	1,000.00	6,893.00	6,893.00	24,999.00	27,471.43
2	25,000.00	27,472.53	34,968.00	38,426.37	49,999.00	54,943.96
3	50,000.00	54,945.05	71,676.00	78,764.84	99,999.00	109,889.01
4	100,000.00	109,890.11	222,538.00	244,547.25	499,999.00	549,449.45
5	500,000.00	549,450.55	695,276.00	764,039.56	999,999.00	1,098,900.00
6	1,000,000.00	1,098,901.10	2,606,890.00	2,864,714.29		
Stockers						
National Stockers	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production (pounds)
1	1,000.00	1,000.00	6,893.00	6,893.00	24,999.00	24,270.87
2	25,000.00	24,271.84	34,968.00	33,949.51	49,999.00	48,542.72
3	50,000.00	48,543.69	71,676.00	69,588.35	99,999.00	97,086.41
4	100,000.00	97,087.38	222,538.00	216,056.31	499,999.00	485,435.92
5	500,000.00	485,436.89	695,276.00	675,025.24	999,999.00	970,872.82
6	1,000,000.00	970,873.79	2,606,890.00	2,530,961.17		
Fry/Fingerlings						
National Fry/Fingerlings	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production (pounds)
1	1,000.00	1,000.00	6,893.00	6,893.00	24,999.00	15,059.64
2	25,000.00	15,060.24	34,968.00	21,065.06	49,999.00	30,119.88
3	50,000.00	30,120.48	71,676.00	43,178.31	99,999.00	60,240.36
4	100,000.00	60,240.96	222,538.00	134,059.04	499,999.00	301,204.22
5	500,000.00	301,204.82	695,276.00	418,840.96	999,999.00	602,409.04
6	1,000,000.00	602,409.64	2,606,890.00	1,570,415.66		

1998 per Farm Production (\$) numbers are from 1998 Census of Aquaculture, Table 2., p 4. These numbers were then divided by Average per pound (dollars) in Table 8., pp 18-22. Foodsize were divided by (.74); Broodsize by (.91); Stockers by (1.03); Fingerlings by (1.66).

**Table Appendix-2
Trout**

National Foodsize	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production (pounds)
1	1,000.00	943.40	8,027.00	7,572.64	24,999.00	23,583.96
2	25,000.00	23,584.91	35,707.00	33,685.85	49,999.00	47,168.87
3	50,000.00	47,169.81	73,918.00	69,733.96	99,999.00	94,338.68
4	100,000.00	94,339.62	203,676.00	192,147.17	499,999.00	471,697.17
5	500,000.00	471,698.11	751,456.00	708,920.75	999,999.00	943,395.28
6	1,000,000.00	943,396.23	3,732,614.00	3,521,333.96		
				6		
Stockers	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production (pounds)	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production (pounds)
1	1,000.00	1,000.00	8,027.00	8,027.00	24,999.00	10,916.59
2	25,000.00	10,917.03	35,707.00	15,592.58	49,999.00	21,833.62
3	50,000.00	21,834.06	73,918.00	32,278.60	99,999.00	43,667.69
4	100,000.00	43,668.12	203,676.00	88,941.48	499,999.00	218,340.17
5	500,000.00	218,340.61	751,456.00	328,146.72	999,999.00	436,680.79
6	1,000,000.00	436,681.22	3,732,614.00	1,629,962.45		
				5		

1998 per Farm Production (\$) numbers are from 1998 Census of Aquaculture, Table 2., p 4. These numbers were then divided by Average per pound (dollars) in Table 9., pp 23-25. Foodsize were divided by (1.06); Stockers by (2.29).

**Table Appendix-3
Tilapia**

National Foodsize	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production
1	1,000.00	588.24	6,106.00	3,591.76	24,999.00	14,705.29
2	25,000.00	14,705.88	34,013.00	20,007.65	49,999.00	29,411.18
3	50,000.00	29,411.76	67,576.00	39,750.59	99,999.00	58,822.94
4	100,000.00	58,823.53	205,490.00	120,876.47	499,999.00	294,117.06
5	500,000.00	294,117.65	719,808.00	423,416.47	999,999.00	588,234.71
6	1,000,000.00	588,235.29	3,509,109.00	2,064,181.76		

1998 per Farm Production (\$) numbers are from 1998 Census of Aquaculture, Table 2., p 4 (Food fish other than catfish and trout). These numbers were then divided by Average per pound (dollars) in Table 12., p 41. Foodsize were divided by (1.70).

**Table Appendix-4
Shrimp**

Foodsize	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production
1	1,000.00	362.32	8,166.00	2,958.70	24,999.00	9,057.61
2	25,000.00	9,057.97	33,980.00	12,311.59	49,999.00	18,115.58
3	50,000.00	18,115.94	65,593.00	23,765.58	99,999.00	36,231.52
4	100,000.00	36,231.88	186,995.00	67,751.81	499,999.00	181,159.06
5	500,000.00	181,159.42	766,667.00	277,777.90	999,999.00	362,318.48
6	1,000,000.00	362,318.84	2,463,833.00	892,693.12		

1998 per Farm Production (\$) numbers are from 1998 Census of Aquaculture, Table 2., p 4 (Crustaceans). These numbers were then divided by Average per pound (dollars) in Table 17., p 57. Foodsize were divided by (2.76).

**Table Appendix-5
Hybrid Striped Bass**

National Foodsize	Lower Bound 1998 per Farm Production (\$)	Lower Bound 1998 per Farm Production	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production
1	1,000.00	409.84	6,106.00	2,502.46	24,999.00	10,245.49
2	25,000.00	10,245.90	34,013.00	13,939.75	49,999.00	20,491.39
3	50,000.00	20,491.80	67,576.00	27,695.08	99,999.00	40,983.20
4	100,000.00	40,983.61	205,490.00	84,217.21	499,999.00	204,917.62
5	500,000.00	204,918.03	719,808.00	295,003.28	999,999.00	409,835.66
6	1,000,000.00	409,836.07	3,509,109.00	1,438,159.43		

1998 per Farm Production (\$) numbers are from 1998 Census of Aquaculture, Table 2., p 4 (Food fish other than catfish and trout). These numbers were then divided by Average per pound (dollars) in Table 12., p 41. Foodsize were divided by (2.44).

**Table Appendix-6
Salmon**

Foodsize	Lower Bound 1998 per Farm	Lower Bound 1998 per Farm Production	Average 1998 per Farm Production (\$)	Average 1998 per Farm Production (Pounds)	Upper Bound 1998 per Farm Production (\$)	Upper Bound 1998 per Farm Production
1	1,000.00	500.00	6,106.00	3,053.00	24,999.00	12,499.50
2	25,000.00	12,500.00	34,013.00	17,006.50	49,999.00	24,999.50
3	50,000.00	25,000.00	67,576.00	33,788.00	99,999.00	49,999.50
4	100,000.00	50,000.00	205,490.00	102,745.00	499,999.00	249,999.50
5	500,000.00	250,000.00	719,808.00	359,904.00	999,999.00	499,999.50
6	1,000,000.00	500,000.00	3,509,109.00	1,754,554.50		

1998 per Farm Production (\$) numbers are from 1998 Census of Aquaculture, Table 2., p 4 (Food fish other than catfish and trout). These numbers were then divided by Average per pound (dollars) (2.00 as per John H.).