Proposed Weighted Multimetric Method for Determining Baywide American Shad Indicator
by Jim Cummins, ICPRB

1. Use major river systems and lumped minor systems, weighted by river size.

Watershed	Area/ Total Bay Area (66,388 sq. mi)	= Weight
Susquehanna	27,486 sq mi	= .41
Potomac	14,689 sq mi	= .22
James	10,432 sq mi	= .16
Other (lumped, with possible others?) 13,941 sq mi		= .21
Baywide		= 1.00

2. Use Multimetrics -   Returning Adults : use ByCatch, Gillnet CPUE, Passage counts, etc.
         YOY   : use Pushnet CPUE, MD SHSS CPUE, etc.
      Each of the three major systems have a subset of these.

3. Each metric is measured as a fraction (percent) of a selected goal.
      This would be an interim goal, such as a return to 1960s (?) era, determined by consensus.
      Researchers/managers in each river system would determine which metrics and associated goals are best,
      with peer concurrence. In situations where data does not go back to the target era, such as the Maryland
      Striped Bass Gill Net survey, professional judgement decisions will have to be made on target conditions
      (but who understands the conditions better than ourselves?).

4. The Baywide American Shad Index (a single number, a %) becomes the sum of weighted scores.

Example (all figures are hypothetical):

Potomac River: 3 components (metrics) make it's set of goals. In this case they are all weighted the same.

Metric		Metric Goal Status
A. Commercial Poundnet Bycatch	Goal is 5 yr $\bar{x}$ = 31.1 lbs/net/day	
(harvest & discards)	Current 5 yr $\bar{x}$ = 21.7,	
	So for this metric we are 21.7/31.1 = .70 towards meeting the goal.	.70
B. MD Gill Net Survey CPUE	Goal is 5 yr $\bar{x}$ of 4 shad/1000' sq. yd./NetHr	
	Current 5 yr $\bar{x}$ = 2.1,	
	So for this metric we are 2.1/4 = .53 towards meeting the goal.	.53
C. MD SHSS YOY CPUE	Goal is 5 yr $\bar{x}$ = 2 YOY/haul	
	Current 5 yr $\bar{x}$ = 5.4,	
	So for this metric we are 5.4/2 = 1.00 towards meeting the goal	
	(highest value is 1).	1.00
	Sum	2.23

Sum of river goal statuses/# of metrics = **River Index** (status of river), so... Potomac = 2.23/3 = **.74**

Do this for each river system, multiply by weighted watershed value, then sum these to get the Baywide Index.
 The Baywide goal for American shad would be to reach 100% of our goal for each (river) system.

Watershed	River Index	X Weight	= WRiver index
Susquehanna	**.43**	.41	.18
Potomac	**.74**	.22	.16
James	**.56**	.16	.09
Other (lumped or not?)	**.67**	.21	.14

Sum = .57 = Bay Shad Index.

So, in this hypothetical example, we are 57% of the way to the goal (i.e., interim goal = 1960s conditions).